Distributed Ledger Technology in Financial Markets. The European Union Experiment

La tecnología de registro distribuido en los mercados financieros. El experimento de la Unión Europea

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Abstract: The European Union Regulation 2022/858 of 30 May 2022 establishes a pilot regime for market infrastructures based on distributed ledger technology. The Pilot Regulation is part of the 2020 Digital Finance Strategy whose objective is for the European Union to embrace the digital revolution and to benefit consumers and business. This article analyses the reasons of this new regulatory option and why this represents a different paradigm of legislation, considering first some advantages, risks and challenges that applying distributed ledger technology in financial markets can encounter. Moreover, this article examines the content of the EU Pilot Regulation with a critical perspective, comparing the previous proposal of Regulation with the current Pilot Regulation which enters into force mainly in March 2023. Significance of this Pilot Regulation could be enhanced if it coordinates with other policy goals such as sustainability and transparency set by the EU legislator. Lacking that coordination, this Pilot Regulation could be perceived as a miss opportunity to foster a digital and green financial markets transition.

Keywords: Pilot Regulation, Market infrastructures, Capital Markets, European Law, Distributed Ledger Technology.

Resumen: El Reglamento UE 2022/858 de 30 de mayo de 2022 establece un régimen piloto para las infraestructuras de mercado basadas en la tecnología de registro distribuido. El Reglamento Piloto forma parte de la Estrategia de Finanzas Digitales 2020 cuyo objetivo es que la Unión Europea aproveche la revolución digital y que ésta beneficie a los consumidores y las empresas. Este artículo analiza las razones de este nuevo enfoque regulatorio y por qué éste representa un paradigma regulatorio distinto, considerando en primer lugar, algunas de las ventajas, riesgos y retos que la aplicación de la tecnología de registro descentralizado puede implicar para los mercados financieros. Además, el trabajo examina el contenido del Reglamento Piloto de la UE desde una perspectiva crítica, comparando la propuesta de Reglamento previa con el actual Reglamento Piloto que entra en vigor en marzo de 2023 principalmen-

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te. La relevancia del Reglamento Piloto podría acentuarse si este Reglamento se coordinara con otros objetivos políticos del legislador europeo, como la sostenibilidad y la transparencia. En ausencia de dicha coordinación, el Reglamento Piloto podría percibirse como una oportunidad pérdida para promover la transición hacia los mercados financieros digitales y verdes.

Palabras clave: Reglamento Piloto, Infraestructuras de Mercado, Mercados de capitales, Derecho europeo, Tecnología de Registro Distribuido.

I. Introduction

1. Digital Finance seems an innovation that no longer is part of science fiction. Distributed Ledger Technologies may have various applications, from monitoring supply chains to enabling corporate voting[1]. Distributed ledger technology (DLT) offers an opportunity to transform financial markets. In this context, the pioneering European Union Regulation 2022/858 of 30 May 2022 establishes a pilot regime for market infrastructures based on distributed ledger technology[2], whose main purpose is to develop crypto assets that can be considered financial instruments according to EU law. The Pilot Regulation is part of the Digital Finance Strategy (2020) whose objective is for the European Union to embrace the digital revolution and to benefit consumers and business.

2. This article is structured as follows. Section II evaluates some advantages that distributed ledger technology offers when applying in trading and post-trading processes. Yet, new risks and challenges arise of application of distributed ledger technology in trading, clearing and settlement that could hinder the practical use of DLT worldwide. Section III analyses the reasons of this new regulatory option and why this represents a different paradigm of legislation. The European Union legislator is trying to find a balanced regulatory approach to foster distributed ledger technology. In this approach the Pilot Regulation has a temporary nature to learn from the actual experience that it intends to promote. Next, section IV examines the content of the Pilot Regulation, explaining new concepts that are necessary to clarify for applying this disruptive technology to financial markets. Some legal restrictions are identified in this article. They may obstruct the consolidation of DLT in financial markets. However, some exemptions are established as a legal mechanism to permit DLT evolution in clearing and settlement processes. In addition, Section V offers a critical perspective, comparing the previous proposal of Regulation with the current Pilot Regulation which enters into force mainly in March 2023. Finally, Section VI concludes highlighting key aspects of the new Pilot Regulation that intertwines technology and law with a proactive attitude to combine with other policy goals.

[1] For this last possibility, *see* B.S. Jiménez-Gómez, "Blockchain as an opportunity to upgrade the right to vote in listed companies", *Indret*, 2023, No.1, pp. 61-97.

[2] Regulation (EU) 2022/858 of the European Parliament and of the Council 30 May 2022 establishes a pilot regime for market infrastructures based on distributed ledger technology, and amending Regulations (EU) No 600/2014 and (EU) No 909/2014 and Directive 2014/65/EU, OJ L 151/1, 2.6.2022.

I. Applying DLT in Financial Markets

1. Advantages of DLT in Financial Markets

3. Numerous advantages are predicated of DLT applied to financial markets: decentralization, lower costs[3], efficiency, transparency, automation of contracts and accessibility[4]. DLT is based on a distributed ledger using a consensus mechanism that allows information to be recorded and shared across a set of network nodes, where the nodes are synchronized. Such a structure seems more resilient than centralized structures.

4. Among the most relevant advantages, possibility of eliminating the need for reconciliations stands out, reducing costs by reducing expenses in time, bureaucracy and intermediaries in a market operating 24 hours a day, which reduces the risk of the counterparty and enables shorter clearing and settlement times[5]. The objective of reducing costs and promoting integration of clearing and settlement systems has been established in Spanish law since the reform of Law 44/2002, of November 22, on Financial System Reform Measures. The European Central Bank published a report in 2021 on the use of distributed ledger technology for market post-trade processes, concluding that the application of DLT to these processes could result in cost savings and efficiency gains[6]. The EU Pilot Regulation is also clear in expecting that tokenization of financial instruments would open opportunities for efficiency improvements in the trading and post-trading process.[7]

5. In addition to efficiency, the DLT infrastructure has greater transparency, which benefits traceability of transactions, as well as their management and execution. If the internal architecture and structure is invisible to the client, there would be no news regarding the technology used. Indeed, the EU Pilot Regulation intends that the consensus mechanism of nodes of the DLT network be public for users, that is, the rules and procedures through which an agreement is reached to validate an operation between the nodes of the DLT network.

6. Another advantage offered by the DLT is the automation in execution of contracts through smart contracts[8]. Such automation saves negotiations since the parties cannot interfere once the operations are in the code. Due to the latter, DLT with smart contracts are described as an element that enhances trust, despite elimination of third parties that would normally oversee executing contracts in stock markets. Lastly, greater access to connection of more issuers with investors generates greater liquidity in these markets.

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[3] A study by Goldman Sachs estimated that they would be reduced by one billion dollars a year, "Blockchain tech could save cash equities market $6bn a year - Goldman Sachs", *Finextra*, 26.05.2016, available at https://www.finextra.com/newsarticle/28955/blockchain-tech-could-save-cash-equities-market-6bn-a-year---goldman-sachs

Compare with J. Parsons, "German Central Bank: Blockchain slower and expensive to implement", *The Trade News*, 31.05.2019 available at https://www.thetradenews.com/german-central-bank-blockchain-slower-expensive-implement/ "The president of the German central bank has dismissed the use of blockchain technology for transferring and settling securities, after a trial project found it was more costly and slower than current methods."

[4] *See* D. Mills, K. Wang, B. Malone, A. Ravi, J. Marquardt, C. Chen, A. Badev, T. Brezinski, L. Fahy, K. Liao, V. Kargenian, M. Ellithorpe, W. Ng, and M. Baird (2016). "Distributed ledger technology in payments, clearing, and settlement", Finance and Economics Discussion Series 2016-095, Washington: Board of Governors of the Federal Reserve System, pp. 8-9.

[5] S. Siddhartha, CEO and founder of Intain. J. Franklin, "Why capital markets should embrace blockchain", *International Financial Law Review*, London (Apr 7, 2020).

[6] European Central Bank, *The use of DLT in post-trade processes*, (Abril 2021), p. 2 https://www.ecb.europa.eu/pub/pdf/other/ecb.20210412_useofdltposttradeprocesses~958e3af1c8.en.pdf This report is based on: ECB Advisory Groups on Market Infrastructures for Securities and Collateral and for Payments, *The Potential Impact of DLTS on Securities Post-Trading Harmonisation and on the Wider EU Financial Market Integration* (September 2017), ECB, *Potential Use Cases for Innovative Technologies in Securities Post-Trading* (January 2019).

[7] Recital 3. Regulation (EU) 2022/858 of 30 May 2022, on a pilot regime for market infrastructures based on distributed ledger technology and amending Regulations (EU) No 600/2014, No. 909/2014 and Directive 2014/65/EU, OJ L 151/1, 2.6.2022.

[8] *See* D. Mills, K. Wang, B. Malone, A. Ravi, J. Marquardt, C. Chen, A. Badev, T. Brezinski, L. Fahy, K. Liao, V. Kargenian, M. Ellithorpe, W. Ng, and M. Baird (2016). "Distributed ledger technology in payments, clearing, and settlement", Finance and Economics Discussion Series 2016-095, Washington: Board of Governors of the Federal Reserve System, pp. 14-15.

2. Risks and Challenges of DLT in Financial Markets

7. Problems faced by the application of DLT in capital markets are several: Scalability, creation of common standards to promote interoperability, actual implementation, systemic risks, legal validity of tokens and potential fragmentation.

8. First, lack of scalability may be one of the problems facing capital markets. For example, the Australian Securities Exchange Ltd (ASX) director confirmed that the settlement system they intend to implement is the largest in the crypto world, but scalability is proving to be one of the factors in the delay of the Australian Stock Exchange with tokenized assets[9], even though the Australian market seems to be one of the most advanced markets[10]. Tokenization of securities and creation of the DLT is a pre-requisite for greater liquidity in the market[11].

9. Secondly, difficulty of finding common standards for interoperability[12] of infrastructures is one of the greatest challenges. Interoperability seems necessary in two senses: between DLT arrangements and legacy systems and across DLT arrangements[13]. Smooth functioning of systems is essential at least in the transition period from legacy systems to DLT arrangements. Furthermore, as not a single DLT should exist, interoperability across DLT arrangements would be necessary for speed and efficiency of transfer and exchange of value. A difference of speed between systems may hurdle arrangement as a given DLT would be quicker and another system slower if it depends on confirmation of transaction settlement[14]. International norms can play a role in this regard. For example, Digital Token Identifiers (DTIs) serve the function for a common language to facilitate their safe and secure use of digital tokens. ISO 24165-1 deals with identification of digital assets and it is a new international standard which has been developed to ensure that everyone understands[15]. Addition of DTIs would allow participants to identify the specific chain associated with any trade or price, improving market transparency by enabling analysis of best prices of the chain in the case of trading or settling DLT financial instruments on multiple blockchains.

10. However, private standards are technical specifications and behavior guides for companies. Although legally speaking they are voluntary regulations, they are compulsory *de facto* when a company enters an economic activity so regulated as financial markets. There are two types of rules: national rules made by public powers with legal-public effect and harmonizing rules with a private origin. Private standards become mandatory through direct reproduction of norms in public journals, being accepted by public power and published in its entirety. Yet, if private standard is modified, it is not notified and

[9] "ASX has invested US$150 million in blockchain stock settlement system so far", *Ledger Insights*, 18.08.2022, available on https://www.ledgerinsights.com/asx-150-million-in-blockchain-stock-settlement/.

[10] B. Quarmby, "La Bolsa de Valores de Australia avanza en la negociación de activos tokenizados", *Cointelegraph*, 16.08.2022, available on https://es.cointelegraph.com/news/australian-securities-exchange-takes-step-towards-tokenized-asset-trading

[11] Example of the Luxembourg Stock Exchange that admitted a financial instrument in a public DLT in January 2022, being one of the most pioneering in Europe and anticipating the Pilot Regime, "Security tokens take first steps into capital markets", 05.30.2022, available on https://news.bourse.lu/192074-security-tokens-take-first-steps-into-capital-markets

[12] Interoperability of DLT infrastructures with legacy infrastructures and interoperability between distributed ledgers across multiple counterparties. HSBC, Distributed Ledger Technology in the Capital Markets, 19.03.2019, available at https://www.gbm.hsbc.com/solutions/global-liquidity-and-cash-management/digital-innovation-hub/blockchain, p. 11

[13] *See* P. Klimos, The distributed ledger technology: a potential revamp for financial systems?, *Capital Markets Law Journal*, Vol. 13, No.2, 2018, pp. 194-222, pp. 210-211.

[14] *See* Mills et al, "Distributed ledger technology in …", *op.cit*., p. 23.

[15] Digital token identifier (DTI) - Registration, allocation and structure - Part 1: Registration and allocation method, defines the allocation and generation of a fixed-length, unique, random identifier for digital tokens in response to an application for a record that meets the specified application guidelines. The standard is supplemented by ISO 24165-2, Digital token identifier (DTI) - Registration, assignment and structure - Part 2: Data elements for registration, which defines the data elements included in the registration record and used to establish the 1:1 relationship between a digital token and the identifier, assigned according to the method of ISO 24165-1.

generates the need to access private sources. The other way is the referral to the standard in a public rule, technical specifications are not incorporated into the public published rule. Additionally, two forwarding models exist: one rigid where the standard of a specific date is required, and another flexible model where it is not forwarded to a specific version but to the most modern version[16].

11. Third, most of the experiments so far have been pilot tests[17] but it has not yet been widely implemented[18]. Creating a DLT ecosystem is not a matter of a day. For example, SDX Web3 Services is tailored to institutional clients who need to scale their Ethereum staking capabilities[19].

12. Fourth, financial stability may be undermined by risks of systemic contagion from the crypto world[20]. Possible risks of systemic contagion led the EU legislator to define a series of thresholds on financial instruments that are intended to be traded on DLT within the EU Pilot Regulation.

13. Another fear is that implementation of DLT technology will lead to a delay in achieving capital market integration. Indeed, academics have already warned of risks of national DLT legislation that can create a world like those of brokered securities holding, where several laws must be consulted to determine investors' rights[21]. It seems that any uncoordinated national initiative in the European market may present a threat to the EU's monetary and financial union.

14. Finally, a fundamental risk is that implementation of DLT markets could concentrate securities clearing and settlement in very few providers[22]. This scenario would create competition problems.

II. Novelty from the regulatory perspective

15. Legal vacuum regarding the use of distributed ledger technology and crypto assets as financial instruments leads to the European legislator to act, although the legislator recognizes that it would be premature to act through modifications of the European regulations on financial services to allow deployment of crypto assets. There were three options considered by the European Commission and

[16] *See* V. Álvarez García, "La problemática de la publicidad oficial de las normas técnicas de origen privado que despliegan efectos jurídico-públicos", *Revista de Derecho Comunitario Europeo,* 2002, 72, 449-482.

[17] Banco Santander itself has been the issuer of the bond, for 20 million dollars, while one of the Group's units has bought it at market price, with a quarterly coupon of 1.98%. Santander Securities Services has acted as tokenization agent and custodian of encryption keys. Ethereum public blockchain has been used, one of the most advanced open source blockchain technologies. This has allowed the bank to securely tokenize the bond and register it in a permissible way on the blockchain. The cash used to complete the investment (delivery against payment on the blockchain) and the quarterly coupon have also been tokenized, that is, they have been digitally represented on the blockchain. Thanks to automation of the bond, which has a maturity of one year, the number of usual intermediaries in these processes has been reduced, which has allowed a faster, more efficient and simpler operation. Santander CIB's goal is to collaborate with the most innovative clients and move from the project stage to product development. *Santander lanza el primer bono con tecnología blockchain de principio a fin*, Madrid 12/09/2019, available at https://www.santander.com/es/sala-de-comunicacion/notas-de-prensa/santander-lanza-el-primer-bono-con-tecnologia-blockchain-de-prin

[18] The projects mentioned are Blockbaster in Germany, Project by Depository Trust and Clearing Corporation, ASX Replacement of CHESS in Australia, Jasper in Canada, Stella in Euro area/Japan, Ubin in Singapur, Inthanon in Thailand. Akhil Rao, "DLT in Payments and Settlements - Bridging the Gap", Finextra, 6/09/2021, available at https://www.finextra.com/blogposting/20856/dlt-in-payments-and-settlements---bridging-the-gap

[19] SDX is licensed by the Switzerland's financial market regulator, FINMA, to operate an Exchange and a Central Securities Depository (CSD). SIX operates and develops infrastructure services for the Swiss and Spanish Stock Exchanges. Available at https://www.sdx.com/news/sdx-web3-launches-ethereum-staking

[20] P. Hernández de Cos, "Financial Stability and crypto-assets", Bank of Spain, 31.03.2022.

[21] M. Lehmann, "National Blockchain Laws as a Threat to Capital Markets Integration", *Uniform Law Review*, Vol. 26, No. 1, 2021, pp. 148-179

[22] E. Benos, R. Garrat, P. Gurrola-Perez, "The economics of distributed ledger technology for securities settlement", *Ledger,* Vol 4, 2019, pp. 121-156. https://ledgerjournal.org/ojs/ledger/article/view/144/159

creation of a market infrastructure based on DLT as a pilot scheme was finally chosen[23]. It was believed that this regulatory option would allow using DLT to be tested on a larger scale. It was considered that risks of the counterparty could be reduced during settlement process because trading and settlement services were offered at the same time. Likewise, the DLT scheme was also committed to mitigating risks of cyberspace by having a decentralized structure and not a single vulnerable center. This infrastructure would lead to lower costs and therefore, less need for collateral. The option of proposing guidance on the applicability of the EU framework on financial services to crypto assets that are considered financial instruments in a DLT was ruled out. And for the time being, the option of modifying the EU regulatory framework to adapt it to the needs of DLT in financial services is ruled out as well. However, it should be noted that the EU Commission does not consider these regulatory options to be exclusive but rather that they are all part of a gradual and complementary approach.

16. We understand that it is necessary to test a new technology to closely experience its operation and risks to establish better regulatory guidelines, although if measures are not binding, their impact will be very limited. Consequently, it might make more sense and consistency in the future to include specific amendments to regulations of the current European areas (the Central Securities Depositories Regulation[24], the Settlement Finality Directive[25], the Prospectus Regulation[26], the Markets in Financial Instruments Directive, MIFID II[27] and the Markets in Financial Instruments Regulation, MIFIR[28]) on a permanent basis once the underlying technology has been proven. Indeed, gaining experience for supervisory authorities is one of the key objectives.

17. The Pilot Regulation is part of the Digital Finance Strategy that was presented by the Commission in 2020, whose objective is for the EU to embrace the digital revolution and to benefit consumers and businesses. The DLT Pilot Regulation is complemented by three related initiatives, the Crypto Asset Markets Regulation Proposal (MICA)[29], the Digital Operational Resilience Regulation Proposal (DORA)[30], and the Directive Proposal to clarify and amend certain related regulations in financial services[31]. This latest proposal for a Directive accompanies the Regulation on a pilot scheme for market infrastructures based on distributed ledger technology, supporting a specific exemption from certain provisions of the Union legislation on financial services applicable to activities and services related to

[23] *See* Proposal for a Regulation of the European Parliament and of the Council on a pilot regime for market infrastructures based on distributed ledger technology, Brussels, 24.9.2020 COM(2020) 594 final 2020/0267 (COD), pp. 6-7. Option 1 was to develop non-legislative measures to provide guidance on the applicability of the EU framework on financial services to crypto-assets that qualify as financial instruments and DLT. Option 2 was to establish targeted amendments to the EU framework on financial services. Option 3 was the Pilot regime on the creation of a DLT market infrastructure.

[24] Regulation (Eu) No 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012, OJ L 257/1, 28.8.2014.

[25] Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems, OJ L 166, 11.6.1998.

[26] Regulation (EU) 2017/1129 of the European Parliament and of the Council of 14 June 2017 on the prospectus to be published when securities are offered to the public or admitted to trading on a regulated market, and repealing Directive 2003/71/EC, OJ L 168, 30.6.2017.

[27] Directive 2014/65/EU of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (Recast), L 173/349, 12.6.2014.

[28] Regulation (EU) No 600/2014 Of the European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Regulation (EU) No 648/2012, L 173/84, 12.6.2014.

[29] Proposal for a Regulation Of The European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937, Brussels, 24.9.2020, COM(2020) 593 final, 2020/0265 (COD). Awaiting Parliament's position in 1st Reading at the time of writing.

[30] Proposal for a Regulation of the European Parliament and of the Council on Digital Operational Resilience for the financial sector and amending Regulations (EC) No 1060/2009, (EU) No 648/2012, (EU) No 600/2014 and (EU) No 909/2014, Bruselas 24.9.2020, COM(2020)595 final, 2020/0266 (COD). Awaiting Council's 1st reading position at the time of writing.

[31] Proposal for a Directive of the European Parliament and of the Council amending Directives 2006/43/EC, 2009/65/EC, 2009/138/EU, 2011/61/EU, EU/2013/36, 2014/65/EU, (EU) 2015/2366 and EU/2016/2341, Brussels, 24.9.2020 COM(2020) 596 final 2020/0268(COD). This proposal modifies the definition of 'financial instrument' as those instruments specified in Section C of Annex I, including such instruments issued by means of distributed ledger technology.

financial instruments, as defined in article 4, paragraph 1, point 15, of MIFID Directive (2014/65/EU); since, otherwise, these provisions would not offer all flexibility required by deployment of solutions in negotiation and post-trade phases of crypto assets transactions.

18. Choice of the legal instrument of "Regulation" avoids fragmentation of the EU market by national legislators and aims to compete globally[32], precisely because intermediaries (traditional or new) tend to establish subsidiaries in those States with more permissive regulations. The Pilot Regulation aims to increase European competitiveness, since the financial system is conditioned by the legal system. The Pilot Regulation emphasizes consumer law, taking measures such as limiting types of financial instruments that can be traded in DLT and not exempting specific provisions to guarantee financial stability and consumer protection. For example, existence of significant risks to investor protection, market integrity or financial stability is a ground for denial of specific authorization to operate a DLT settlement system[33]. However, it is not a "regulatory sandbox", because it does not generally regulate a controlled testing space for any type of technological project like the Spanish Law 7/2020 for the digital transformation of the financial system, of November 13, 2020[34].

III. Novelty from the legal perspective

1. Tokenization

19. As it is well-known, there is an essential link between representation of securities by means of book entries and their centralized registry for clearing and settlement of transactions carried out on these securities[35]. This scheme is known as "closed circuit" in charge of a central securities depository (CSD)[36]. This is a premise of our stock market system. However, tokenization and DLT come to challenge the current securities trading, clearing and settlement system. DLT is defined in the Pilot Regulation as a technology that enables the operation and use of distributed ledgers (decentralized registries)[37]. Tokenization of financial instruments consists of "digital representation of financial instruments on distributed ledgers or the issuance of traditional assets in tokenized form to enable them to be issued, stored and transferred on distributed ledger[38]. Linguistically, "transformation into crypto-assets" of financial instruments has been modified by "digital representation" of financial instruments, which is a nuance that introduces the need for interaction between traditional systems in securities accounts and systems based on tokens. Although

[32] French, German or Luxembourg law allows securities to be issued in a DLT, *see,* "Native issuances of DLT securities in Luxembourg, France and Germany and admission to the Luxembourg Stock Exchange Securities Official List", 17.05.2022, Clifford Chance, available at: https://www.cliffordchance.com/insights/resources/blogs/talking-tech/en/articles/2022/05/native-issuances-of-dlt-securities-in-luxembourg-france-and-ger.html

[33] Art. 9. 10 Pilot Regulation.

[34] A. Huergo Lora, "Un espacio controlado de pruebas (regulatory sandbox) para empresas financieras tecnológicamente innovadoras: el anteproyecto de ley de medidas para la transformación digital del sistema financiero", *El Cronista del Estado Social y Democrático de Derecho*, Nº 76, 2018, pp. 48-59.

[35] A. J. Tapia Hermida, "La post-contratación en los mercados secundarios de valores: el sistema de compensación y liquidación de valores", 2017, *Documentos de Trabajo del Departamento de Derecho Mercantil*, Universidad Complutense, p. 38.

[36] A central security depository is defined as "an entity that provides securities accounts and central safekeeping services", *Federal Reserve Policy on Payment System Risk*, Board of Governors of the Federal Reserve System, 2016.

[37] Art. 2.1 Pilot Regulation. The proposal definition of DLT was "a class of technologies which support the distributed recording of encrypted data". Proposal for a Regulation of the European Parliament and of the Council on a pilot regime for market infrastructures based on distributed ledger technology, Brussels, 24.9.2020 COM(2020) 594 final 2020/0267 (COD). J. McCarthy, "Distributed ledger technology and financial market infrastructures: an EU pilot regulatory regime", *Capital Markets Law Journal*, 2022, vol. 17, No.3, pp. 288-306, pp. 293-294. McCarthy criticizes how the definition in the proposal differs from an interpretation of blockchain generally. For this author DLT is a sub-set of blockchain and DLT should involve a permissioned network of participants as nodes, for any practical consideration of DLT use in securities market. However, a distributed ledger in the strictest sense is a type of database that is shared across nodes in a network. Blockchain is a specific type of distributed ledger. *See* D. Mills *et al*, "Distributed ledger technology in payments, clearing, and settlement", Finance and Economics Discussion series 2016-095. Washington: *Board of Governors of the Federal Reserve System*, 2016, p. 10.

[38] Recital 3, Pilot Regulation.

attempts are made to mitigate credit and liquidity risk on DLT systems, the truth is that there is no such thing as zero risk, so both systems will have to be connected at least in a transitional period.

2. New Systems

20. There are three regulated systems in the Pilot regime. The DLT Multilateral Trading System (DLT MTF), the DLT Settlement System (DLT SS) and the DLT Trading and Settlement System (DLT TSS). The third figure was included after the amendments of the first reading of the European Parliament, since it was incoherent to project a pilot regime that does not allow trading and settlement to be integrated in the same entity, when that is one of the opportunities presented by DLT. Therefore, this deficiency has been corrected in the final Pilot Regulation, which means that both a MTF can be vertically integrated from the negotiation to the settlement phase, and, in turn, a central securities depository can perform functions of the first stage of trading financial instruments based on DLT[39].

21. On the one hand, the European legislator is aware that combination of negotiation and post-trade services and activities within an entity is not contemplated in the current regulations. For this reason, the Pilot Regulation allows for a new type of hybrid figure, the DLT trading and settlement system (DLT TSS), which enables combination of activities. However, given that the Pilot Regulation has a didactic nature, it cannot be considered a source for a comprehensive reform on separation of negotiation and post-trade activities.

22. On the other hand, the definition of a DLT MTF does not include that it is managed by a central investment services company, or a market operator[40]. The opposite did not fit in with the concept of decentralized finance. The Pilot Regulation proposal conditioned the design of the infrastructure architecture, so it could be an efficient model in centralized infrastructures but not in decentralized ones[41].

23. In addition, the definition of home Member State has been passed from the definition article of the Commission Proposal to have a specific article in the Pilot Regulation with respect to competent authorities[42]. Distribution of supervisory functions among Member States authorities avoids the problem that distributed technologies by their very structure imply.

3. Limits by object and value

24. Creation of new DLT infrastructures must be made compatible with existing infrastructures. However, several limits are placed on using crypto assets. The most relevant is that DLT financial instruments must be "crypto-assets that are considered financial instruments and that are issued, transferred and stored on a distributed ledger"[43]. The definition of a crypto asset is intrinsically related to the concept of distributed ledger technology. The Pilot Regulation offers a non-restrictive concept of DLT, since it defines a technology that allows the operation and use of distributed ledgers. This definition was corrected from the original proposal, where reference was only made to technologies that allow distributed recording of encrypted data, which restricted ways of transfer that could be developed in the future[44].

[39] This vision was projected by some authors, B. Garré, *et al*., "A vision for regulated digital security infrastructure in Europe", *Capital Markets Law Journal*, 2020, vol. 15, No.3, pp. 298-321.

[40] A person or persons who manages and/or operates the business of a regulated market and may be the regulated market itself is the definition of "market operator" by Directive 2014/65/EU, Art. 4(1) point (18).

[41] *See* J. Zapata Sevilla, "Las lagunas del paquete de medidas sobre finanzas digitales de la UE. Especial referencia a las infraestructuras de los mercados", *Revista de Derecho del Sistema Financiero*, No. 3, 2022, pp. 260-279, p. 267.

[42] *Cf*. Article 12 Pilot Regulation with art. 2 (22) Proposal Pilot Regulation.

[43] Recital 8, Pilot Regulation.

[44] *See* D. A Zetzsche, J. Woxholth, "The DLT sandbox under the Pilot-Regulation", *Capital Markets Law Journal*, Volume 17, Issue 2, April 2022, pp. 212–236, p. 219.

25. This new definition in the Pilot Regulation no longer coincides with the proposed MICA Regulation for DLT. However, the definition of a crypto asset in the MICA Proposal is broad with respect to the underlying structure. A crypto asset is a digital representation of value or rights that can be transferred and stored electronically, using distributed ledger technology or similar technology [art. 3(1)(2) MICA Proposal]. Securities to which the Pilot Regulation applies are crypto assets according to the MICA proposal but are excluded from its scope of application, because the MICA proposal excludes financial instruments [art. 1 (2)(a) MICA Proposal][45].

26. Nevertheless, the Pilot Regulation also limits the financial instruments that can be admitted to trading or registered in an DLT market infrastructure. Financial instruments contemplated in the Regulation are shares whose issuer has a market capitalization (real or estimated) of less than EUR 500 million; bonds or other forms of securitized debt, including representative depository receipts for such securities or money market instruments with an issue volume of less than EUR 1 billion, excluding from the calculation of the threshold corporate bonds whose issuers have a market capitalization of less than EUR 200 million at the time of issuance; and shares in collective investment schemes (UCITs[46]), whose assets have a market value of less than EUR 500 million[47].

27. Size of financial instruments is also limited by authorized entities, since the aggregate market value of all financial instruments cannot exceed EUR 6 billion at the moment of admission to trading, or initial recording of a new financial instrument[48]. Additionally, when the added value of an entity reaches EUR 9 billion, an exit transition strategy must be activated[49]. Several considerations must be made in this regard. It highlights that the thresholds for both emission and added value in a market infrastructure have been raised in parliamentary procedures with respect to the Commission's proposal[50]. These modifications are positive if it allows established operators to not only operate a DLT market infrastructure as an experiment, but also to make it their main business[51].

28. Moreover, it should be noted that competent authorities have the option to lower the threshold depending on the market size and the average capitalization of the DLT financial instruments that have been admitted on trading platforms in the Member States insofar as the services and activities will be carried out [art. 3(6) Pilot Regulation]. Room for maneuver in the hands of national authorities may lead to divergence in the future of infrastructures since the issue size or the total value for each authorized entity depends on the Member State in which they carry out their services and activities. Both authorization of trading and settlement market systems and their revocation depend on that threshold, ESMA has a coordinating role in this task though.

4. Exemptions

29. Exemptions are related to communication of transactions by the markets ("transaction reporting"), replacement of cash delivery by a tokenized delivery, the possibility of allowing retail investors

[45] The financial instruments defined in Directive 2014/65/EU, art. 4.1.15. are transferable securities, money market instruments, units and shares in collective investment schemes, options contracts, futures, swaps, forward interest rate agreements and other contracts related to securities, currencies, interest rates or yields, emission rights or other derivative instruments, financial indices or financial measures that can be settled in kind or in cash, etc.

[46] Units in collective investment undertakings.

[47] Art. 3.1 Pilot Regulation.

[48] Art. 3.2. Pilot Regulation

[49] Art. 3.3 Pilot Regulation.

[50] In the regulation proposal, the added value for each authorized entity was 2,500 million euros and the value from which the transition strategy should start was 2,750 million euros.

[51] For example, SIX-BME is happy with the threshold, talk by Laura Sacristán, Chief Commercial Officer BME-SIX, at FIDE, *Sesión: Tokenización De Instrumentos Financieros, ¿Hacia Un Mercado Descentralizado, Sin Supervisión E Intermediación?* (21.09.2022)

to go directly to the market without the need for an intermediary, or the exemptions related to outsourcing obligations by CSDs.

30. Exemptions that may be requested by investment services companies or the market operator that manages the DLT MTF refer to Directive 2014/65/EU[52] known as MIFID II and Regulation (EU) no. 600/2014 (MIFIR)[53]. However, for exemptions to apply, the company or market operator must request and be granted the exemption from the legislation. In addition, the company or operator must comply with the requirements settled under the Pilot Regulation and with compensatory measures that the competent authority deems appropriate[54]. A CSD that manages a DLT SS can request exemptions to Regulation No. 909/2014 (CSDR). Thus, the CSD must request the exemption and be granted it, as well as comply with the requirements of the Pilot Regulation and with the compensatory measures that the competent authority considers appropriate[55]. In turn, the exemptions that an DLT TSS can request are also with respect to the MIFID Directive, the MIFIR Regulation and the Central Securities Depositories Regulation.

31. Requested exemptions must be proportionate and justified by using a distributed ledger technology and be limited to the MTF or SS subject to the Pilot Regulation. However, it is not clear whether supervisors are trained to assess proportionality and the degree of innovation required. The requirement of the SS regarding the use of a securities account or the use of book entries must be shown to be incompatible with use of distributed ledger technology that it proposes [art. 5(2)(a) Pilot Regulation]. Such a demonstration seems redundant with respect to general requirements[56].

32. Specific requirements for an operator of a MTF also relate to natural and legal persons dealing on own account as members or participants. Persons are required to: be sufficient good repute, have a sufficient level of trading skills, competence and experience, including knowledge of DLT functioning, not to be market makers on the MTF, do not use an algorithmic trading technique that do not provide other persons with direct electronic access to the MTF, do not trade on their own account when executing client orders on the DLT market infrastructure, and have given their informed consent to trading on the MTF as a member or participants and have been informed of potential risks of using their systems to trade DLT financial instruments[57]. Second, to be a participant in a DLT SSs, many characteristics are required: good repute, sufficient level of capacity, competence, experience and knowledge about settlement, technology functioning and risk assessment, as well as granting of informed consent[58]. However, so many subjective requirements exclude clients as participants of the ledger due to the level of knowledge demand, which contrasts with the supposed objective to promote disintermediation[59]. It is not also clear why good repute is necessary to act on your own as participant. In addition, the obligation to report operations imposed by Regulation 600/2014 (CSDR, art.26) can be exempted, but the MTF must keep records of all operations with all the information imposed by Regulation 600/2014 (CSDR) and the competent authorities must have direct and immediate access to mentioned data.

33. Additional requirements for all DLT infrastructures in the market are the minimum for them to grant the exemption[60]. Operators of DLT market infrastructures must establish clarity and detail in

[52] Directive 2014/65/EU of The European Parliament and of the Council of 15 May 2014 on markets in financial instruments and amending Directive 2002/92/EC and Directive 2011/61/EU (Recast), OJ L 173/349*,* 12.6.2014.

[53] Regulation (Eu) No 909/2014 of the European Parliament and of The Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012, OJ L 257/1, 28.8.2014.

[54] Art. 4.1 Pilot Regulation.

[55] Art. 5.1 Pilot Regulation.

[56] With the same opinion but referring to the Proposal Regulation, *see* Zetzsche and Woxholth, "The DLT sandbox under …", *loc.cit*., p. 223.

[57] Art. 4.2. Pilot Regulation.

[58] Art. 5.5. Pilot Regulation.

[59] With the same opinion but referring to the Proposal Regulation, *see* Zetzsche and Woxholth, "The DLT sandbox under …", *loc.cit*., p. 223.

[60] Directive on settlement finality in payment and securities settlement systems. OJ L 166, 11.6.1998.

their business plans and activities, as well as make available to the public the written documentation that explains rules of governance of the infrastructure, including terms and conditions that define rights, obligations, and responsibilities of operators[61]. Special relevance is given to rules of private international law, judicial jurisdiction, and applicable law, as well as any out-of-court mechanism for conflict resolution and any protection measure in the event of insolvency with reference to Directive 98/26/EC.

34. There is some inconsistency with respect to the mention of availability by electronic means of the mentioned documentation. At first, the Spanish version of the Regulation states that operators of market infrastructures[62] "will make available to the public by electronic means" and later, that operators of DLT market infrastructures "may make their written documentation available by electronic means" [63]. This last addition was not in the proposal[64] and if it is interpreted as an optional form, it does not agree with transparency and digital access that these platforms intend to promote. However, this inconsistency is not in the English version of the Regulation[65]. Indeed, article 7(3) of the Pilot Regulation once again stresses the obligation to provide information on a website to its members, participants, issuers, and clients on the type of DLT they use and the difference between a multilateral trading system or a traditional securities settlement and a DLT-based system.

35. It is not clear what measures may be necessary beyond the requirements imposed by the Regulation regarding compensatory measures that the competent authorities consider appropriate to achieve the objectives of the provisions in respect of which an exemption has been requested or to ensure investor protection, market integrity or financial stability[66]. Only in the case of a SS, it is explicit that financial instruments are registered in the distributed ledger, that the number of financial instruments of an issue coincides with the total number of financial instruments registered in the distributed ledger at any time, that keep records that allow the CSD (Central securities depositories) to segregate without delay financial instruments of one member, participant, issuer or client from those of another and that do not allow securities overdrafts, debtor securities balances or creation or deletion improper values[67].

36. The problem regarding segregation of financial instruments lies in the definition of a participant in the system and the difference between a member or a client. The Regulation does not define who is who. It is preferred that definitions be left to the business plan of the system, so terms such as "proprietary" are not used[68]. Moreover, in the case of a CSD that manages a SS, it is required that it publishes participation criteria that allow open and equitable access to all persons who intend to become participants, and that these criteria be transparent, objective, and non-discriminatory[69]. In addition, that the settlement system must publish prices and commissions it charges for the settlement services it provides[70].

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[61] Art. 7 Pilot Regulation.

[62] Spanish version: "Los organismos rectores de infraestructuras del mercado basadas en la TRD pondrán asimismo a disposición del público por medios electrónicos documentación escrita actualizada, clara y detallada"

[63] Art. 7.1 second paragraph Pilot Regulation.

[64] Art. 6.1 Pilot Regulation Proposal.

[65] "Operators of DLT market infrastructures shall also make publicly available up-to-date, clear and detailed written documentation that defines the rules under which the DLT market infrastructures and their operators are to operate, including the legal terms defining the rights, obligations, responsibilities and liabilities of operators of DLT market infrastructures, as well as those of the members, participants, issuers and clients using their DLT market infrastructure. Such legal terms shall specify the governing law, any pre-litigation dispute settlement mechanisms, any insolvency protection measures under Directive 98/26/EC and the jurisdictions in which legal action may be brought. Operators of DLT market infrastructures may make their written documentation available by electronic means." (Art. 7.1 second paragraph Pilot Regulation.)

[66] Art. 4.1.c y Art. 5.1c. Pilot Regulation.

[67] Art. 5.2 Pilot Regulation.

[68] *Vid*. Zetzsche and Woxholth, "The DLT sandbox under …", *loc.cit*., p.222, advocating an open interpretation and not including definitions in the Regulation.

[69] Art. 5.6 (a) Pilot Regulation.

[70] Art. 5.6 (b) Pilot Regulation.

V. Criticism

1. Transparency concerns

37. The private sector is charged with the costs of implementing DLT to educate regulatory and supervisory authorities about novel projects. However, such benefits do not have to benefit the whole society, because opinions, even non-binding, of the European Securities Market Authority (ESMA) or the competent national authorities are not made public. It is specified that opinions of ESMA and the report of the competent authority in relation to any notable divergence with respect to said opinion, opinion that are necessary to carry out the specific authorization procedure of the three figures regulated in the Pilot Regulation are not public[71]. Further, considering that ESMA's report on the requested exemptions or on the acceptability of the type of distributed ledger technology should be carried out "where necessary to promote the consistency and proportionality of exemptions, or where necessary to ensure investor protection, market integrity and financial stability"[72]. No reasons for not making such a report public are given if it is intended to protect investors. Nor is it stated with respect to the relevant authorities whether their non-binding opinion on characteristics of the SS or TSS will be made public, although neither is it excluded as if the Regulation does in the report cases.

38. The relevant authorities are[73]: a) the authority responsible for overseeing the securities settlement system managed by the CSD in the Member State whose legal system governs said system[74]; b) the central banks of the Union issuing the most relevant currencies in which the settlement takes place; and c) where applicable, the central bank of the Union on whose books the cash component of a securities settlement system operated by a CSD is settled[75].

39. Therefore, while transparency is sought in the financial market sector, obliging the actors to describe their business model, and even to provide the competent authority with all the pertinent information that it may request, these transparency obligations are not reciprocal for the competent national authorities. We advocate a restrictive interpretation of article 11(2) of the Pilot Regulation, since "all the information" that may be requested should refer to what is mentioned in the previous provision. It is very burdensome not to know what all the information refers to, and this burden contrasts with the behavior of competent authorities, which subsequently breaks the principle of transparency that should guide the entire administration, promoting an asymmetric relationship, since authorities have room of discretion when they can control the threshold from which no more financial instruments can be traded in a DLT market infrastructure.

40. In the event of abuse of margin of discretion by the national authorities to downgrade, divergence would be created in future infrastructures, which enhances disharmony, since it is a reason for revoking the specific authorization to manage a DLT multilateral trading facility (DLT MTF), a DLT settlement system (DLT SS), a DLT trading and settlement system (DLT TSS), this being contrary to the objectives of the Pilot Regulation. The only safeguard in this regard is future guidance from the European Securities and Markets Authority regarding the exercise of the option to lower the threshold by national authorities. But if there are different value-added thresholds for financial instruments, there is a risk of regulatory arbitrage. The information to be published by ESMA only refers to a list of grants and refusals of DLT MTFs, DLT SS and DLT TSS and the total number of exemption requests[76].

[71] Art. 9.7 y 10.8 Pilot Regulation.

[72] Art. 8.7. Pilot Regulation.

[73] See art. 12 Pilot Regulation.

[74] If the investment firm is a legal person, the Member State in which its registered office is situated; (iii) if the investment firm has, under its national law, no registered office, the Member State in which its head office is situated (Article 4(1), points (55)(a)(ii) and (iii), of Directive 2014/65/EU.)

[75] Member State in which a CSD is established.

[76] Art. 9.8 Pilot Regulation.

2. Sustainability concerns

41. References to sustainability have changed between the Proposed Pilot Regulation and the final Regulation. Recital 3 of the Proposal stated: "Without a secondary market capable of providing liquidity and allowing investors to buy and sell such assets, the market for crypto assets that are considered financial instruments will never expand sustainably." This statement has disappeared from the final Regulation, as there is no longer any reference to sustainable expansion of the crypto active market in its corresponding recital 4. It is announced in recital 61 of the Pilot Regulation that "operation of a DLT market infrastructure must not undermine climate policies of the Member States. Thus, it is important to encourage further the development of, and investment in, low-emission or zero-emission distributed ledger technologies."

42. Nevertheless, the references to emissions are nothing more than an ideal, which will remain a dead letter since no requirement is regulated to implement this policy. It seems to be an aspirational final tagline of EU policies but not pragmatic at present, being aware of the challenges posed by crypto assets in terms of energy consumption[77]. For example, Proof of Stake can save electricity costs and enable faster blockchains compared to Proof of Work, bringing better security and scalability to networks that implement it[78].

43. The Commission Action Plan on Sustainable Finance (2018) could have been considered in the Pilot Regulation[79]. The Action Plan (2018) projects different options like incorporating climate risks into institutions' risk management policies and on the potential calibration of banks' capital requirements in the Capital Requirement Regulation and a proposal for requiring asset managers and institutional investors to disclose how they consider sustainability factors in their investment decision making process[80]. Since DLT has been subject to criticism for energy consumption, a kind of measurement in that regard would help sustainable clearing and settlement systems. Financial industry has envisioned private permissioned blockchains which are not energy-intensive[81].

44. However, given that permissionless DLT systems offer more robustness, potentially their use would be better for efficiency. As the Pilot Regulation is a temporary piece of law, these measurements could enhance the future decision of the EU Commission to extend the period, to extend the Regulation to other types of financial instruments, such as derivatives, to amend the Pilot Regulation or make permanent amendments of EU financial law or, in the last option, to terminate specific permissions[82]. Surprisingly, ESMA must report to the EU Commission among other subjects, the impact of the use of DLT on the climate policy objectives of the EU[83]. Nevertheless, this information is not compulsory to report by investment services companies or market operators. Therefore, it is obscure where the data is going to come from.

VI. Concluding remarks

45. This Pilot Regulation is a brave initiative to foster efficiency improvements in trading and post-trading processes. However, it seems to be aimed at incumbents, operators, and service providers in

[77] The European Parliament incorporated "energy consumption" in the Recital 2 of the Regulation in the Report of First Reading. REPORT on the proposal for a regulation of the European Parliament and of the Council on a pilot regime for market infrastructures based on distributed ledger technology (COM(2020)0594 - C9-0305/2020 - 2020/0267(COD)) Committee on Economic and Monetary Affairs Rapporteur: Johan Van Overtveldt. A/2021/0240

[78] B.S. Jiménez-Gómez, "Risk of blockchain for data protection: A European Approach", *Santa Clara High Technology Law Journal,* vol. 36, No. 3, 2020, pp. 281-342.

[79] Communication from the commission Action Plan: Financing Sustainable Growth, Brussels, 8.3.2018, COM(2018) 97 final, available at: https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52018DC0097&from=EN

[80] *Ibid.*

[81] C. Gola, J. Sedlmeir, "Addresing the Sustainability of Distributed Ledger Technology", *Questioni di Economia e Finanza, Banca D'Italia*, 2022, p.8.

[82] *See* art. 14.2 Pilot Regulation.

[83] *See* art. 14.1 (f) Pilot Regulation.

capital markets with the aim of adopting a disruptive technology, even though the recitals say otherwise. Exemptions are produced on demand, and they are only temporary. A maximum of six years[84], together with the possibility of not granting authorizations or even revoking them for many different reasons, some of them are not even in the hands of applicants. For example, the threshold of added-value financial instruments that can be traded on DLT market infrastructure.

46. The Pilot Regulation ignores several principles that should guide public administration, such as transparency. Reports of competent authorities or ESMA influence to authorize an exemption from legal requirements, but they are not public. This lack of publicity is an obstacle to knowledge of population about how to comply with the regulation insofar as it does not encourage new interested persons to request to participate in DLT market infrastructures and it may have opposite effects.

47. In addition, lack of interest in including sustainability objectives is also not consistent with the premise that technology will lead us towards cleaner societies or the promise that digitized finance will be better for investors, to the extent that there is no control of emissions in the Regulation nor is any respective obligation articulated in the future. This absence is also not consistent with other policies of national and European regulators and it may cause effects contrary to those intended.

48. In the financial sector, innovation has been very slow due to regulatory burdens. This new Pilot Regulation intends not to be an obstacle to innovation, but on many occasions the Regulation lacks clarity and should be simpler if it intends to attract start-ups to the European continent. Hiring multiple advisors (only to comply with the regulatory framework) is not something cheap and all costs that companies incur in the end are passed on to the client. Therefore, greater linguistic simplicity and not referring to vague or undefined concepts in the Regulation, such as with respect to compensatory measures would help to make the Pilot framework well defined for potential participants.

49. Finally, the significance of this Pilot Regulation could be enhanced if it coordinates with other policy goals, such as sustainability and transparency set by the EU legislator. Lacking that coordination, this Pilot Regulation could be perceived as a miss opportunity to foster a digital and green financial markets transition.

[84] Three years since the applicability date which is 23.03.2023 to the ESMA submission report on 24.03.2026. This period can be extended three years more. *See* arts. 14.2 (a) and art. 19 Pilot Regulation.