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# Defining a Roadmap to a Digital Bond Market

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# A digital bond market — a landscape of disruption

*GlobalCapital* gathered together some of the leading players in the international debt capital markets for a private GC Live breakfast briefing dedicated to digitisation on September 25 in London.

The briefing examined the important issue of how new digital technologies, including distributed ledgers, can be introduced into the bond market. By gathering a group of high-level experts from issuers, investors, investment banks, market infrastructure providers and regulators, the event shed light on this crucial — but little understood and at times inaccessible — development of the bond market.

During the opening panel, representatives from investment banks, SSA issuers and digital platforms discussed whether digitisation is bringing genuine reform to the bond markets, the key navigation points on the roadmap for taking digitisation forward and whether the journey is fast enough. They also debated how market participants have responded to the ECB's July policy statement and, arguably the most important talking point: identifying the next steps to begin to form a genuine networked market infrastructure.

Below are the speakers and an edited transcript of the first panel discussion.

## Discussion participants



Moderator:  
**Toby Fildes**,  
managing director,  
*GlobalCapital*

**Tim Armbruster**,  
senior vice president,  
group treasurer, KfW

**David Durouchoux**,  
deputy chief  
executive officer,  
Societe Generale  
— Forge

**Domenico Nardelli**,  
treasurer, Asian  
Infrastructure  
Investment Bank

**Timo Reinschmidt**,  
chief commercial  
officer, Swiat

**Cyril Rousseau**,  
director general —  
finance, European  
Investment Bank

**Esther Wandel**,  
deputy director  
general, digital  
euro, Deutsche  
Bundesbank

**GlobalCapital:** Banks, exchanges and clearing houses are all interested in applying new digital technology including distributed ledger technology (DLT) to bond market processes. How far has this brought us to genuine reform of the bond market?

**Tim Armbruster, KfW:** We all know distributed ledger technology has been discussed for 10 or 15 years. I remember our first test transaction was in 2017 and then nothing happened for five years. Lots

of elements were missing. One thing was the legal framework, especially in Germany. This has totally changed — now we are talking about wholesale central bank digital currency (CBDC).

If we look at how we did business in the past until the 1970s and 1980s, it was like paper trades. It took two weeks to settle. Then it went electronic, T+2, but this was also for the last 30 years.

The big question is: what is the next technology evolution? There is a good argument for distributed technologies and what we need to

look at is how to scale it. It's not set that it is this technology, but I'm a big fan of it. What we have to do is tick those boxes and make clear — can we scale or not?

**Cyril Rousseau, EIB:** Based on our experience from testing this technology with six bond issuances already, we are seeing that from a technical point of view, everything works and is ready.

Now where are we in terms of transformation? Not that far at this stage because for that to turn into a

true approach with broader market adoption, two things are key.

The first one is managing the cash leg — I’m sure we are going to elaborate on that later. This is in the process of being solved and this is how you can have the promise of atomic settlement, which is crucial to deliver new value to investors and market participants. The second thing is to make sure that for investors, digital bonds are as good as existing bonds. Some progress needs to be made here.

**GlobalCapital: What about the Bundesbank?**

**Esther Wandel, Bundesbank:** When we as central bankers think about that question, we come at it not so much from the asset side, but rather from the other side of the equation: the settlement. We particularly look at the question of the market’s adoption of DLT from the perspective of how we can ensure we keep to our goal of keeping the settlement of large value payments in central bank money. We understand that the existence of this possibility is also a very important basis for the development of the market for digital assets. We are in a kind of a chicken-and-egg or a kind of circular situation: If central bank money is offered for settlement the market for DLT assets can develop.

**GlobalCapital: What about the AIIB as an issuer here?**

**Domenico Nardelli, AIIB:** The transition wants to happen in this space. But it’s proceeding at a pace that is a little bit slower than one would have expected a few years ago.

Tim mentioned their early trials in 2017. I remember in 2018



when the World Bank did their first blockchain-supported issuance. If you think about how, in the same amount of time, the progress on the cryptocurrency side has been mind-boggling compared to digital technology applied to issuance processes.

If you look at crypto companies, it’s in the news today [September 23] or yesterday that Tether, for example, is doing a funding round that will value the company at \$500bn. That’s a huge development.

In our space, I would agree that the technology seems to be there,

so clearly there must be some other components that are proceeding at a little bit slower pace and the whole thing is not coming together for some reason. I read a DZ Bank white paper on these themes — I liked it because it was short and easy to read. But it was very interesting. They proposed the creation of a smart bond contract.

So there is a need to agree what a digital security, a digital asset is and how it can be traded. So it’s not only about issuance; a few pieces need to come together.

**David Durouchoux, Societe Generale-Forge:** As a bank, what we want is to serve our clients better. We have significant operating costs, so the efficiency gains are very important. A way to serve them better is to be more efficient and for traditional activities to be less costly. In that matter blockchain can definitely help to leverage the digitalisation of capital markets and we have been engaging since 2019 with tokenised bonds and CBDC transactions like with the EIB, twice. That’s the first aspect.

We also need to develop and get new clients. That’s why Societe Generale-FORGE is regulated and

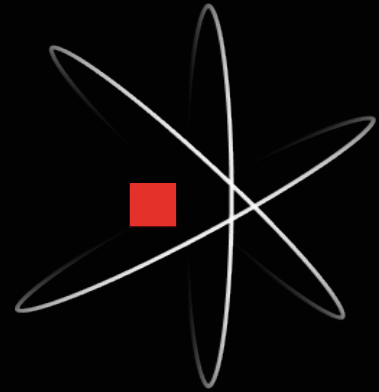


*“There are different points where technology makes sense but technology should support the human being, not more, not less”*

*Tim Armbruster, senior vice president, group treasurer, KfW*

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**GlobalCapital:** Tim, is KfW selling to crypto investors?

**Armbruster, KfW:** We don't invest in crypto, but we do invest in bonds which are issued on a DLT base. We are also an investor there. I want to take up one point which you made, Domenico. Just from a pure German angle, when you said it takes a while, I take a little bit of an opposite view. If I look at Germany, which introduced the Electronic Securities Act in the middle of 2021, before then it was not possible to dematerialise a note legally, so you had to bring your documentation to the vault in the central securities depository (CSD). You couldn't do any digitalisation.

If I look now, since 2021, at the legal framework, a very important foundation for public issuers like ourselves, and now the developments of the last three years, it's very positive. But it's also because we have different boxes ticked now and one important box is, of course, the cash on chain there. But what we also have to look at is that last year we had a sandbox for

the first time in the European system with the ECB. It was the first time we really could test assets and cash on chain, so the full front-to-end implementation of the technology there.

If you do clear P&L cases, then, of course, you also need the test environment. At the moment we have no testing environment so I hope we get one. But we now will have, of course, the introduction of wholesale CBDC at the end of Q3 2026. So there is something moving but we should also not overestimate when it makes sense to issue a bond.

We're still also on a learning journey from the perspective of interoperability, for example, or also from the perspective of contingency management. These are all things we have to test before we shift on scale. But this is something we still have to do our homework on. But it's clear, as you said, the fundamental of stablecoins is DLT and we're getting a huge push for the technology.

**GlobalCapital:** We're going to come on to collaboration in a moment which might pick up on your point, David. Since we first launched this event in March, the ECB has set out the roadmap for taking digitisation forward. I'm sure many of you will know about Pontes and Appia by now. But are these policies going the right way? Are they moving fast enough, Domenico? Maybe not according to what you said. And are the plans sensible? Can we start with the Bundesbank?

**Wandel, Bundesbank:** It might be helpful to share some insights on the fancy names of Pontes and Appia. What is actually behind them?

Indeed, there was an exploration phase by the European Central Bank which happened in 2024, which was both experiments and trials. It is always very important to keep in mind that this exercise already went beyond pure experiments.

Three solutions that three central banks in Europe developed were tested. That's always the way it works; we have the ECB but there's tight collaboration with the national central banks.

The Bundesbank provided one solution, the Trigger Solution. The exercise was about testing so-called interoperability solutions, which basically combined the DLT world with the cash leg of the traditional settlement systems.

It was of great interest to market players: there were 64 participants from nine countries. There were around 200 transactions, almost 60 use cases and around €1.6bn settled in central bank money. This was the largest effort so far by a central bank doing this kind of work.

We learned that, and this is something that Tim already mentioned, the market is exploring a huge amount of use cases in the trade but also in the post-trade area. It was very important for us to get confirmation of the appetite for settlement in central bank money. Therefore, the ECB decided to build on that momentum, and to speed up the process and really go even further: from trials to developing a real-world solution.

Pontes is a short-term offering which allows the settlement of DLT assets in central bank money. A pilot was announced for Q3 2026. Then there is a second track called Appia, which will basically look at a fully integrated ecosystem shaping the infrastructure of markets in the future. We want to move quickly with Pontes because we see the market needs and if — and that comes back to this chicken-and-egg situation — the central banks have no offering, this risks innovation not developing any further and that is something we cannot afford, particularly not in these times.

The second reason is that it is also crucial that central bank money is chosen to ensure financial stability and that no deviation effects move markets into other kinds of assets.

The second track, Appia, is the longer-term perspective where we will work gradually in a very cooperative way with the market. As



Tim mentioned already, we will ask ourselves what the right technology is for the future. This is why Appia wants to explore that question much more carefully, in cooperation with the market, to see what would really suit the needs at that point in time.

**GlobalCapital:** Cyril, were you nodding in a supportive way?

**Rousseau, EIB:** I'm nodding in a very supportive way because it's an extremely important and crucial development for the market. One of the bottlenecks was the lack of a cash leg and what the ECB has decided will remove this bottleneck, first with Pontes, then possibly with Appia. Now that the central bank is removing the main bottleneck for atomic settlement we should focus on the other bottlenecks.

We can also have confidence in the fact that the central bankers will deliver because there is urgency now and if the central banks don't move, market participants might use other currencies. So not only has the central bank decided but it has incentives to act.

And then we need collectively to look at other bottlenecks as well. One is interoperability, so here we need standards. There is still work to do on technical standards to achieve good interoperability and also market standards, ICMA standards like the Bond Data Taxonomy (BDT). There are also the other elements — and Tim mentioned them earlier — like ECB eligibility of digital assets.

**GlobalCapital:** Just picking up a little bit of what you were both saying there, how has the market response been since the July 1 policy statement? Beforehand it felt like there was a bit of hiatus while participants were waiting for the ECB statement. Have we seen since then a bursting of the digital dam, if you like, or are we still a bit slow to respond?

**Durouchoux, SG-FORGE:** We are completely favourable to CBDC and think we should enlarge the development of its use. We were the first to operate such transactions in 2019. We are very happy with the wholesale CBDC and convinced that we should go for it because this risk-free money is the anchor for financial stability.

Production-ready solutions like the Pontes and Appia projects are



clearly something in which we will engage. As a global bank we should serve all of our clients, not only the capital market, so we have to bridge with, for example, crypto clients, stablecoin clients and AM engaging with crypto as well.

We need to articulate a technological continuum between tokenised CB money and other types of private money distribution, stablecoin being one of them.

**Timo Reinschmidt, Swiat:** First of all, I must say the ECB trials have been a big success. Swiat was involved in transactions of more than €500m. We've done the Siemens bond and we've proved that settlement time can be reduced with the Bundesbank Trigger Solution and can reduce settlement time to intra-day. That was a big achievement. Ten parties in total were involved in the transaction — eight banks, several investors and the house bank for the payment. Everything settled within minutes.

In my view, CBDC is a good long-term goal. But what we need, and I think Pontes will give us the comfort, is a more longer-term solution in the interim that works well. Pontes, as I understand it, is an interoperability mechanism as well. We have proven it works very well in the Bundesbank trigger chain and other live transactions, not only experiments. Building up on the existing payment rails of banks will make it much easier for them to adopt much faster and then scale.

**Wandel, Bundesbank:** That's also the response we get. We hear that having this quick solution in terms of Pontes, which will deliver a Eurosystem DLT-based

solution which bridges market DLT platforms with our RTGS [real time gross settlement], the TARGET Services helps a lot. Pontes also gives us time and room to learn with a view to taking further steps.

**Nardelli, AIIB:** A couple of things to add. One is on the efficiency the technology is bringing about. Timo mentioned the potential to settle much faster or instantaneously as well. This is one of the things that we talked about and did a little bit of due diligence on during our own experiment with issuing a digital note.

The platform that we chose — we worked with Euroclear in that particular instance — did allow for T+0 settlement; that's a big change, a big improvement. However, as we spoke to investors, we also found out that many are not yet ready to entertain T+0 settlement, so we eventually settled for two days after trade. This may have to do with what Timo was talking about in terms of the rails for payment with the banks, we don't know completely. But that was one issue. So back to the point, the technology is there, it does allow for a lot of improvement.

The second observation I want to make goes back to the points that Esther was talking about in terms of the work the Bundesbank and ECB are carrying out. To your question, Toby, I don't know how successful it is, but I think bolting CBDC on to the processes for settlement of bonds is the right way to go, particularly if you look at it from a multilateral development bank perspective.

One of the CBDC's inherent features is that it has or permits the programmability of the currency. If you think about many of us MDBs,



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who work in complex jurisdictions and deal with multiple types of counterparts, ensuring that we know where the money that we are deploying is going and who is getting paid has so many benefits that are closely associated with technologies. So this is a big plus. It is also one of the reasons why many do object, but it is one of the reasons that will dictate the success of the experiment.

**Armbruster, KfW:** My dear friend said something very important: it's the aspect of learning. When we started our project in 2023 and we announced to the market in 2024, we clearly framed that KfW was learning, who wanted to join us? And we did the first syndicated transaction in Germany with wide market participation from rating agencies to regulatory administrations etc.

In-house learning is very important for us, so the compliance, operational, transaction management, legal perspective etc, but on the other side, you also have to give all market participants and investors the chance to learn, to see the benefits, have a vision for certain business cases and test certain business cases. I repeat, we are still there to test scalability. This is very important. We're still ticking boxes and more transactions will come because it's very efficient, if you look in combination with AI, if you program payments by using smart contracts, if you look also from a competitiveness environment.

But one thing is clear looking at KfW: we issue between €70bn-€90bn euro-equivalent bonds per annum. This is the fundamental cost of funding for promotional business. Of course, the new technology, if we scale it up, should have no disadvantages for us, because if it did from an economic point or an operational risk point, it would not be scalable for KfW and that's probably true for most market participants. We all share the same responsibility; we are all regulated in a certain format.

But we see a huge development out of the US in this technology. We have to be aware that we are, on a global scale here, in full competition also with regards to this technology. This is why we also have to be quick.

**Durouchoux, SG-FORGE:** Thank you for what you said because it



*“We need not only regulatory clarity to operate but reasonable scaling options as well which we can leverage to drive an investment trajectory”*

*David Durouchoux, deputy chief executive officer,  
Societe Generale — Forge*

will help my point. The CBDC experiment was very successful and drove a lot of expectation in the markets. But if we, to Tim's argument, don't have improved securities regulation we cannot move as banks. We need not only regulatory clarity to operate but reasonable scaling options as well which we can leverage to drive an investment trajectory.

That's why we are advocating to the ECB for the eligibility of security tokens y as collateral and to the EU Commission to lift the cap on the EU DLT Pilot regime which are detrimental to the initiatives in Europe aimed at boosting liquidity in the secondary market. For instance, at the moment you have a €6bn cap for the bond market on a single DLT platform — €6bn is 10% of EIB's issuance a year. It's not enough for making clear revenues balancing the investments needed to create such a platform.

The last point would be reviewing the impact in the EU of the Basel prudential rules which are limiting us doing our job as banks, especially within a tougher competitive context.

**GlobalCapital:** Here we come to what I think is one of the really big issues in this digital evolution. These experiments, which we can call them, remain isolated actions for the large part, though. Markets are, by definition, networks. So what is the next step to begin to form a genuine networked market infrastructure?

**Wandel, Bundesbank:** How can we develop an integrated network which forms the basis for the

financial markets of the future? This is obviously a different task than fulfilling immediate market needs.

This is what I said at the beginning: For us it's very important that we do not rush into pre-commitments regarding specific solutions in this space, that any way forward is really developed carefully together with the market. What are the exact features? What is the exact technology? I know that shared ledger or unified ledger are currently the buzzwords. This is certainly something to be looked at. But we want to approach this question in a technologically open, neutral way, to see what really works for the market and provide them with the right solutions. That is why Appia is there.

**Rousseau, EIB:** Obviously technological and actor fragmentation has been one of the issues in terms of capacity in scaling up this market. We have seen that when we have done our actual issues. It's very difficult to achieve the interoperability between different players who don't have the same things or strategies at stake. But it's only by doing so, achieving scale, that we can compete with existing products, which for issuers like us are all based on liquidity, which needs this interoperability.

So what we have seen with the ECB experiments is that all of a sudden you have a list of all of the people who were interested in it, you see all of them doing things and they are all part of the same push to develop the market.

In the short term, Pontes is providing something that will help develop this interoperability because here you already have a standard, you have solutions for the

cash leg and so this is an incentive for the other actors to do their own homework in terms of the interoperability that we need. Then at some point, whether it will be several platforms or a single ledger, we will see what the most efficient approach is.

**Reinschmidt, Swiat:** First of all, it's very important to point out we have seen more than experiments — . On the networks, yes, I do think we need consolidation in this space. What we are seeing currently is, on the one hand, the large public non-permissioned networks and on the other, multiple permission private networks. Almost every bank operates its own internal network, all in competition with the others. Then we have great initiatives like Global Layer One, but they are still at the white paper stage.

What we have done is kick off last year with an initiative called Regulated Layer One and are trying to bring market participants in Europe together. The idea is that we take the existing SWIAT network, which has transacted more than a billion [of] notional in various transactions— and carve this network out into an independent cooperative structure, like how Swift was founded many years ago, where banks can co-invest, can operate, control this network because we think Europe needs a private-led initiative like this. As Tim has said, we need to be fast because otherwise we will just be joining a US network in a couple of years.

**Nardelli, AIIB:** From my side, I agree with Esther on this one. The platform that will end up prevailing or becoming predominant cannot

be pushed from above. Certain things have to work, particularly for investors. If you are an investor, you are not going to go to a platform or adopt a certain technology just because you like it. You are going to go where the liquidity is.

This is a very important aspect, to favour the ability for all the platforms to have a bridge to communicate with one another and have more investor participation, which is what we looked for in our case. For example, the digital note that we issued could be settled through Euroclear, in Hong Kong through the central money market unit and in Switzerland. We thought this was good because it was going to attract more investors and eventually there would be a perception of more liquidity there.

**GlobalCapital:** Tim, are you seeing genuine market appetite to collaborate on infrastructure?

**Armbruster, KfW:** Yes, there is and there will be much more pressure because in the background, everybody's idea, of course, is to scale. Fragmentation reduces scalability by nature and also reduces the business cases, so there will be a point, though I don't think it's bad that we have a competitive environment at the moment because competition is something that we like. We like to have a lot of competition because that normally brings the best out of technology, the best user journey and also the best costs for market participants. If I do a transaction, over 40 banks are in competition regularly, so we like that very much.

But of course, the big question for us is then: Can we scale the

technology because this is the last or final question about whether we use it or not. Of course, the networks have to be discussing that also, but I think very important is more what Esther said about the interoperability between those networks — I always call this different “autobahns” or different highways. If you can go from one highway to another and you have no problem with doing that, then it works. Then we have larger networks because those are from different providers. But this is something we have to test.

**GlobalCapital:** Already in primary markets, digital solutions are available for some activities. But market participants still prefer personal interaction, so is there a limit to how far digitalisation can go?

**Armbruster, KfW:** There are different points where technology makes sense but technology should support the human being, not more, not less. Areas like leadership, inspiring people, giving feedback — I hope we never come to a position where AI is doing that.

We also have to be careful that we do not shift responsibilities somewhere where we are not responsible anymore. This is something that we also have to keep in mind.

But also very important is, if I just look at an employer's attractiveness, which is also very important for KfW, you have to work with this technology because the next generation wants to have this as a standard tool for their workplace. So, you also have to think about how you integrate this technology from an employer's attractiveness standpoint.









**GlobalCapital:** So for KfW to attract the best new graduates. Domenico, how about you?

**Nardelli, AIIB:** I don't think digital technology is going to displace a personal relationship. If I look at the time that anyone in my team like portfolio managers who trade bonds spend talking to a counterpart before or after they have executed a trade, for things that are around the transaction, but not the transaction itself, meaning how to book the trade or maybe there is a problem because the counterpart has changed SSI codes and we were not aware in the









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*“If when Pontes arrives everyone is still fragmented, we might not have a massive impact and then there might be disappointment”*

*Cyril Rousseau, director general — finance, European Investment Bank*

middle office. So you have to chase people. That probably is going to be taken over or resolved by technology.

Where you would like your people to spend time talking to the person physically, to a counterpart, is on which bonds actually you have to buy, why you have to buy that particular security or sell it at that point in time, or more quality interaction. People will have more time for more quality interaction with counterparts rather than just fixing the execution aspects of trades.

**Rousseau, EIB:** You mentioned the market and why it hasn't moved to full digitalisation. Right now, it's a process of price discovery. You want investor feedback and this feedback is linked to relationships, so it makes sense that it does not move to being fully automatic right now.

That being said, I'm not sure this is something that cannot change. It's a little like art auctions. Right now, you can do them in a fully automated way, but in some cases you still have to have someone in the room managing them. Market standards, market practices and market customs change over time. Right now, to do price discovery we still need some human interaction.

What is going to happen in the future if all investors are fully automated and only use micro transactions with atomic settlement? It might be a very different price discovery mechanism that would not need to rely on personal interaction anymore. A question of time and speed. Digitalisation is a trend. Where and when does it stop? This is something that is a really open question.

**Wandel, Bundesbank:** As you know, a lot of work was done in the

past around capital markets union or as it is called now, savings and investment union. There is now a real and new chance for technology to drive more integration of the European market.

Europe has done a lot of work on removing regulatory barriers and improving the regulation around DLT. But what is happening at the moment in the Eurosystem is really a big chance to move things with technology, not by regulation.

**Durouchoux, SG-FORGE:** The digitalisation of finance is clearly a trend. We have seen an acceleration in both tokenised securities and crypto becoming mainstream in Europe from 2020 to 2024, and, until the US presidential election last year, we had one to two years' advantage and were leading the game, especially with the EU pushing versatile regulation.

Since the new US administration came in, things have been accelerating very fast, and not only on the Trump coin and similar products which are, by the way, a good communication tool to focus attention but are the visible part of the iceberg.

We saw the biggest part of it in June 2025 when the US crypto workgroup [the President's Working Group on Digital Asset Markets] issued a 170-page report, which is a well-structured approach to the global digitisation of markets, not only on crypto. Now they have a clear and public roadmap, which is similar to the EU's really ambitious and 'American-style' on the digitalisation of all assets, transversally. If we in Europe don't play at par by increasing our level of

ambition, we could be pushed from the outside into doing it another way and that would not be the best case for us.

**GlobalCapital:** We have time for a question or two.

**Audience question — Armin Peter, ICMA:** We all agree it's actually a journey, which for some is going too fast, for others too slow. Finding the right balance between efficiency, resilience and competitiveness is particularly difficult as we just highlighted. The question is often about doing too many things at once. But what is the one thing that everyone should focus on?

**Wandel, Bundesbank:** We need to make sure that the market is prepared for Pontes. This is one thing we should be focusing on now: Having the market prepared for the Pontes project.

**Rousseau, EIB:** I would second that. But we also need to work on the other bottlenecks in parallel — consolidation, interoperability, connecting to platforms. If, when Pontes arrives, everyone is still fragmented, we might not have a massive impact and then there might be disappointment.

**Armbruster, KfW:** We have the asset on chain, we get the cash on chain, we've got the first networks. For me, what is really missing is the *pari-passu* with regards to ECB eligibility. Without that we will be at a disadvantage and will be more expensive because every investor will increase the premium which will mean on the other side, for us as a benchmark issuer, it doesn't make sense. This is really the point and the foundation for that is what Cyril said — interoperability.

**GlobalCapital:** Armin, what would be the one thing that we all need to focus on?

**Peter, ICMA:** It's data harmonisation in the first place because if we don't speak the same language, then frankly we're never going to have interoperability. You have to label data, even at a time of AI. AI only works if you label the data right. Otherwise we're never going to have interoperability. So data harmonisation is what I would say. GC

# Solving the technical jigsaw puzzle – big bang or gently does it?

Enthusiasts for distributed ledger technology are convinced it can bring efficiency and cost savings to the bond market. But in this GC Live discussion, experts argued DLT can also respond to new needs, with better services and new financial instruments — for example, to reduce risk.

The Eurosystem's Trials in 2024 proved financial transactions can be settled on distributed ledgers using central bank money. The eurozone's monetary authorities are determined to have a central bank digital currency available to use by the end of 2026.

But that is just one part of the infrastructure needed to construct a viable bond market on DLT.

There will be no big bang or 'ChatGPT moment', participants said — instead, financial players and regulators need to patiently and persistently work towards a truly interoperable market that begins to save people time instead of consuming it.

And that could mean focusing less on building platforms and more on agreeing standards, which would then be freely available for the market to use to create applications.

## Discussion participants



**Adeline Bachelier**, deputy director of innovation and financial market infrastructures, Banque de France

**Gabriel Callsen**, senior director, fintech and digitalisation, International Capital Market Association

Moderator:  
**Jon Hay**, corporates, markets and sustainability editor, *GlobalCapital*

**Peter Kohl-Landgraf**, digital transformation manager, capital markets, DZ Bank

**José Manuel Marqués**, director, financial innovation and market infrastructures department, Banco de España

**Peter Pears**, capital markets partner, Mayer Brown

**Ankur Prakash**, head, digital and strategic initiatives, global banking, Standard Chartered

*GlobalCapital*: Thank you for joining us for the third discussion, where we're going to be tackling the very difficult issue of solving the technical jigsaw puzzle, which I think people have been talking around all morning, but in a way this is perhaps the heart of it. And the subtitle is 'big bang or gently does it?' So we'll be talking about whether we can make progress incrementally or

there'll need to be a much more coordinated and possibly top-down approach.

To start us off, we're going to address perhaps the primary question. The promise of digital capital markets is innovation and efficiency, and we've heard an awful lot about efficiency today. But we've also heard a lot about the complexity and the difficulties. We need to ask:

are new technologies actually more efficient or is it merely that they're able to cut costs because we can cut through some of the inefficiencies that exist now, because it's an opportunity to reset and redefine market relationships?

**Adeline Bachelier, Banque de France**: The promise of new technologies extends to a wide range



*“I think there are going to be different solutions — a preference for wholesale CBDC in Europe and other regions. Stablecoins perhaps in the US — and there will need to be interoperability”*

*Gabriel Callsen, ICMA*

of areas in finance. We are looking at the entire chain, rather than just a part of it. So we are looking at trades but also post-trade activities. So it's complex but it could be very powerful.

On one hand, the rationale for using new technologies is to improve the functioning of financial markets as they exist today, but on the other hand it's a way to respond to new needs.

For instance, we can improve environmental, social and governance performance, as distributed ledger technology could allow full transparency on long-term investments and thus to target investments in compliance with ESG criteria. It could also be helpful for regulators to have direct access to information.

Another example is businesses and individuals like complete control of their accounts and cash flow without having to constantly call their banks. And it could be useful in particular for businesses with cross-border transactions to move funds around without calling their banks all the time.

**GlobalCapital:** Gabriel, is the market we have now full of inefficiency that needs this cure?

**Gabriel Callsen, ICMA:** It's all relative. Things can always be improved, and whether it's more efficient or cutting costs to me seems to be the same side of the coin. Ultimately I think it's about providing better services.

If you look at the adoption of new technologies in different market segments, the repo market in

particular gives us a glimpse of what is possible. DLT and blockchain is business as usual. It is used to provide intra-day funding.

It's been a focus for us. We published the digital assets annex to the global master repurchase agreement last year to cater to this demand.

If we then look at the evolution in digital bond issuance, some of the processes are T+1 in most cases, T+0 if there's a demand. There's an opportunity to provide a different funding service depending on needs. Traditional bond issuance will continue but there will be funding opportunities on a different timescale, perhaps with different pricing incentives for different parties. Certainly I think there is room for innovation.

**Peter Kohl-Landgraf, DZ Bank:**

To start from a rather personal background, I have software development expertise, I started as a quantitative analyst to value and build risk metrics for structured interest rates and exotic derivatives. It was a very interesting thing to see that we can programme everything we want around a derivative and build its risk metrics.

And then I found out that this technology, DLT, enables building a synthesis between a financial instrument and software.

So in the future, instruments will come fully as software. And the interesting point about DLT is — what we all know since the emergence of bitcoin — coordination is managed by a protocol by a cryptographic algorithm, without the need of an intermediary.

So this is where the potential lies. Not to just digitalise financial instruments as they are but to rethink them, rethink associated workflows and ideally to come up with added value beyond efficiency — being digital and faster, for example.

We will work on this very closely. We started not in the primary market with that topic, we started on the derivative side, to ask ourselves ‘how can we redesign a financial derivative to remove all the frictions that are associated with it?’ And yes, you can surely use and programme a smart contract which can act as a digital escrow to get rid of counterparty credit risk.

And then I step beyond efficiency, I go towards where real value gets added. The real value-added lies in new financial instruments which provide new features like risk reduction. And also provide an interaction with your clients and market partners on a peer-to-peer basis.

**José Manuel Marqués, Banco de España:** I will try to give you a more central bank point of view. Basically there are a lot of efficiencies coming from this transparency, this improvement in the post-trade and in the reconciliation process. The potential of smart contracts and programmability makes it easier not only to automate the whole process but also to be more 24/7 and there are many opportunities in the space of cross-border, for example.

What we are doing in the central bank community is to test all this through experimentation. One of the discussions is: ‘OK, all these benefits are real and should be fostered, but there are some important questions on the basics, on the financial market infrastructure — about the role of settlement.’

There are three alternatives to achieve this. One is central bank money, that's the traditional one, and this is what we are doing with Pontes and Appia, to preserve the role of central bank money.

At the same time, there are other alternative opportunities that could be considered, like stablecoins or tokenised deposits.

Stablecoins from our perspective have more complications in terms of stability and tokenised deposits maybe have more difficulties in terms of management and fragmentation of the liquidity.

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There are clear advantages that we should promote and clear principles we should think about and preserve, in order to have all the benefits. At the same time, we must maintain the level of stability and trust in the system that we have now, based on central bank money.

**GlobalCapital:** Peter, is it making your life more efficient already or more difficult?

**Peter Pears, Mayer Brown:** Digital bond projects are some of the most interesting things we work on at the moment but interesting things doesn't naturally equal efficient.

The system we have currently runs on rails, so we don't have difficult questions about is the debt enforceable? How do we transfer debt? What's the tax treatment? Where's the register?

These are the type of things we know under the current system. We deliver opinions on them but those opinions are delivered in standard fashion.

When we have digital bond projects presented to us, sometimes we have to re-analyse those, sometimes across a range of different jurisdictions. A lot of work has gone into that by lots of law firms, banks, market participants and industry bodies, and we are a long way through that process.

But I think if you said to me 'Is the legal spend or the legal thought that goes into a digital bond at the moment less than goes into a conventional bond?' then the answer is no.

**GlobalCapital:** Ankur, you have worked on a few deals. Do

you see that shining light of efficiency ahead of us? How far out of reach is it?

**Ankur Prakash, Standard Chartered:** I concur with every comment the other participants have made. I don't think there is a lightbulb moment for digital bonds in the same way as some people talk about the ChatGPT moment. I don't think that ChatGPT-type moment has arrived for digital bonds.

Nor do I think it is going to happen in a lightbulb-type moment. It will be a series of incremental steps and each of those steps will lead to some problem solving or an improvement over the current process.

The panel title is very appropriate — jigsaw puzzle. There are many pieces of this puzzle — the cash leg, settlement, adoption by investors, regulatory clarity, adoption by the other players in the value chain.

Each of these pieces is a crucial element. These experiments that we have been part of have incrementally added to some part of solving that jigsaw puzzle. But I don't think in the immediate future it is game-changing.

**GlobalCapital:** So we're still sitting on the sitting room floor with all the pieces laid out in front of us.

**Adeline, obviously there's enormous variety and innovation going on, creativity, with umpteen market participants devising different solutions. To make progress we need to evaluate them and have a process for working out which are going to be effective, which are the best ones.**

The European Central Bank and the Eurosystem last year carried out its Trials to conduct 60-odd different use cases. And you've published a report evaluating that.

What were the main things you felt were learnt from that process, and going forward, who is going to take the role of the Eurosystem in evaluating all the trials and experiments?

**Bachelier, Banque de France:**

Last year we conducted lots of experiments and trials, with real transactions and more than 60 participants. We tested three solutions to settle in central bank money, as financial transactions recorded on DLTs. These solutions were provided by Banque de France, Bundesbank and Banca d'Italia.

And in particular with the Banque de France solution, we tested the issuance of tokens of central bank money directly on DLTs, so CBDC.

And with our colleagues from Banca d'Italia and the Bundesbank we tested the settlement of central bank money directly in our current centralised payment system — T2, our real time gross settlement system, and TIPS, our fast payments system.

And we tested this settlement with various sectors — of course with credit institutions but also fintechs and other financial intermediaries such as central securities depositories.

And we also tested it on various market segments, as we did a few years ago at the Banque de France. And we tested it with different DLT technologies, public and private blockchains.

First of all, we can say it works. We can issue central bank money on DLTs, we can settle financial transactions on DLTs, so now the question is what could be the added value? So I think we need to further analyse the entire chain as we are used to focus on T2S for instance so on the end of the chain, of the securities chain.

And it showed us that we could reduce costs in particular and improve transparency. I think that it may be useful first for market segments which do not benefit yet from delivery versus payment, and lots of them are still manual.

And it's also important to focus on the settlement asset. Of course as public authorities we work on



*"I would deeply recommend starting to think about products and new workflows and just put the infrastructure debate on the second level"*

**Peter Kohl-Landgraf, DZ Bank**

our central bank money, on our settlement asset and it will be important even in the tokenisation realm to maintain central bank money for financial stability and monetary stability. But commercial bank money and settlement assets, private settlement assets are also useful for institutions which do not have access to central bank money.

So we have to work on it but we think that it could be very powerful for cross-border payments and transactions.

**GlobalCapital:** We were talking about Pontes and Appia. Will the Pontes system be most similar to the Bundesbank Trigger system, out of those three?

**Bachelier, Banque de France:**

No. Pontes is a short-term solution. We think that now we observe I could say a proof of concept fatigue, so it's important now to go into production and by the end of next year, we will have central bank money, CBDCs on DLT.

It will be a short-term solution, meaning that we combine the best of the three solutions we tested last year, and so the solution will be provided by Banco de España, the Bundesbank, Banca d'Italia and Banque de France.

We will use a link with the market, which Banca d'Italia tested, we will use a Eurosystem DLT, DL3S, which Banque de France developed, and our colleagues from the Bundesbank will work on the link between T2 and DLTs. So it will be a fourth solution.

**Marqués, Banco de España:** We continue with the experimentation that is already taking place, we continue to have lessons. But at the same time we recognise that we need to provide some sort of solutions to connect with T2S.

As Adeline was explaining, we will try to have some pilot in the third quarter of next year to have this connection in production, combining the best from the lessons that we already have. And we'll work to have in 2028 or something like that a solution completely integrated in the Target Services with all the framework.

Basically now we have to connect without any kind of adjustment in the Target Services, but to have this kind of connection to provide a solution already to the market as soon as possible.



*"If you step away from digital markets, it's ... industry level collaboration that helps solve the bigger picture problems"*

*Peter Pears, Mayer Brown*

We will continue working on this one in order to fully integrate the solution in the Target Services. That will take more time — you need more adjustment, including the contracts, agreements and so on. We need more time to do that in order to have this already in place in a couple of years.

**Bachelier, Banque de France:**

It's important to say that the new solution will be in place by the end of next year, 2026. We can also continue the experiments and trials we had last year, the channel is not closed.

And for Appia it will be longer, yes, because we have to work on our response as a public authority, on our response to the public objective, for instance Capital Market Union, so Savings and Investment Union now. With Appia, the idea is to integrate the ecosystems in Europe and so we have to look at the entire chain of securities, not only the settlement. So we have to embark on all the ecosystems.

**Kohl-Landgraf, DZ Bank:** From a technical viewpoint, the Trials were pretty nice, right? Within the Trials the participants in the Eurosystem settled €1.6bn on chain last year, operated by smart contracts; this is what the technology provides.

But now — taking this picture of the jigsaw pieces lying around — maybe we end up in 2026 in the eurozone by having Pontes being provided to the market in a standardised way by the Eurosystem.

But I would ask the industry: where are the standards on the industry side, on the asset side? They are not much.

We're still on this platform narrative — selling platforms. But actually, we need to have protocol standards.

I think ICMA has taken a good approach on standardising bond data in a digital format [through the Bond Data Taxonomy]. But now we need to enrich these data standards with protocols.

What do I mean by protocols? It's all about how we interact against an asset chain, against several chains, against smart contracts. These things need to be standardised.

So from my perspective this still seems a difficult task. At every conference we talk about standardisation; yes, standardisation is key. But who is taking the approach?

I would like to give you a little example. Look at the AI space. What did Google do this year? They pushed an open proposal for an agent-to-agent interaction protocol — they pushed it open on a GitHub repository, everyone can look at it.

They assembled 50 participants across the world and even Microsoft joined, because every competitor has an interest in using such base modules. In our industry that would be for example a protocol standard for delivery versus payment. Then one can build business upon that.

So in the financial industry it would be good to have this cash solution standardised but we also need solutions for things like having data feeds on chain and processing a primary market issue on chain. And I think there should be an interest in the entire industry to assemble standard modules.



*“We must maintain the level of stability and trust in the system that we have now, based on central bank money”*

*José Manuel Marques, Banco de España*

**GlobalCapital:** Peter and Ankur, based on your interactions with the market, do you see this sort of coalescence or co-operative initiative appearing?

**Prakash, Standard Chartered:** We see a number of examples. Our industry is very competitive. But in this space, people are definitely more willing to share and collaborate.

Everyone realises that unless we share where we have benefited and where we have failed, it will take longer as an industry to progress.

It’s going to be a collective effort and too big a problem for any one organisation to solve. ICMA certainly is leading many of the collaborative initiatives, but also central banks... there are government-led initiatives, inter-bank initiatives, between legal firms, fintechs and ecosystem players. So definitely I see a lot of collaboration.

**Pears, Mayer Brown:** I totally agree with that. I think some of the best publications to read in the market are not only industry publications but collaboration of industry initiative publications.

If you step away from digital markets, it’s that kind of industry level collaboration that helps solve the bigger picture problems.

Someone on one of the previous panels mentioned the reaction to Libor. Of course there was a lot of industry collaboration when we were dealing with Libor, and similarly with other challenges. So it’s surely the future.

**GlobalCapital:** Gabriel, should ICMA be the channel for

achieving this harmonisation and standardisation Peter was talking about?

**Callsen, ICMA:** Certainly. It’s all about collaboration, the ICMA Bond Data Taxonomy being one example of a technical approach to enhancing connectivity and promoting interoperability.

The idea is to have a common language based on a bond term sheet, and provide this not only in a PDF, which is perhaps a bit old-fashioned, but in a machine-readable format to be embedded. It’s been used by a number of market participants already — Hong Kong last year in its digital green bond issue. The World Bank announced last month that they had implemented an AI model using the Bond Data Taxonomy to enhance liquidity management in the traditional fixed income business.

And there are other initiatives under way. We heard earlier from other panellists and Peter also alluded to this, working on bridging the gap between traditional securities and DLT-based securities.

Ultimately all securities have similar features. We have harmonised these through the Bond Data Taxonomy to be used as a common language and continue to engage with a range of market participants, working closely with market infrastructures, so there’s more to come in the future.

But also with issuers, investors, agents and the entire value chain, because ultimately, there are many different parts and if we take a step away from tokenisation

— tokenisation being a sub-topic of digitisation — it is important to connect the dots, whether it is just continuous digitisation or whether it’s for a DLT project.

**GlobalCapital:** Obviously at the moment the market already uses systems like Euroclear and Clearstream for settlement, clearing and so on. When securities go into those, they obviously have digital form and they are kept in databases. The data gets standardised at that point. Are you talking about bringing the standardisation out concentrically to an earlier stage in the generation of a bond? It’s not actually that more will be standardised, it’s simply that the process happens earlier?

**Callsen, ICMA:** Absolutely. The idea is for it to be end-to-end, because there are different levels of standardisation if you will, at different points of the lifecycle. But the idea is for it to be end-to-end from the point of when the security is created, that is pre-bookbuilding or pre-pricing, all the way to pricing, settlement, distribution and so on.

**GlobalCapital:** Peter, does that sound encouraging to you?

**Kohl-Landgraf, DZ Bank:** It does definitely. If you look at this narrative of standardisation again, what does it mean from a software development perspective?

For securities issued in the primary market, I can go through step by step and ask ‘What is the input? What is the next step? What is the transition?’

This is the most crucial point. It’s not about the standard in the end, which is there — it’s rather how can we standardise processes and redesign them, from a very functional viewpoint.

This is how smart contracts are designed and how full functional workflows are designed.

This is what we at DZ Bank are exactly doing, building internally across inter-disciplinary teams to explain to lawyers and back office people how this technology works and then going through their processes and asking: ‘What can we do better by functionalising them?’ I think this works out quite well.

**Marqués, Banco de España:** I have one additional view on this discussion about standardisation and cooperation. From a technical point of view I completely agree with what you say that this is necessary but there is also another angle, related to the geopolitical context and the willingness to have this cooperation. I think that here we have good news because in the retail space, we have less coincidence between both sides of the Atlantic. I think the US has a clear view that is completely different to Europe or UK.

But in the wholesale markets, I think that the context is radically different. There is a lot of interest in cooperating and in coordinating. We have several projects from the Bank for International Settlements, like Agora where you have jointly central banks of US, central bank of UK, the IIF, most participants from several parts of the world.

You have very recent papers published by the Bank for International Settlements where they clearly make an overview of what are the main challenges in developing financial market infrastructures that are adapted to DLT and this has been signed by the Federal Reserve, by the European Central Bank, by the Bank of Japan, Swiss National Bank, UK, basically everyone.

There is a clear willingness on the political side to cooperate and I think it should be relatively easier from the political side to have this kind of coordination.

**GlobalCapital:** One of the big questions everybody has been talking about this morning is repo eligibility for DLT bonds in the Eurosystem. There is clearly a block. Even if all the technology can work well, if you can't take covered bonds or highly rated SSA bonds that are digital instruments to the European Central Bank and repo them in exactly the same way as you can a normal bond, why would KfW or the EIB issue €5bn of them? Can you give us any sense of how that process to accommodate that is coming on?

**Bachelier, Banque de France:** I don't know if the CBDC is the starting point for that, but we are working on it. Of course we cannot announce now that it will be into



production next year. But we have already integrated this issue in our analysis and we want to test it. It's an ongoing work.

But we have to analyse very carefully the impact on the transmission of monetary policy. That's why we are so very clear when we say that we can issue central bank money in DLTs, but it doesn't mean we will change policy access to central bank money.

The idea with Appia — and it's the same idea with monetary policy repo — we want to better combine central bank money and commercial bank money, as we will with Agora, which is for cross-border payments.

Of course we will embark on repos for monetary policy. But we have to be very careful with the transmission to monetary policy.

That's why it takes time, but of course we have to find the right balance between going too fast and waiting.

**Marqués, Banco de España:** We are on the same page. This is not a technical question, it's a question about the implications of broadening the assets in the collateral system.

On top of that, we had just updated our collateral management platform in the Eurosystem this year. So the idea will be to continue improving this platform.

But at the same time, as Adeline was mentioning, we could explore this possibility in Appia — that is how the whole infrastructure should be evaluated in the long term.

That is hard to manage — we have to combine updating the

new platform with evaluating alternatives in the long term view.

And of course in this long term view, to include collateral is one possibility. If for other reasons the policy on collateral is broadened, then we will have to adapt this situation in the current platforms.

**GlobalCapital:** Does anyone in the audience have a question?

**Christoph Hock, head of tokenisation and digital assets at Union Investment:** Looking at repo eligibility and tradability on a multilateral trading facility, at the moment in Europe, the CSD Regulation requires that a bond which is traded on an MTF or eligible for repo at the ECB has to be registered with a central securities depository. The Digital Securities Sandbox and DLT Pilot Regime are workarounds. A question to the panellists: do you believe we will still have legacy regulation being in favour of the old traditional CSD, not taking into account the new market environment with de-central securities registrars? Is this not the solution to the problem we are discussing here this morning?

**Pears, Mayer Brown:** I can't comment on whether we will still have the regulation but I think the question is a very good one. It's one of the common questions that we get on transactions — whether you can list it or not. Listing it is often an investor requirement. So I don't have the answer to whether those legacy systems will still apply but I do think it's a very pertinent question.

**GlobalCapital:** I'm going to give you each a final chance to say anything you haven't managed to say yet. But I suggest that you also focus on the question of the ultimate goal. What is the ultimate destination? Is it going to be essentially one big ledger where everything can be viewed? People have often referred to transparency and greater information as being one of the benefits of this. Or is it going to be a very complicated system of networked networks?

**Bachelier, Banque de France:**

To respond to our public policy in Europe of Savings and Investment Union — it's really important to understand this objective.

And I don't believe we will have only one ledger. I think we could have ledgers, regional ledgers. But we have to work on interoperability.

It's not a new topic. In central banks we all have payment systems — they are not interoperable. It's not a technical issue, it's a political issue.

**Callsen, ICMA:** I would say it's important to look at it holistically across the value chain.

As to the question of whether we have one ledger or not, ultimately if it's around settlement, one ledger may be helpful. Is it realistic? Probably not.

I think there are going to be different solutions — a preference for wholesale CBDC in Europe and other regions. Stablecoins perhaps in the US — and there will need to be interoperability.

But nonetheless, whether it's tokenised or traditional, connectivity will be critical between the different steps, whether it's from bookbuilding, from pricing, distribution and so on. So I think that remains critical and standards will play a helpful role to scale the market. I think digitisation is a rising tide and the time to act is now.

**Kohl-Landgraf, DZ Bank:**

Regarding this question of a unified ledger and interoperability I think we had exactly the same discussion 30 years back when we talked about 'are there intranets or intranets, or is there an internet?'

Yes, there is an internet and Silicon Valley companies early saw the potential and started building up software for that.

This is why I would deeply recommend starting to think about products and new workflows and just put the infrastructure debate on the second level.

Because I think there will be some infrastructure and surely there will be some interoperability mechanism provided by a tech company or cloud provider or someone else.

We are the financial industry, we should serve our clients with new products and workflows and this is where the potential lies.

Regarding the standardisation issue, again I think it's time to reach out to other partners by publishing source code and white papers, to get into a concrete discussion on how these base modules are designed — again highlighting there is still no standard on delivery versus payment.

We need these base modules to build a digital infrastructure for the financial industry in the future.

**Marqués, Banco de España:** I think that after all the experiments, we have a lot of consensus on the main question that we tried to answer.

We do not have yet the answers to your question about a single ledger but we have the main elements: what should we identify, what are the main trade-offs that we should discuss?

The importance is at least to solve this connection of the cash ledger to the securities one, in order to be able to go into production and answer all these questions. I think this is important. Once we have something on production we can compare with the traditional, legacy systems and begin to answer your question, hopefully.

**Pears, Mayer Brown:** My initial reaction to the question of whether you have a unified ledger is probably no in the short term. But also the existing systems don't work like that. We have clearing systems in different jurisdictions and there are jurisdictional reasons for that as well as just commercial reasons for it.

So I think the answer there is probably no from me, but to use the phrase of the day, I think whatever ledgers are used, they do need to be interoperable because that's how people can participate. You have liquidity and the maximum number of investors and issuers can access.

**Prakash, Standard Chartered:**

For me I don't think a single ledger or multiple ledgers is the most important question; the important thing is that there is an interoperable, connected infrastructure.

Hopefully that infrastructure has a clearly defined benefits case. All of us have different views but for me the blue sky benefits case will be something which is more transparent, very much more liquid, widely accessible, and at par with the conventional system at the very least. Hopefully it offers on top of it something beyond that. That to me is the Holy Grail.

**GlobalCapital:** Thank you very much. I've liked the emphasis in this panel on not just replicating the market we have but allowing it to seize new opportunities and do new things. **GC**

*"For me the blue sky benefits case will be something which is more transparent, very much more liquid, widely accessible, and at par with the conventional system at the very least. Hopefully it offers on top of it something beyond that"*

*Ankur Prakash, Standard Chartered*

