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The role of private and public regulation in the case study of crypto-assets: The Italian move towards participatory regulation

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ABSTRACT

With the Digital Financial package (MiCA, DLT Pilot, and DORA, later on complemented by the DAC8 proposal) the European Union seeks to establish an appropriate legal framework for crypto-assets showing a financial nature. The package represents a first attempt to regulate a complex and emerging phenomenon, characterised by significant trade-offs. Unsurprisingly, in this early stage of the law-making process several relevant aspects of the crypto environment remain unaddressed, such as pure DeFI models, DAOs, and NFTs. Such regulatory gap is to a large extent attributable to the difficulty of addressing technologically complex issues through command-and-control top-down legislation. The improvements delivered by the Better Regulation Agenda are not enough to solve this conundrum. In this context, the Communication by the Bank of Italy on Decentralised Technology in Finance and Crypto-assets and its first move, the smart-contract MoU, provide an interesting case study to discuss the potential of 'participatory regulation.' This experimental form of regulation tries to get the most out of co-regulation, self-regulation, and command-and-control, combining their characters with the view of reconciling the technology neutrality principle with technology-based regulation. Participatory regulation aims to bridge the public and private sector in order to strike a right balance between flexibility and legal certainty, without stifling innovation.

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1. Introduction

Distributed ledger technologies (DLTs) and, among them, blockchain[1] are rapidly changing the FinTech[2] scene. A multitude of crypto-assets, intended as 'digital representations of value or rights,'[3] is flourishing on their shoulders. Most of them have a financial function. Unsurprisingly, the phenomenon has soon attracted the attention of financial supervisors and regulators.[4] The Digital Financial Package represents the first comprehensive legal framework dealing with it.[5]

Following the adoption of the DLT Pilot Regulation,[6] the European Parliament and the Council passed the Markets in Crypto-Assets Regulation (MiCA)[7] and the Digital Operational Resilience Act (DORA).[8] The interest shown by the EU is very timely: even in the wake of Terra/Luna collapse (May 2022) and FTX bankruptcy (January 2023), crypto trading activity significantly increased.[9] Thus, there is an urgent need to establish an appropriate legal framework for crypto-assets at EU level, in order to fill legal gaps while avoiding the risk of legal fragmentation from State to State.[10] In this context, the declared objective of the EU package is safeguarding public interests such as financial stability, prevention of crime, transparency, in-

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[1] Stuart Haber and W. Scott Stornetta, 'How to time-stamp a digital document' (1991) 3(2) Journal of Cryptology 99-111 is considered the first work on a cryptographically secured chain of blocks. However, the first conceptualization of a decentralised system secured by cryptography is attributable to the work of a person (or a group of people) using the name Satoshi Nakamoto (see the white paper 'Bitcoin: A Peer-to-Peer Electronic Cash System', released in 2008, available at <https://bitcoin.org/bitcoin.pdf>; hereinafter, all links are last accessed on 15 April 2023). In a nutshell, Blockchain is a combination of already existing technologies which develop the idea of DLT in an innovative manner. The trustworthiness of each transaction recorded on the distributed ledger is not verified by a central authority but originates from the fact that an identical copy of the ledger is held by each user on the network ('nodes'). Each blockchain network has its own consensus mechanism ensuring that all the 'blocks' of transactions are valid and all participants approve and store the same version of the ledger. Once recorded, the transaction becomes immutable, unless a new consensus is achieved between the members of the network (see OECD (2018). 'The OECD Blockchain Primer', <https://www.oecd.org/finance/OECD-Blockchain-Primer.pdf>). Blockchains can vary in their architecture. They are called public whether any trustless entities can read; permissionless whether any trustless entities can write. In turn, they are called private whether only trusted entities can read; and permissioned whether only trusted entities can write (Damiano Di Francesco Maesa and Paolo Mori, 'Blockchain 30 applications survey', (2020) Journal of Parallel and Distributed Computing 138(C) 99-114, 101).

[2] Fintech consists in the exploitation of technology to design, support and drive disruptive financial business. For an overview on its legal implications, see, among many, Jelena Madir (ed.), FinTech: Law and Regulation (Edward Elgar Publishing 2021, 2nd ed). The impact of Fintech on banking is discussed in ESRB Advisory Scientific Committee. Will video kill the radio star? – Digitalisation and the future of banking, Reports No 12 of January 2022, <https://www.esrb.europa.eu/pub/pdf/asc/esrb.ascreport202201_digitalisationandthefutureofbanking~83f079b5c7.en.pdf>.

[3] According to Recital 2 of the Regulation of the European Parliament and of the Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937 ('MiCA'), crypto-assets are digital representations of value or rights. Representations of value also include external, non-intrinsic value attributed to a crypto-asset by parties concerned or market participants, meaning the value can be subjective and can be attributed only to the interest of someone purchasing the crypto-asset. Crypto-assets are only one of the several applications of blockchain technology in financial markets. See Colleen Baker and Kevin Werbach, Blockchain in financial services. in Jelena Madir (ed), FinTech: Law and Regulation (supra note 2) 123-147, 146-147, concluding – similar to what experts indicated with respect to Fintech innovative start-ups – that 'Blockchain will be incorporated into the back-office processes of financial services firms in order to increase efficiency, liquidity, transparency, and security.' Therefore, not necessarily the crypto-economy will produce a radical disruption or decentralisation of financial institutions.

[4] A flood of report is being issued on the subject-matter: among many, see Federal Reserve Board - Divisions of Research & Statistics and Monetary Affairs (2016). 'Distributed ledger technology in payments, clearing, and Settlement', Finance and Economics Discussion Series 2016-095, <https://www.federalreserve.gov/econresdata/feds/2016/files/2016095pap.pdf>; Bank of England (2022). 'Financial Stability in Focus: Cryptoassets and decentralised finance', <https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-in-focus/2022/cryptoassets-and-decentralised-finance.pdf?la=en&hash=4316FB5539A62CD05015281B31B14FA85AAFE303>; Deutsche Bundesbank (2017). 'Distributed ledger technologies in payments and securities settlement: potential and risks', Monthly Report September 2017, <https://www.bundesbank.de/resource/blob/707710/3f3bd66e8c8a0fbeb745886b3f072b15/mL/2017-09-distributed-data.pdf>, 35-49.

[5] Following the Communication 'A New Industrial Strategy for Europe,' 10 March 2020, COM/2020/102 final, the Commission published a revised 'Capital Markets strategy Union' (Communication from the Commission 'A Capital Markets Union for people and businesses-new action plan,' 24 September 2020, COM(2020) 590 final) and a new Digital Finance Strategy (Communication from the Commission 'a Digital Finance Strategy for EU,' 24 September 2020, COM(2020) 591). These soft law acts set the scene for the Digital Financial Package.

[6] In line with the European Parliament resolution of 3 October 2018 on distributed ledger technologies and blockchains: building trust with disintermediation (2017/2772(RSP)), the European Parliament and the Council adopted 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 and (EU) No 909/2014 and Directive 2014/65/EU.

[7] *Supra* note 3.

[8] Regulation (EU) 2022/2554 of the European Parliament and of the Council of 14 December 2022 on digital operational resilience for the financial sector and amending Regulations (EC) No 1060/2009, (EU) No 648/2012, (EU) No 600/2014, (EU) No 909/2014 and (EU) 2016/1011 (DORA).

[9] Giulio Cornelli, Sebastian Doerr, Jon Frost and Leonardo Gambacorta (2023). 'Crypto shocks and retail losses', BIS Bulletin No 69, <https://www.bis.org/publ/bisbull69.pdf>.

[10] Among many, see Aditya Narain and Marina Moretti (2022). 'The right rules could provide a safe space for innovation', Finance & Development, <https://www.imf.org/-/media/Files/Publications/Fandd/Article/2022/September/Narain.ashx>; OECD (2022). Lessons from the crypto winter: DeFi versus CeFi, OECD Business and Finance Policy Papers, <https://www.oecd-ilibrary.org/deliver/199edf4f-en.pdf?itemId=%2Fcontent%2Fpaper%2F199edf4f-en&mimeType=pdf>.

vestor/consumer protection, cyber-security, and competition, without stifling innovation and depriving society of the benefits that decentralised technologies can unlock, for instance in terms of product-design, cost savings, and financial inclusiveness.

Building on the Digital Financial Package, this paper investigates whether a partial repositioning of the interplay between private and public regulation may be desirable to advance the regulatory standard, exploring new rule-making models. As will be shown below, said experimental avenues would neither imply a retreat from public intervention to the benefit of free and uncontrolled self-regulation, nor an automatic transposition of private law schemes into legal standards. The discussion is rooted in the Italian case study, and namely in the actions recently undergone by the Bank of Italy (BoI) *vis-à-vis* decentralised technology in finance and crypto-assets.

The paper is structured as follows. Section I offers an overview on the crypto-asset landscape. An outline of the Digital Financial Package will be provided in section II. Section III illustrates virtues and limits of the European normative approach to crypto-assets. In section IV special emphasis will be placed on the Communication by the Bank of Italy on Decentralised Technology in Finance and Crypto-assets ('BoI Communication')[11] and the Bank of Italy - Università Cattolica del Sacro Cuore - Roma Tre University memorandum of understandings on smart-contract ('smart-contract MoU').[12] This case study provides the opportunity to discuss, in section V, the potential of 'participatory regulation'.[13] Section VI concludes.

2.   The crypto-assets environment

The crypto-assets environment is quite variegated and shows, at times, blurred differences among different categorisations.

A first distinction can be drawn between natively digital crypto-assets (e.g., non-fungible tokens – NFTs; utility tokens) or digital representations of non-digital resources (e.g., security tokens; e-money tokens).

A second distinction relies in the degree of decentralization to which the issuance and circulation of crypto-assets are subjected.

Decentralised finance (DeFi) embodies the maximum level of decentralisation.[14] This broad term includes all those financial services with no centralised point of authority or single point of failure as they are built on the decentralised infrastructure of blockchain technology.[15] By enabling direct participation on a peer-to-peer (or peer to platform) basis,[16] it is often associated to the financial inclusion argument. DeFi services are built on programmable and open architecture and are non-custodial by design.[17] Consistent with their inclusiveness, DeFi services are typically built upon public, permissionless ecosystems (e.g., Ethereum). Accordingly, DeFi applications (DApps) are generally trustless. The International Organization of Securities Commissions (IOSCO) describes DeFI as a 'multi-layered technology stack' consisting of four on-chain layers and a group of key off-chain inputs.[18] By pushing the concept of decentralisation to its maximum, DeFi is considered one of the most disruptive FinTech avenues, with relevant policy implications.[19]

In contrast, the minimum level of decentralisation can be seen in Initial Coin/Exchange Offerings (ICOs/IEOs). It involves the massive issuance of tokens as a tool to raise capital for business projects. Depending on the case, such digital tokens

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[11] <https://www.bancaditalia.it/media/approfondimenti/2022/cripto/en-Comunicazioni-della-Banca-ᴅᴅᴅ-Italia-DLT-cripto.pdf?language_id=1>.

[12] <https://www.bancaditalia.it/media/notizia/smart-contracts-memorandum-of-understanding-between-the-bank-of-italy-universit-cattolica-del-sacro-cuore-and-roma-tre-university/?com.dotmarketing.htmlpage.language=1>.

[13] The expression has been advanced by Fabio Bassan. 'Digital Platforms and Blockchains: The Age of Participatory Regulation' (10 October 2022). European Business Law Review (forthcoming), <https://ssrn.com/abstract=4244139>, and ib., 'Web3 in transition and Participatory Regulation', CPI, 1° February 2023, <https://www.competitionpolicyinternational.com/web3-in-transition-and-participatory-regulation/>.

[14] For an overview, see Raphael Auer, Bernhard Haslhofer, Stefan Kitzler, Pietro Saggese, Friedhelm Victor (2023). 'The Technology of Decentralized Finance (DeFi)', BIS Working Papers No 1066, <https://www.bis.org/publ/work1066.pdf>.

[15] Tech London Advocates (TLA) (2022). Blockchain: Legal & Regulatory Guidance, 2nd ed, 80. For instance, in Italy see the IDEFIC Ecosystemic Project, <https://institutionaldefiforsecuritytoken.com>.

[16] Only peer-to-peer transactions taking place on the so-called 'unhosted wallets' identify DeFi in the strict sense (pure DeFi). When transactions are facilitated by third parties, the so-called 'exchangers', typically providing exchange and digital wallet services, the term DeFi may still be used, but in a non-strict sense.

[17] Namely, rules, rights and obligations are enshrined in protocols and programmes prepared and made freely available on the infrastructure by users of the infrastructure. This makes it difficult to identify a central person or entity to whom governance responsibilities, and thus the competent jurisdiction and applicable law, should be reported.

[18] International Organization of Securities Commissions (IOSCO) (2022). 'Decentralized finance report', <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD699.pdf>, 3. Namely, those layers are: 1) the "settlement layer", consisting of blockchains and "Layer 2" solutions where the consensus state of the blockchain is maintained (i.e., transactions are recorded, and participants and smart contracts have addresses that can hold crypto-assets and interact with other participants and smart contracts); 2) the "asset" layer, consisting of crypto-assets (coins and tokens) that participants and smart contracts create and transfer on the DeFi blockchain; 3) the "smart contract" layer, consisting of smart contracts (and auxiliary software) used to provide functionality to DeFi products and services; 4) the "application" layer, consisting of front-end user interfaces, application programme interfaces (APIs), and other code that allow participants to interact with the smart contracts. Although, to date, most of these applications are hosted off-chain, some of them may be on-chain. Those off-chain inputs make up a "DeFi supply chain" of information, services and assets that can affect the application, smart contract or asset layer.

[19] OECD (2022). 'Why Decentralised Finance (DeFi) Matters and the Policy Implications', <https://www.oecd.org/daf/fin/financial-markets/Why-Decentralised-Finance-DeFi-Matters-and-the-Policy-Implications.pdf> ESRB (2023). 'Crypto-assets and decentralised finance. Systemic implications and policy options', <https://www.esrb.europa.eu/pub/pdf/reports/esrb.cryptoassetsanddecentralisedfinance202305~9792140acd.en.pdf?853d899dcdf41541010cd3543aa42d37>.

may be used in return for goods or services or securities, commodities or derivatives.[20] ICOs/IEOs imply the existence of an issuing entity. Therefore, although 'tokens' issued by means of an ICO/IEO are built, like crypto-currencies, on DLT technologies, they show, compared to the latter, stronger elements of verticality and centralisation.[21]

A third distinctive element is the dividing line between stable and unstable (or unbacked) assets, the former being commonly referred to as 'stablecoins.' According to the Financial Stability Board, a stablecoin is 'a cryptoasset that aims to maintain a stable value relative to a specified asset, or a pool or basket of assets.'[22] Stablecoins can be asset-backed[23] or algorithm-based.[24] The reference to a reserve reduces the volatility of the crypto-asset, which can be quite high for unstable cryptos such as Bitcoin.[25] When stablecoins are built on a DLT technology, it is more common that permissioned

(rather than permissionless) protocols are used.[26] In turn, the most prominent example of unstable crypto-currency, Bitcoin, is built on a permissionless blockchain. If the reference-asset consists of fiat currency, the stablecoin is defined 'e-money token.' Regardless of whether they are e-money token or not, stablecoins can be used as means of payment, security, derivative financial instrument, or a combination of them. Although the project has been withdrawn, the notorious case of Libra[27] is somewhat emblematic of the 'transformative' nature of a crypto-asset: 'apparently conceived as a stablecoin, with a strong stress on its functions as a means of payment, its nature may in fact be borderline with that of securities and financial instruments, be it an investment fund or a derivative.'[28] Insofar as stablecoins are used as an instrument of payment, they act, in parallel with commercial bank money, as a private currency. In this respect, concerns have been raised about the effectiveness of monetary policies that could be undermined by a remarkable increase in the degree of diffusion and acceptance of this kind of crypto-asset.[29]

These concerns explain the sovereign rush, currently pioneered by China, to launch a central digital bank currency (CBDC), eventually (but unnecessarily[30]) built on blockchain. According to surveys,[31] CBDC can be wholesale-only[32] or

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[20] See S. Howell, M. Niessner and D. Yermack (2018), 'Initial Coin Offerings: Financing Growth with Cryptocurrency Token Sale', European Corporate Governance Institute (ECGI) - Finance Working Paper 564/2018, <https://ecgi.global/sites/default/files/working_papers/documents/finalhowellniessneryermack.pdf>; Filippo Annunziata, Speak, If You Can: What Are You? An Alternative Approach to the Qualification of Tokens and Initial Coin Offerings, (2020) European Company and Financial Law Review 17(2) 129-154.

[21] Filippo Annunziata, Blockchain and financial law: FinTech and crypto-assets. in Oreste Pollicino and Giovanni De gregorio (eds), Blockchain and Public Law Global Challenges in the Era of Decentralisation (Edward Elgar Publishing 2021) 209-224 arguing that the collection of new financial resources, to be employed as the backbone of some kind of entrepreneurial process, is something that looks pretty close to the issue of traditional securities, through an offering on the market.

[22] FSB (2020). 'Regulation, Supervision and Oversight of "Global Stablecoin" Arrangements. Final Report and High-Level Recommendations', <https://www.fsb.org/wp-content/uploads/P131020-3.pdf>, 5.

[23] Asset-backed stablecoins represent value by reference to an underlying reserve which may consist of one or more fiat currencies (e.g., Tether, linked to the US dollar), precious metals (e.g., Digix), securities such as bonds (e.g., SRC), other virtual assets (e.g., MakerDAO) or a portfolio of several assets (e.g., Synthetix).

[24] Algorithm-based stablecoins (e.g., Basis or Frax) deploy an algorithm or protocol which acts as the 'central bank', increasing or decreasing supply. The algorithm-based decision-making process may be fed on third-party data ('oracles') and the governing rules of the algorithm may be changed by the governance process.

[25] As noted by Dirk A. Zetzsche, Ross P. Buckley, Douglas W. Arner, 'Regulating LIBRA: The Transformative Potential of Facebook's Cryptocurrency and Possible Regulatory Responses', (2021) Oxford Journal of Legal Studies 41(1) 80–113, 82, Bitcoin's extreme price volatility means it can only serve as a medium of exchange in instantaneous transactions, so it is currency, but not money. According to Filippo Annunziata, Blockchain and financial law (*supra* note 21) 212 'Bitcoin, on the one hand, may be perceived as an equivalent to money, but, on the other hand, appears closer to a non-traditional asset class, to be considered as a means of storing value, rather than as a means of exchange. […] Rather than considering Bitcoin as money, one should therefore consider it as a kind of investment or a means for storing value, due – *inter alia* – to the expectation that its value might increase in the future (despite its very high volatility).'

[26] IOSCO (2020). 'Global Stablecoin initiatives. Public Report', <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD650.pdf>, 5.

[27] In June 2019 Facebook (Meta) announced, together with 28 partners, the launch of the Libra project. The Libra Association would have been the sole issuer of the Libra coin. Only the Association would have created ('mint') or destroyed ('burn') coins. The Libra Reserve would have consisted of a pool of high-quality short-term government debt or bank deposits. Libra had to operate on a permissioned blockchain, as the initial processing and validating nodes would have been carried out by the members of the Libra Association, that were expected to increase over time. However, Meta had announced from the outset its intention to move towards a permissionless governance after a period of five years. In December 2020, Libra changed its name to Diem, with the view of developing a crypto-assed referenced to US-dollar. In January 2022 the Diem Association announced the selling of its intellectual property rights and of the Diem Payment Network (DPN) payment system to Silvergate Bank.

[28] Filippo Annunziata, Blockchain and financial law (*supra* note 21) 214.

[29] See Martina Tambucci, Blockchain-Based Financial Investments and the Role of Regulatory Authorities: The Italian Perspective. in Benedetta Cappiello and Gherardo Carullo (eds), Blockchain, law and governance (Springer 2021) 103-110, 110.

[30] Whilst DLT may offer potentially useful innovations, there is no presumption that CBDCs inherently require DLT: see Bank of England (2020). 'Discussion Paper: Central Bank Digital Currency', <https://www.bankofengland.co.uk/-/media/boe/files/paper/2020/central-bank-digital-currency-opportunities-challenges-and-design.pdf?la=en&hash=A71920A2FFB6511E43F787019C549262049CC7A8#page=42>, 6.

[31] TLA (2022), Blockchain: Legal & Regulatory Guidance (*supra* note 15) 62-67; Bank of International Settlements (BIS) (2018). 'Central bank digital currencies', <https://www.bis.org/cpmi/publ/d174.pdf>.

[32] As with electronic central bank deposits, wholesale digital token CBDCs would only be accessible by pre-defined users (*i.e.*, qualifying financial institutions) and may (but is not required to) be combined with the use of DLT. Such wholesale-only CBDCs could

of general purpose, the latter being designed according to a token-based[33] or account-based system.[34] CBDCs are intended to be digital representations of fiat currency that are issued and controlled by a central bank. They are 'programmable money', meaning that the behaviour of CBDC accounts or tokens – alone, or in combination with smart contracts or third-party data oracles – can be programmed with instructions beyond those required merely to facilitate or restrict CBDC movement between accounts.[35] Interoperability will be a key element determining the success of CBDCs in cross-border payments. Although the advent of CBDC may strongly reduce the role of commercial banks in the financial system,[36] apparently the G7 economies are not willing to (totally) disintermediate the role of commercial banks.[37]

A further category of crypto-asset is represented by non-fungible tokens (NFTs),[38] the prototype of natively digital crypto. They consist of a unique, non-divisible token, often linked to an object (e.g., digital art or in-game asset) which uses blockchain technology to record ownership and validate authenticity. NFTs are merely database created and recorded on a DLT; however, they contain metadata defining their object.[39] Although they have several applications, NFTs can also be used for payment or investment purposes. Further, they can be digital representation of financial assets ('tokenisation.')[40]

Lastly, an emerging category of crypto-assets is represented by 'social tokens' (also known as 'community tokens'). This kind of asset is linked to a company, an organisation or a person. Social tokens assign the owner direct rewards such as early access to new content, 'money can't buy' experiences, discounts, governance rights and influence on decision making. Social tokens generally have an identifiable entity or individual behind them, which makes them more familiar to permissioned blockchains.[41] Social tokens may qualify as utility tokens for the purposes of MiCA.

3. The Digital Financial package

The Digital Financial Package is built upon three pillars: MiCA; DLT Pilot, and DORA. In a way, the proposal to amend tax transparency rules for crypto-asset transactions can be considered the fourth leg of the EU strategy.[42]

3.1. MiCA

The first pillar of the Digital Financial package is to design a comprehensive legal framework for markets in crypto-assets (MiCA).[43] In particular, the MiCA lays down uniform transparency and disclosure rules on the issuance, offer to the

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also be used as a backing or settlement asset for other payments or stablecoin services, such as payment services or stablecoins offered by the relevant institution.

[33] In a token-based system, the CBDC is created as a token with a specific denomination. The transfer of a token from one party to another does not require reconciling two databases, but is rather the near-immediate transfer of ownership, very much like handing over banknotes from one person to another. For a recommendation of the tokenised model, see ConsenSys (2020). White paper 'Central banks and the future of digital money', <https://cdn2.hubspot.net/hubfs/4795067/ConsenSys-CBDC-White-Paper.pdf>, 17-18.

[34] In an account-based system, the central bank holds accounts for users of the CBDC, and handles itself the debit and credits between users.

[35] For instance, such instructions could include limits on holdings, expiration dates, automated inflation or deflation rates, recipient or transaction restrictions and direct implementation of other forms of public or monetary policy.

[36] Namely, the Bank of England noted that 'if disintermediation [i.e. the conversion of deposits held at commercial banks to CBDCs and the consequential reduction in the banking sector's balance sheet] were to occur on a large scale, that would either imply a large fall in lending or would require banks to seek to borrow significantly more from the Bank of England. This could have profound implications for the structure of the banking system and the [Bank of England's] balance sheet:' Bank of England (2020). 'Discussion Paper: Central Bank Digital Currency' (*supra* note 30) 35. More in detail, in our system central banks support commercial bank money in various ways, by: (i) allowing commercial banks to settle interbank payments using central bank money; (ii) enabling convertibility between commercial and central bank money through banknote provision; and (iii) offering contingent liquidity through the lender of last resort function. Importantly, while cash and reserves are a liability of the central bank, commercial bank deposits are not.

[37] According to G7 (2021). 'Public Policy Principles for Retail Central Bank Digital Currencies (CBDCs)', <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1025235/G7_Public_Policy_Principles_for_Retail_CBDC_FINAL.pdf>, Principles 9 and 10, CBDCs should complement cash and existing central bank money, and co-exist with robust private money to support public policy objectives.

[38] TLA (2022), Blockchain: Legal & Regulatory Guidance (*supra* note 15) 86-98.

[39] Namely, such metadata define: i) the name of the NFT; ii) the smart contract address which manages the ownership and transferability of the NFT; iii) the associated asset(s). The associated asset is not normally stored on-chain. However, it is common practice for the creators/issuers of NFTs to store them on other forms of decentralised and distributed file storage systems (DFSS) – for example, the InterPlanetary File System (IPFS).

[40] Indeed, in the context of global anti-money laundering (AML) and counter-terrorist financing (CFT), the Financial Action Task Force (FATF) explained that 'some NFTs that on their face do not appear to constitute VAs [i.e., virtual assets] may fall under the VA definition if they are to be used for payment or investment purposes in practice. Other NFTs are digital representations of other financial assets already covered by the FATF Standards. Such assets are therefore excluded from the FATF definition of VA, but would be covered by the FATF Standards as that type of financial asset. […] Countries should therefore consider the application of the FATF Standards to NFTs on a case-by-case basis' (FATF (2021). 'Virtual assets and virtual asset service providers. Updated guidance for a risk-based approach', <https://www.fatf-gafi.org/media/fatf/documents/recommendations/Updated-Guidance-VA-VASP.pdf>, 24, Section 53).

[41] TLA (2022), Blockchain: Legal & Regulatory Guidance (*supra* note 15) 102-104.

[42] See Proposal for amending Directive 2011/16/EU on administrative cooperation (DAC) in the field of taxation (2022/0413(CNS)) (DAC8).

[43] For comments on the draft proposal, see Valeria Ferrari, 'The regulation of crypto-assets in the EU – investment and payment tokens under the radar', (2020) Maastricht Journal of European and Comparative Law 27(3) 325–342; Marek Bočánek, 'First draft of crypto-asset regulation (MiCA) with the European Union and

public and admission to trading of crypto-assets; additionally, it governs the authorisation and supervision of crypto-asset service providers (CASPs).[44] The Regulation intends to protect investors, promote innovation and competition, safeguard financial stability,[45] ensure the smooth operation of payment systems, avoid monetary policy risks, prevent market abuse and insider dealing.[46] In force of the technology neutrality principle, crypto-assets that are already covered by existing legislation, such as financial instruments,[47] de-

posits,[48] funds,[49] or securitisations,[50] fall outside the scope of MiCA and shall remain covered by existing regulation.[51] Non-fungible tokens are not covered by the Regulation either,[52] but the Commission shall investigate, after a period of 18 months, whether adopting a legislative proposal specifically targeting them.[53] MiCA divides crypto-assets into three categories: 1) asset-referenced tokens (ARTs), consisting of a means of exchange, other than e-money tokens, that purports to maintain a stable value by referencing to another value or right or a combination thereof, including one or more official currencies ;[54] 2) e-money tokens (EMTs), consisting of a medium of exchange that purports to maintain a stable value by referencing to the value of one official currency ;[55] 3) crypto-asset that are not ARTs or EMTs and that provide access to a good or service supplied by the issuer of that token, commonly referred to as 'utility tokens.'[56] ARTs and EMTs represent sub-categories of stablecoins.[57]

MiCA establishes specific rules for the issuance/offering of each of the three types of crypto-assets.

The issuer of ARTs has an obligation to publish a white paper previously approved by the competent authority.[58] This

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potential implementation', (2021) Financial Law Review 22(2) 37-53; Agata Ferreira and Philipp Sandner, 'EU search for regulatory answers to crypto assets and their place in the financial markets' infrastructure', in (2021) Computer Law & Security Review 43(105632); Dirk A. Zetzsche, Filippo Annunziata, Douglas W. Arner and Ross P. Buckley, 'The Markets in Crypto-Assets regulation (MiCA) and the EU digital finance strategy', (2021) Capital Markets Law Journal 16(2) 203–225. For a comment on the final compromise text, see Tina van der Linden and Tina Shirazi, 'Markets in crypto-assets regulation: Does it provide legal certainty and increase adoption of crypto-assets?', in (2023) Financial Innovation 9(22).

[44] Art. 2(1) MiCA.

[45] According to Edoardo Martino (2022). 'Regulating stablecoins as private money. A critical take on the EU proposal between liquidity and safety', Amsterdam Center for Law & Economics Working Paper No. 2022-07, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4203885>, the MiCA proposal mainly focuses on protecting investors and fostering innovation, whereas financial stability would remain in the background, which might be problematic in case of liquidity dry up. The possible medium/long-term impact of stablecoins on financial stability is investigated in Mitsu Adachi *et al.* (2022). 'Stablecoins' role in crypto and beyond: functions, risks and policy', Macroprudential Bulletin, <https://www.ecb.europa.eu/pub/financial-stability/macroprudential-bulletin/html/ecb.mpbu202207_2~836f682ed7.en.html;> Basel Committee on Banking Supervision (2022). 'Prudential treatment of cryptoasset exposures', <https://www.bis.org/bcbs/publ/d545.pdf>. The question, although delicate, is one of a futuristic nature: so far, the level of banks' exposure in crypto-assets appears to be modest: see Renzo Corrias (2022). 'Banks' exposures to cryptoassets – a novel dataset', Basel III Monitoring Report September 2022, <https://www.bis.org/bcbs/publ/d541_crypto.pdf>, 101-106, representing that total crypto-asset exposures reported by respondent banks amount, in relative terms, to approximately 0.14% of total exposures (on a weighted average basis across the sample of reporting banks).

[46] Recitals 6 and 95 MiCA. Interestingly, commenting the launch of the Libra project, the first global stablecoin which was considered, at the time, in a position to compete with fiat currency, Dirk A. Zetzsche, Ross P. Buckley, Douglas W. Arner, Regulating LIBRA (*supra* note 25) 98 identified the following areas for a future EU-wide regulation: consumer protection (therein widely referred to investors, customers, clients, and/or depositors); financial stability; market integrity (criminal activities); macroeconomic, political and stakeholder concerns.

[47] Directive 2014/65/EU. According to F. Annunziata, Blockchain and financial law (*supra* note 21), 222, 'a token – that is not merely a 'transferable instrument' or a fund's unit – should be considered as a financial instrument if – having ascertained its derivative nature – it is traded on a platform qualified as a trading venue under MiFID II. The question whether a pure utility token, or a hybrid token, is a financial product shall be answered verifying if: (i) the token has an 'underlying'; (ii) the value of the token can vary in function of such 'underlying'; (iii) the token can be settled in cash, or if – in fact – it is negotiated on a trading venue.' The abil-

ity of tokens to act as financial instruments has been first recognised by the SEC in the DAO case, where it found that the tokens at hand were covered by Section 2(a)(1) of the Securities Act and Section 3(a)(10) of the Exchange Act, as they represented 'investment contracts', that is 'an investment of money in a common enterprise with a reasonable expectation of profits to be derived from the entrepreneurial or managerial efforts of others' (15 U.S.C. Sections 77b-77c). For a discussion on the impact of the SEC decision in Europe, see Chris Thomale and Philipp Hacker, 'Crypto-Securities Regulation: ICOs, Token Sales and Cryptocurrencies under EU Financial Law', (2018) European Company and Financial Law Review 15(4) 645-696. Since only investment tokens, contrary to utility and payment tokens, qualify as securities, somehow anticipating the MiCA proposal the Authors noted that a legal framework governing tokens that are uncovered by MIFID II and Securitisation Regulation would be welcome to address, for instance, aspects such as (crypto) consumer protection and (crypto) payment services. See also Evariest Callens, 'Financial instruments entail liabilities: Ether, bitcoin, and litecoin do not', (2021) Computer Law & Security Review 40(105494). For further discussion, also with specific respect to the Italian regulatory landscape, see Ugo Malvagna, Filippo Sartori, 'Cryptocurrencies as 'Fungible Digital Assets' Within the Italian Legal System: Regulatory and Private Law Issues', (2022) The Italian Law Journal 8(1) 481-501, 484-488.

[48] Directive 2014/49/EU and Directive 2014/65/EU.

[49] Directive 2015/2366/EU.

[50] Regulation (EU) 2017/2402.

[51] Recital 9 and Article 2(4) MiCA.

[52] Article 3 MiCA.

[53] Article 142(2)(d) MiCA.

[54] Article 3(6) MiCA.

[55] Article 3(7) MiCA.

[56] Article 3(9) MiCA.

[57] In its Opinion delivered on 19 February 2021 on a proposal for a regulation on Markets in Crypto-assets, and amending Directive (EU) 2019/1937 (CON/2021/4), the European Central Bank (ECB) seemed sceptical about the policy choice of regulating two sub-categories of stablecoins, noting that 'asset-referenced and e-money tokens should be subject to similar requirements in order to prevent the risk of regulatory arbitrage' (see, in particular, Sections 2.1.4 and 3.2.4).

[58] Articles 17(1)(a) and 19 MiCA.

step is similar to a prospectus requirement.[59] Issuers are liable for the information given in the white paper.[60] The authorisation to issue ARTs can be granted only to legal persons established in the EU. It is conditional on the fulfilment of capital requirements and the preparation of a recovery and redemption plan.[61]

EMTs can only be issued by credit institutions and electronic money institutions.[62] EMTs represent a sub-category of e-money under Art. 2, n. 2 of the e-money Directive (EMD).[63] As a consequence, MiCA adds a new category of 'currency' to those already existing (cash; scriptural or bank commercial money; electronic money; and, now, e-money token). Like for ARTs, EMTs issuers shall publish a crypto-asset white paper notified to the competent authority[64] and be liable for information therein included ;[65] however, differently from ARTs, the approval of the white paper by competent authorities is not required.[66] EMTs issuers shall adopt recovery and redemption plans.[67]

Issuers of 'utility tokens' shall be legal persons (regardless of where they are established), and are obliged to publish and notify the competent authority a white paper (which, like EMTs, is not subjected to a previous approval by the competent authority).[68] They shall be liable for information provided in the white paper[69] and offer a 14 calendar-days right of withdrawal to retail holders.[70] In order to offer to the public (or be admitted to trade on a trading platform) such utility tokens, the legal person shall satisfy specific requirements.[71]

The European Banking Authority (EBA) can classify as 'significant' given ARTs[72] and EMTs,[73] which will then be subjected to more extensive requirements and be supervised by the EBA itself, instead of national competent authorities (NCAs).

The rules on CASPs represent the second pillar of the Regulation. They apply to entities performing given services.[74] In order to obtain the authorisation CASPs shall be legal persons established in the EU and respect capital requirements.[75] Depending on the type of service, specific requirements for the management body can be drawn, such as, for instance, good repute.[76] CASPs shall notify in writing to competent authorities the decision to acquire, directly or indirectly, a qualifying holding in a CASP or to further increase, directly or indirectly, such a qualifying holding so that the proportion of the voting rights or of the capital held would reach or exceed 20%, 30% or 50% or so that the crypto-asset service provider would become its subsidiary.[77] CASPs shall be considered 'significant' if they have, on average, at least 15 million active users in one calendar year in the EU.[78] In this case, the NCAs of the home Member State shall update the European Securities and Markets Authority (ESMA) Board of Supervisors once per year about key supervisory developments.[79] In order to increase the level of transparency of the crypto market, ESMA shall establish a register of: a) crypto-asset white papers of utility tokens; b) issuers of ARTs; c) issuers of EMTs; and d) CASPs.[80]

In case of qualified infringements of the Regulation, the EBA (or competent NCA) shall adopt decisions imposing a fine.[81] In addition, the EBA shall impose periodic penalty payments to compel given activities.[82]

3.2. DLT Pilot

The second pillar of the Digital Financial Package is the DLT Pilot Regime.[83] The Regulation is intended to boost the promotion of market infrastructures based on DLTs through a pilot regime designed to support innovative financial instruments in tokenised form, while preserving safety and market integrity. Tokenisation of financial instruments concerns

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[59] Paolo Giudici and Guido Ferrarini, Digital Offerings and Mandatory Disclosure: A Market-Based Critique of MiCA. in Emilios Avgouleas and Heikki Marjosola (eds), Digital Finance in Europe: Law, Regulation, and Governance (De Gruyter 2021) 87-108, stand in favour of a market-based approach, arguing that activities such as blockchain offering securities (under MIFID II) or utility tokens (under MiCA) should be left free to decide what information to offer to investors, as long as the information provided is free from false or misleading statements, and does not omit any material fact. Indeed, blockchain investors would know where to get the relevant information they need. A reversal of the burden of proof for losses incurred would be sufficient to protect investors while preserving innovation. On a more general note, the Authors seem sceptical about the actual benefits of mandatory disclosure regulation.

[60] Article 26 MiCA.

[61] Articles 16 and 17, 46 and 47 MiCA.

[62] Article 48(1)(a) MiCA.

[63] Article 48(2) MiCA, referring to Directive 2009/110/EC, as amended by Directive (EU) 2015/2366.

[64] Articles 48(1)(b) and 51 MiCA.

[65] Article 52 MiCA.

[66] Article 51(11), II period MiCA.

[67] Article 55 MiCA.

[68] Articles 4(1)(a)(c)(d), 5(1)(a)(c)(d), 6, and 8(3) MiCA.

[69] Article 15 MiCA.

[70] Article 13 MiCA.

[71] Article 14 MiCA.

[72] Article 43 MiCA.

[73] Article 56 MiCA.

[74] Article 3(16) MiCA lists the following CASPs: a) the custody and administration of crypto-assets on behalf of clients; b) the operation of a trading platform for crypto-assets; c) the exchange of crypto-assets for funds; d) the exchange of crypto-assets for other crypto-assets; e) the execution of orders for crypto-assets on behalf of clients; f) placing of crypto-assets; g) reception and transmission of orders for crypto-assets on behalf of clients; h) providing advice on crypto-assets; i) providing portfolio management on crypto-assets; j) providing transfer services for crypto-assets on behalf of clients.

[75] Article 59 MiCA.

[76] Article 62(2)(g) MiCA.

[77] Article 83 MiCA.

[78] Article 85(1) MiCA, specifying that such average is calculated on the daily number of active users throughout the previous calendar year.

[79] Article 85(3) MiCA.

[80] Article 109(1) MiCA.

[81] Article 131 and 111 MiCA.

[82] Article 132 MiCA.

[83] For a comment on the Commission's proposal, see Giovanni Zaccaroni, 'Decentralized Finance and EU Law: The Regulation on a Pilot Regime for Market Infrastructures Based on Distributed Ledger Technology', (2022) European Papers 7(2) 601-613; Randy Priem, 'A European distributed ledger technology pilot regime for market infrastructures: finding a balance between innovation, investor protection and financial stability', (2022) Journal of Financial Regulation and Compliance 30(3) 371-390.

the digital representation of financial instruments on distributed ledgers or the issuance of traditional asset classes in tokenised form to enable them to be issued, stored and transferred on a distributed ledger.[84] Therefore, the DLT Pilot is not addressed to all crypto-assets, but only to those that qualify as financial instruments. It has a clear vertical dimension and shall not be confused with the broader horizontal project launched, beyond the reach of financial services, by the Commission on 14 February 2023 to establish a European Blockchain Regulatory Sandbox (2023–2026).[85] The Regulation is designed to reconcile technological innovation with a high level of investor protection, market integrity, financial stability and transparency.[86] In addition, it seeks to avoid regulatory arbitrage and loopholes.[87] DLT market infrastructures can be of three kinds: 1) DLT multilateral trading facilities (DLT MTF); 2) DLT settlement systems (DLT SS) ;[88] and 3) DLT trading and settlement systems (DLT TSS).[89]

The Pilot Regime creates a temporary exempted zone supervised by ESMA and national competent authorities, also in the view of drawing lessons and gaining experience of the opportunities and specific risks relating to crypto-assets that qualify as financial instruments and to their underlying technologies.[90] The status as DLT market infrastructure is optional and does not prevent financial market infrastructures such as trading venues, central securities depositories (CSDs) and central counterparties (CCPs) from developing trading and post-trading services and activities for crypto-assets that qualify as financial instruments, or are based on DLT, under existing Union financial services legislation.[91]

Operators of DLT market infrastructures shall establish clear and detailed business plans describing how they intend to carry out their services and activities. They shall also make publicly available up-to-date, clear and detailed written documentation that defines the rules under which the DLT market infrastructure and its operators act.[92] Operators of DLT market infrastructures should be liable in the case of a loss of funds, of collateral or of a DLT financial instrument, limited to the market value of the asset lost as of the time the loss incurred, unless the operator of the DLT market infrastructure demonstrates that the event occurred independently of its operations.[93] In any case, to avoid any risk to financial stability, the aggregate market value of DLT financial instruments admitted to trading or recorded on a DLT market infrastructure is limited to 6 billion euros at the moment of admission to trading, or initial recording, of a new DLT financial instrument.[94] In the same vein, the types of financial instrument admitted to trading or recorded on a DLT market infrastructure are limited to shares, bonds, and units in collective investment undertakings that benefit from the execution-only exemption under Directive 2014/65/EU.[95] Further, applicants shall propose compensatory measures to mitigate risks arising from insolvency.[96] Operators of DLT market infrastructures shall provide their members, participants, issuers and clients with clear and unambiguous information regarding how the operators carry out their functions, services and activities, including, of course, the type of DLT used.[97] Operators of DLT market infrastructures shall ensure that the overall information and communication technology (ITC) and cyber arrangements related to the use of their DLT are proportionate to the nature, scale and complexity of their businesses.[98] Operators of DLT market infrastructures should also have in place a credible exit strategy in case the pilot regime is discontinued, the specific permission or some of the exemptions granted are withdrawn, or the thresholds set out in this Regulation are exceeded.[99] The DLT Pilot regime is based on a system of permissions[100] and exemptions.[101] Permissions are granted for a period of up to six years from the date on which the specific permission was

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[84] See Recital 3 DLT Pilot and OECD (2020). 'The Tokenisation of Assets and Potential Implications for Financial Markets', OECD Blockchain Policy Series, < https://www.oecd.org/finance/The-Tokenisation-of-Assets-and-Potential-Implications-for-Financial-Markets.pdf>.

[85] All information available at <https://digital-strategy.ec.europa.eu/en/news/launch-european-blockchain-regulatory-sandbox> and <https://ec.europa.eu/digital-building-blocks/wikis/display/EBSI/Sandbox+Project>.

[86] Recital 6 DLT Pilot.

[87] The concern for regulatory arbitrage and loopholes is consistent with the Conclusions from EBA (2018). 'Consultation on the EBA's Approach to Financial Technology' <https://eba.europa.eu/documents/10180/1919160/EBA+FinTech+Roadmap.pdf>, 12, noting that the creation of EU sandboxes could prevent 'forum shopping'. On a similar note, see also ESAs (ESMA-EBA-EIOPA) (2019). 'Report. FinTech: Regulatory sandboxes and innovation hubs' (JC 2018 74), <https://www.esma.europa.eu/sites/default/files/library/jc_2018_74_joint_report_on_regulatory_sandboxes_and_innovation_hubs.pdf>, whose attempt, however, was creating a common set of best practices to be implemented on a national basis.

[88] While the use of permissionless DLT could allow the elimination of intermediaries (Central Securities Depository – CSD), the solution proposed by the European regulator favours the recourse to permissioned DLTs and seeks to duplicate the presence of traditional financial intermediaries.

[89] Recital 12 DLT Pilot. Further, as explained under Recital 14, the combination of trading and post-trading activities within a single entity is not envisaged by the existing rules, irrespective of the technology used, due to policy choices related to risk specialisation and unbundling for the purposes of encouraging competition. Although the pilot regime should not be meant as a fundamental overhaul of the separation of trading and post-trading activities, in view of the potential benefits of DLT it is justified to combine the activities normally performed by multilateral trading facilities and securities settlement systems (DLT TSS).

[90] Recital 6 DLT Pilot.

[91] Recital 7 DLT Pilot.

[92] Article 7(1) DLT Pilot.

[93] Recital 22 and Article 7(6) DLT Pilot.

[94] Article 3(2) DLT Pilot.

[95] Article 3(1) DLT Pilot.

[96] Articles 8(4)(h), 9(4)(h), and 10(4)(h) DLT Pilot.

[97] Article 7(3) DLT Pilot. According to the ESMA (2017). Report 'The Distributed Ledger Technology Applied to Securities Market,' <https://www.esma.europa.eu/sites/default/files/library/dlt_report_-_esma50-1121423017-285.pdf>, 4 'permissioned DLTs have a number of advantages compared to permissionless systems when it comes to governance issues, scale or the risk of illicit activities, which makes them more suitable for securities markets.'

[98] Article 7(4) DLT Pilot, to be read in conjunction with DORA (see below para. 2.3).

[99] Recital 43 and Article 7(7) DLT Pilot.

[100] Articles 8-10 DLT Pilot.

[101] Articles 4-6 DLT Pilot.

granted, and should be valid only for the duration of the pilot regime.[102] Consistent with the declared objective to fuel (and eventually shape) the development of emerging technologies, cooperation between operators of DLT market infrastructures, competent authorities and ESMA is of paramount importance.[103] In this context, ESMA is entrusted with a co-ordination role.[104] The competent authority may require any corrective measures with respect to the business plan of the operator of the DLT market infrastructure, the rules of the DLT market infrastructure and the legal terms in order to ensure investor protection, market integrity or financial stability.[105] In harmony with the optional nature of the DLT Pilot regime, no sanctioning powers exceeding withdrawal of permissions and/or exemptions are assigned to competent authorities by the Regulation.

3.3.   *DORA*

The third pillar of the Digital Financial package is the Digital Operational Resilience Act (DORA). In line with the views expressed in the Commission's 2018 Fintech action plan,[106] DORA supplements and completes the Network and Information Security (NIS) directive,[107] meanwhile repealed by the NIS 2 Directive,[108] to set uniform requirements for the security of network and information systems of companies and organisations operating in the financial sector as well as critical third parties providing ICT-related services, such as cloud platforms or data analytics services. It strives to create an operational resilience risk-management culture.[109] DORA applies to the whole financial sector, insofar as given technological activities are involved. Therefore, CASPs and ARTs' issuers are just two of the many categories of entities to whom the Regulation may apply.[110]

4.   Virtues and limits of the Digital Financial package

Several proposals have been put forward to regulate crypto-assets.[111] As a matter of fact, calibrating the optimal strategy is a quite difficult 'balancing act between compelling driving forces.' Indeed, while some drivers promote decentralization in the name of financial inclusion and increased competition, others forecast a future dominated by few tech players and are concerned about consumer and investor protection, due to new opportunities of fraudulent or abusive conduct that an untransparent environment may unlock.[112]

Against this background, far from adopting a wait-and-see-approach, the EU took a significative step forward by adopting a comprehensive and fully-fledged normative package intended to accompany (and, in some aspects, even shape) the development of the crypto-asset market.[113]

The regulatory effort beneath the Digital Financial Package shows virtues and limits.

First, the Digital Financial package lays down new rules only where a regulatory gap can effectively be noticed. Indeed, crypto-assets that fall under existing EU financial services leg-

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[102] Recital 48, Articles 8(11), 9(11), and 10(11) DLT Pilot.

[103] Article 11 DLT Pilot.

[104] Article 11(5) DLT Pilot.

[105] Article 11(3) DLT Pilot.

[106] Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions, 'FinTech Action plan: For a more competitive and innovative European financial sector,' 8 March 2018, COM/2018/0109 final.

[107] Directive (EU) 2016/1148, meanwhile repealed by the NIS2 Directive.

[108] Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148. With the view of filling the regulatory gaps arguably left by the AI Act, Antonella Sciarrone Alibrandi, Maddalena Rabitti, Giulia Schneider, 'The European AI Act's Impact on Financial Markets: From Governance to Co-Regulation,' EBI Working Paper Series 2023 – no. 138, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4414559#> explore whether there is room for (fruitful) cooperation among financial supervisors entrusted with the enforcement of DORA and the European Artificial Intelligence Board.

[109] Arg. *ex* Recital 12 DORA: '[This Regulation] explicitly refers to ICT risk via targeted rules on ICT risk-management capabilities, incident reporting, operational resilience testing and ICT third-party risk monitoring. This Regulation should thus also raise awareness of ICT risk and acknowledge that ICT incidents and a lack of operational resilience have the possibility to jeopardise the soundness of financial entities.' Article 3(1) defines 'digital operational resilience' as 'the ability of a financial entity to build, assure and review its operational integrity and reliability by ensuring, either directly or indirectly, through the use of services of ICT third-

party service providers, the full range of ICT-related capabilities needed to address the security of the network and information systems which a financial entity makes use of, and which support the continued provision of financial services and their quality throughout disruptions.'

[110] Article 2(1)(f) DORA.

[111] Corinne Zellweger-Gutknecht, Developing the Right Regulatory Regime for Cryptocurrencies and Other Value Data. in David Fox and Sarah Green (eds), Cryptocurrencies in Public and Private Law (Oxford University Press 2019) 61-92 qualifies cryptocurrency as 'value data' characterised by the rivalrous and excludable nature. According to them, trust shall be the cornerstone of any future regulatory regime. Syren Johnstone, Rethinking the Regulation of Cryptoassets. Cryptographic Consensus Technology and the New Prospect (Edward Elgar Publishing 2021) 117 and 275-277: 'Regulatory agencies will need to look for new mechanisms for bringing oversight to the industry that involve strategies different from those previously employed. Such mechanisms may be called attraction regulation. Actors in the industry that are seeking to be regulated are doing so for a number of good reasons [...]. High-level principles based on attraction regulation [...] may produce increased oversight over larger parts of the commercial market by appealing to the desire for validation, legitimacy, and growth. [...] It is important that public regulation is not prematurely imposed on innovative new ways of developing commercial activity in a manner that may inhibit the ability of private market regulation to develop effective outcomes that align with public policy.'

[112] Editorial by Emilios Avgouleas and Heikki Marjosola, Digital Finance in Europe (*supra* note 59) V-X.

[113] Approximately two years ago Agata Ferreira and Philipp Sandner, 'EU search for regulatory answers to crypto assets (*supra* note 43)' 14-15 wished that Europe would not miss the opportunity to influence the trajectory of financial innovation and set the tone for a progressive and inclusive regulatory approach to crypto-assets while mitigating risks and minimizing negative externalities.

islation remain regulated under the existing regulatory framework, regardless of the technology used for their issuance or their transfer.[114] This approach appears consistent with the view that 'entire areas of current legislation may […] already apply to crypto-assets,' so that 'the myth of crypto-assets being totally unregulated [would be] completely fake.'[115]

Second, and similar to the Artificial Intelligence Act proposal,[116] both MiCA and DLT Pilot, although relying on authorisation/licensing, and, only to a limited extent, designation, depart from the model of regulation by subject (recently iterated by the DMA[117] and, limited to Very Large Online Platforms and Search Engines, DSA)[118] and overcome the idea of regulation by product/activity, which is still present in DORA. Indeed, MiCA and, especially, DLT Pilot adopt a technology-based perspective.

At the same time, however, Recitals 9 DLT Pilot[119] and 9 MiCA[120] recall the technology neutrality principle, intended as 'same activities, same risks, same rules.' This raises two kinds of objections, the former regarding the declared indifference of the Union to the technologies involved, the second concerning the policy choice to apply the same rules when the same product/service is built on different technologies.

With respect to the first objection it has been observed that, in the wake of the Web3 era, technology neutrality would not be more than a superstition.[121] Although formally mention-

ing such principle, MiCA and DLT Pilot would in fact follow the opposite route. By abstaining from directly regulating unstable crypto-assets (e.g., Bitcoin), which are often built on public permissionless blockchains (e.g., Ethereum), MiCA may indirectly make private permissioned blockchains more attractive to investors – although, in abstract, nothing prevents stablecoins from being built on permissionless public blockchains; additionally, in the light of the broad understanding of 'asset-referenced tokens,' which are backed to 'another value or right, or combination thereof, including one or several official currencies' (Recital 18), it cannot be excluded 'that the asset-referenced token will be able to refer to 'assets' which do not have stable value.'[122] In a similar vein, the 'anti-Bitcoin' proposed amendment, toned down in the final compromise text, illustrates that the neutrality principle may be easily contradicted when it comes to regulation by technology.[123] Further, in the final version of MiCA the definition of decentralised autonomous organization (DAO) contained in paragraph 1(1a) of the Parliamentary draft submitted to the trialogue procedure – which identified a DAO as 'a rule-based organizational system that is not controlled by any central authority and whose rules are entirely routed in its algorithm'[124] – has been erased.

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[114] Recital 9 MiCA.

[115] Filippo Annunziata, Blockchain and financial law (*supra* note 21) 215, further noting, however, that 'most of the times one recognizes the difficulties that arise in relation to the proper qualification of the asset and, therefore, of the applicable rules, but the question remains a typical issue of legal qualification of new phenomena.'

[116] Proposal for a Regulation of the European Parliament and of the Council laying down harmonised rules on artificial intelligence (Artificial Intelligence Act) and amending certain union legislative acts (2021/0106/COD).

[117] Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act).

[118] Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act).

[119] 'Union legislation on financial services is intended to be neutral as regards the use of any particular technology over another. Therefore, references to a specific type of distributed ledger technology are to be avoided. Operators of DLT market infrastructures should ensure that they are able to comply with all applicable requirements, irrespective of the technology used.'

[120] 'Union legislation on financial services should be guided by the principles of 'same activities, same risks, same rules' and of technology neutrality. Therefore, crypto-assets that fall under existing EU financial services legislation should remain regulated under the existing regulatory framework, regardless of the technology used for their issuance or their transfer, rather than this Regulation.'

[121] According to Fabio Bassan, 'Digital Platforms and Blockchains: The Age of Participated Regulation (*supra* note 13)' 15 it is apparent that technology neutrality is a superstition to overcome. In a nutshell: if regulation is by technology, regulatory action cannot be neutral with respect to technology. This change of paradigm is inherent to the evolution of the Internet. Indeed, 'Web3 creates a platform (the blockchain) on top of the basic infrastructure

(the Internet). This involves a radical change, the most significant since the birth of the internet, on a conceptual but also a practical level. As for the former: the Internet was a neutral technology and so was the cloud, a platform that had developed on the Internet. The competition operated on the services that the operators provided on the technological platform, which was the same for everyone. With the blockchain, everything changes. The choice of the blockchain involves a technological choice. There are good technologies and bad technologies, not just bad uses of technology. Therefore, blockchain technology is not neutral' (Ib., 'Web3 in transition (*supra* note 13)' 3).

[122] Tomasz Tomczak, 'Crypto-assets and crypto-assets' subcategories under MiCA Regulation', (2022) Capital Markets Law Journal 17(3) 365-382, 374.

[123] The Greens and S&D political parties of the European Parliament proposed an amendment to ban Proof of Work (PoW) crypto-assets, on the ground that the consensus mechanism deserves energy-consuming mining activities. Practically speaking, this amendment would have amounted to a ban on Bitcoin, the most prominent and widespread example of blockchains using PoW consensus mechanism. The MiCA opted for an environmental-friendly approach (Recital 7), which however is limited to a disclosure requirement. Indeed, issuers shall specify in their white papers the environmental impact of the underlying technologies on which crypto-assets are built, according to technical standards adopted by ESMA, in cooperation with EBA (see Articles 6(1)(j) and 6(12), with respect to utility tokens; 19(1)(h) and 19(11), with respect to ARTs; 51(1)(g) and 51(15), with respect to EMTs). However, said disclosure obligation is limited by the scope of MiCA, which, as said, does not (directly) cover unstable crypto-currencies such as Bitcoin. Anyway, there are rumours that the European Commission is working with international partners to develop a grading measure that will encourage more environmentally friendly consensus systems, such as proof of stake (PoS): see <https://www.bloomberg.com/news/articles/2022-10-18/eu-puts-bitcoin-in-crosshairs-with-crypto-energy-labeling-plan>.

[124] In DAOs members decide to trust the underlying software and the smart contracts instead of appointing a (costly) 'middle-man'. This approach has been termed 'rule of code' (Usha R. Rodrigues, 'Law and the Blockchain', (2019) Iowa Law Review 114(2) 679-729, 707). For a useful overview on the legal implications of the concept of DAO, see Oscar Borgogno, 'Making decentralized au-

Recital 22 of the passed version clarifies that MiCA 'should apply to natural and legal persons and certain other undertakings and to the crypto-asset services and activities performed, provided or controlled, directly or indirectly, by them, including when part of such activities or services is performed in a decentralised manner.' However, 'where crypto-asset services are provided in a fully decentralised manner without any intermediary, they should not fall within the scope of this Regulation.'[125] Even the notions of DLT MTF, DLT SS, and DLT TSS adopted in the DLT Pilot seem to imply a certain level of centralisation and thus appear unfamiliar to fully decentralised technologies. After all, the DLT Pilot is about tokenisation of financial instruments. However, MiFID II struggles to apply to decentralised infrastructures. As a result, DeFi platforms and DApps may not be part of the pilot regime.[126] These examples show that technology-based regulation can hardly be technology neutral.

Coming to the second objection, the attempt by MiCA to bring the heterogeneous categories of tokens under the binary logic of financial/payment instrument may be challenged as well. Indeed, it has been noted that the issuing and circulation of digital tokens based on distributed technologies, especially if permissionless, may deserve an *ad hoc* regulation to properly balance the different interests and risks involved in order to guarantee investments and customer protection, regardless of their classification. From a broader perspective, this concern couples with the idea that, even when exploring regulation by technology, the EU law-making process would still be affected by the 'regulatory matrix.'[127]

Ultimately, with the Digital Financial Package the EU strives to secure a global first mover advantage in regulating crypto-related activities. One may see an attempt to reiterate the 'Brussel effect'[128] pioneered by the GDPR.[129] However, the package is a "short blanket," as several crucial aspects remain unregulated. Notably, those *vacua* pertain the most controversial avenues of the crypto environment: DeFI, DAOs, public permissionless blockchains, and NFTs. Hence, it is reasonable to expect that the legislative package represents only the starting point of a wider normative process that has just begun.

The next sections of this paper bring the Italian case study to discuss the potential of 'participatory regulation,' intended as an experimental regulatory model that, in parallel with ordinary law-making process, may help filling the gaps and improving the regulatory standard.

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tonomous organizations (DAOs) fit for legal life: mind the gap', (2022) Banca d'Italia. Questioni di Economia e Finanza (Occasional Papers), No 718, <https://www.bancaditalia.it/pubblicazioni/qef/2022-0718/QEF_718.pdf>, investigating whether a number of issues emerging from DAOs (lack of limitation of liability; governance concerns; the definition and allocation of token-holders' rights) can benefit from the solutions provided by corporate law with respect to management and moral hazard problems involving complex organizations.

[125] Like for NFTs, the Commission shall investigate, after a period of 18 months, whether adopting a legislative proposal targeting pure DeFI (Art. 142(2)(a) MiCA). In any case, anti-money laundering (AML) and countering the financing of terrorism (CFT) rules may apply to DeFi. According to FATF (2021). 'Virtual assets and virtual asset service providers (*supra* note 40)' 27, Section 67 and 32, Section 82 as a general rule 'DeFi application (i.e. the software program) is not a VASP [i.e., value asset service provider] under the FATF standards, as the Standards do not apply to underlying software or technology. However, creators, owners and operators or some other persons who maintain control or sufficient influence in the DeFi arrangements, even if those arrangements seem decentralized, may fall under the FATF definition of a VASP where they are providing or actively facilitating VASP services. This is the case, even if other parties play a role in the service or portions of the process are automated. Owners/operators can often be distinguished by their relationship to the activities being undertaken. For example, there may be control or sufficient influence over assets or over aspects of the service's protocol, and the existence of an ongoing business relationship between themselves and users, even if this is exercised through a smart contract or in some cases voting protocols. Countries may wish to consider other factors as well, such as whether any party profits from the service or has the ability to set or change parameters to identify the owner/operator of a DeFi arrangement. [...] Depending on its operation, there may also be additional VASPs that interact with a DeFi arrangement. [...] A person that creates or sells a software application or a VA platform (i.e., a software developer) may therefore not constitute a VASP, when solely creating or selling the application or platform.'

[126] As noted by Emilios Avgouleas and Alexandros Seretakis, Governing the Digital Finance Value-Chain in the EU: MIFID II, the Digital Package, and the Large Gaps between!. in Emilios Avgouleas and Heikki Marjosola (eds), 'Digital Finance in Europe (*supra* note 59)' 1-35, 28 ff. 'MiFID II was adopted before the rise of digital finance and does not account for the problems posed by new technological developments. As a result, its rules are unable to deal with the new conduct, operational and financial stability issues posed by integrated decentralized platforms, such as aggravated conflicts of interests caused by the integration of functions and operational and cyber-security risks'. More in detail, DeFi allows to combine robo-advisory services, settlement, custody and

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trading within a single platform. This challenges the current legal paradigm, which is premised upon a silo-based approach to the regulation of financial markets and participants. While MiFID II would probably need a general rethinking, they proposed to widen the scope of the DLT Pilot proposal, in order to include DeFi which would not hold an authorization as a MiFID investment firm. Based on the resilience shown by DeFi platforms during the Covid-19 outbreak, they take the view that 'properly regulated DeFi infrastructures can become a safe passage to the democratization and further integration of EU capital markets under the open finance paradigm.' Instead, 'the pilot regime [would be] informed by the expectation that new market trends centered around the new technology could fit into the existing disclosure and licensing based regulatory paradigm for EU financial markets. This [would be], however, an unfounded expectation reinforced by incumbent industry interests.'

[127] Fabio Bassan, 'Web in transition (*supra* note 13)' 9, noting that 'the vertical rules that were no longer effective in the analog world are not becoming "magically" effective in the digital one, let alone the blockchain. In essence, the approach is right, but the regulatory framework that the European lawmaker applies is old and no longer relevant.'

[128] Anu Bradford, 'The Brussels Effect', (2012) Northwestern University Law Review 107(1) 1-68.

[129] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation).

5.   The Communication by the Bank of Italy on Decentralised Technology in Finance and Crypto-assets and the smart-contract MoU

On 15 June 2022 the Bank of Italy adopted a Communication on Decentralised Technology in Finance and Crypto-assets ('BoI Communication'). It pursues a twofold objective: first, 'to remind supervised intermediaries, supervised entities and all those who work in various capacities in decentralized ecosystems, including as users, of the opportunities and risks associated with the use of these technologies in finance and with crypto-asset related activities and services;' second, 'to highlight a number of aspects that are important for defining, on the part of the abovementioned entities, safeguards to mitigate the risks associated with the use of decentralized technologies and/or trading in crypto-assets.'[130]

The Communication is grounded on two building blocks.

The first one is that 'the role of developers and providers of IT solutions, as well as of entities tasked with developing and managing smart contracts, is key to ensuring the proper functioning of the ecosystem and to guaranteeing financial stability and consumer protection.' This qualifying aspect requires enlarging the regulatory perspective. For instance, in DLT ecosystems interrelations between operators and technology providers may be independent of a contractual relationship, so that the existing prudential rules on outsourcing may prove to be ill-suited.[131] It is therefore necessary to start developing models based on a 'scheme' approach.[132]

The second one is that 'DLTs can deliver benefits for users, related to efficiency gains in the provision of financial services, the extension of system operating hours, cost and time savings for cross-border transactions, faster transfer of financial assets and progress on the technological frontier, partly as a result of stronger competition. For this to happen, DLTs must have the characteristics of more mature technologies, i.e. guarantee business continuity and, in general, resilience to scalable cyber-attacks (i.e. be capable of adapting their capacity to record an increasing number of transactions without any significant deterioration in the speed and quality of services), be economically and environmentally efficient (in particular, by supporting a high volume of operations at low and sustainable costs), and have robust and identifiable governance structures.'[133]

Based on the preceding assumptions, the Communication offers an interesting overview on the main market trends.

In light of this, depending on the case, asset-linked stablecoins can act as both a payment and investment instrument,[134] the Bank of Italy takes a quite straightforward view, affirming that the use of unbacked crypto-assets 'should not be in any way be promoted.'[135]

The analysis shifts then to the legislative changes brought by the Digital Financial Package. In this context, it is submitted that, while representing a first and important step forward, MiCA does not address all the different issues posed by crypto assets and their application in decentralised finance. From a subjective point of view, the regulation introduces rules applicable to clearly identifiable entities (i.e., issuers, providers, service providers), which do not exhaust the range of entities involved in decentralised finance systems. Therefore, the following will not be regulated: smart contract programmers and governance token holders of decentralised autonomous organizations (DAOs); unhosted wallets, i.e., software that allows peer-to-peer transfers between DLT addresses.[136]

In this context, the BoI adopted some non-binding guidelines to the benefit of regulated entities, financial intermediaries, other operators, and clients.

In the first instance, pending the adoption of specific provisions on the subject-matter, the BoI clarified to entities and financial intermediaries its reading of how existing prudential rules may apply to crypto-related activities.[137]

Further, the BoI provides guidance to banks and intermediaries also with respect to consumer/customer protection. Indeed, the Communication mentions the need to ensure the appropriate definition of the customer segments to which entities and intermediaries intend to offer/distribute products or services in crypto-assets, assessing the introduction of qualitative and quantitative operational limits. Interestingly, particular attention shall be paid to protect customers against legal and reputational risks arising from transactions carried out through portals or trading platforms to which access is granted or facilitated. Notably, the Communication gives a

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[130] BoI Communication, 1.

[131] BoI Communication, 3.

[132] Piero Cipollone (Deputy Governor of the BoI) (2022). 'Keynote speech', Conference on Digital Platforms and Global Law', Rome, 29 April 2022, <https://www.bancaditalia.it/pubblicazioni/interventi-direttorio/int-dir-2022/en_CIPOLLONE_29_aprile_2022.pdf?language_id=1>, 5.

[133] BoI Communication, 3. Blockchain 4.0 meets those requirements. See Silvio Micali, 'Blockchain 4.0', Conference on Digital Platforms and Global Law, Rome, 29 April 2022, <https://www.unidroit.org/wp-content/uploads/2022/05/BLOCKCHAIN-4.0-UNIDROIT-29-APRIL-2022-VERSIONE-2.pdf>, and Fabio Bassan, 'Digital Platforms and Blockchains (*supra* note 13)' 21-22: 'Public (permissionless) blockchains decentralize consensus, facilitate exchanges and, by distributing information, eliminate asymmetry and reduce access barriers, supporting competition. They can also be fully compliant with data pro-

tection rules. Only 4.0 blockchains have all these features: they are secure, scalable and decentralized, green and sustainable, upgradable, they operate without interruption, do not fork, provide for decentralized interoperability, and for simultaneous, secure affordable and unmediated bilateral exchanges.'

[134] Indeed, 'a trading or store of value function could, to some extent, be associated with crypto-assets (also backed by a reserve) whose value is anchored to low-volatility assets and linked to a lender's right to the market value of the underlying asset. Other crypto-assets, anchored to instruments that are potentially volatile such as financial instruments, though also backed by a redemption right for users, may have an investment function as they are predominantly speculative and therefore characterized by higher risk profiles': see BoI Communication, 5.

[135] BoI Communication, 5.

[136] Ib., 8.

[137] Such activities include: the financial exposures limitation; issuance/redemption of crypto-assets; custody and management of the reserve in the case of asset-linked stablecoins; infrastructure management and transaction validation; provision of CASs (e.g. digital wallet; exchange; trading platform; order execution; placement, and receipt and transmission of orders on behalf of third parties; and advisory services). See BoI Communication, 9-10.

specific warning about unstable crypto-assets, affirming that 'it is strongly recommended that the intermediary does not enable or facilitate such access if there is no way for it to verify that these portals or platforms are able to prevent trading in high-risk crypto-assets (e.g. unbacked crypto-assets).'[138]

In the second instance, the BoI provides guidance to a larger group of operators (scheme operators, wallet providers, payment infrastructure providers – which do not qualify as entities and financial intermediaries), and technology providers. After making this clear, consistent with the findings of the CPMI-IOSCO report,[139] by 15 November 2022 stablecoin arrangements fall under the Eurosystem 'PISA framework' radar,[140] the BoI put forward a number of recommendations. In particular: i) DLT architecture and technology management shall be designed in a clear-cut manner, so that risks (e.g., operational, cyber, information and data protection), where possible (e.g., permissioned DLTs), can be referenced to programme developers that determine the functioning of DLT or to subjects with powers for managing DLT functions; ii) technology service providers, where clearly identifiable, may fall under the supervisory rules as an outsourcee of supervised intermediaries and/or be subject, under certain conditions, to oversight standards for the payment system. The controls on these entities could extend to the monitoring of DeFi peer-to-peer transactions enabled by software (unhosted wallets'); in this respect, the providers of the technology used and the support functions (e.g., entities that manage DLT by providing the technological support and planning systems) should ensure that adequate reporting information is available (for instance, a list of all transactions carried out *vis-à-vis* unhosted wallets, where this information can be inferred by a list of hosted wallets).[141]

In view of the difficulty, in 'pure DeFi' models, of identifying responsible parties, it will be further investigated whether intervening in the processes of drawing up and developing the technological standards used, with a view to strengthening the necessary risk mitigation safeguards.[142]

In the third instance, consistent with ESAs guidelines[143] and with its previous consumer-oriented activity,[144] the BoI

declares it will keep on informing customers[145] about the inherent risks of crypto-assets.[146]

Most importantly, in the concluding part of the Communication the BoI makes some quite relevant considerations on the best regulatory strategy to cope with the challenges posed by crypto-economy in a future-proof, flexible and effective manner.[147]

According to the Italian Supervisor, there is room to work on the definition of standards and good practices acting as 'quality parameters' and that 'could be a shared point of reference' of decentralised technologies or some of their distinctive elements (such as smart contracts). In this respect, the Communication acknowledges that 'recourse to forms of public-private partnership can represent […] a valid option.' This step requires building 'a governance model that can exploit the synergies stemming from the public sector's interaction with the private sector, in a co-regulatory way whereby the authorities continuously engage with technological operators to create shared benchmarks, so that technology can evolve in a manner that is consistent and compatible with the rights and safeguards that deserve to be guaranteed.' To this end, the BoI declares to be 'open to dialogue with the various stakeholders, including through the innovation facilitators it manages' (e.g., CanaleFintech;[148] MilanoHub;[149] Italian Regulatory Sandbox).[150]

This strengthened private-public relation may spur 'virtuous and adequately monitored innovation in the financial and payments system, in order to mitigate the risks that it may entail and to maximize the benefits it may provide to the advantage of the economic system and its components: consumers, households, firms and public administration bodies.'

Building on the Communication, on 26 October 2022 the BoI, Università Cattolica del Sacro Cuore and Roma Tre University announced the signing of a memorandum of understanding to carry out research on the characteristics of smart contracts used by DLT infrastructures for the provision of banking, financial and insurance services ('smart-contract MoU'). The initiative has a broader scope than cryptos but will still be relevant in this context. The smart-contract MoU – which it is open to participation by further (public or private) parties – 'aims to define good practices to be offered as a reference point to market operators, including technology intermediaries and algorithm developers.'

Interestingly, the MoU may produce positive spill-overs on the ongoing legislative procedure on the Data act proposal,

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138 Ib. 11.

139 According to Committee on Payments and Market Infrastructures (CPMI) – IOSCO (2022). 'Application of the Principles for Financial Market Infrastructures to stablecoin arrangements', <https://www.bis.org/cpmi/publ/d206.pdf>, the principles for financial market infrastructures (PFMI) shall apply not only to payment instruments and CSDs, but also to stablecoin arrangements (SAs) that are considered systemically important financial market infrastructures (FMIs).

140 Payment Instruments, Schemes and Arrangements. See <https://www.ecb.europa.eu/paym/pdf/consultations/ecb.PISApublicconsultation202111_1.en.pdf>.

141 BoI Communication, 13-14.

142 Ib., 14.

143 ESAs (2022). 'EU financial regulators warn consumers on the risks of crypto-assets', <https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Warnings/2022/1028326/ESAs%20warning%20to%20consumers%20on%20the%20risks%20of%20crypto-assets.pdf>.

144 For instance, see the joint press-release with the Italian Financial Authority 'Consob e Banca d'Italia mettono in guardia contro i rischi insiti nelle cripto-attività', April 2021,

<https://www.bancaditalia.it/media/comunicati/documenti/2021-01/CS_Congiunto_BI_CONSOB_cryptoasset.pdf>.

145 On the need to create a holistic, common catalogue of rights for the fragmented and often overlapping notions of 'customer', 'client', 'consumer', and 'investor' in financial markets, see Filippo Annunziata (2022). 'Towards an EU Charter for the Protection of End Users in Financial Markets', European Banking Institute Working Paper Series 2022 - no. 128, Bocconi Legal Studies Research Paper No. 4200502, <https://ssrn.com/abstract=4200502>.

146 BoI Communication, 14-15.

147 Ib., 5-6, and 14-16.

148 <https://www.bancaditalia.it/focus/fintech/index.html>.

149 <https://www.bancaditalia.it/focus/milano-hub/index.html?com.dotmarketing.htmlpage.language=1>.

150 <https://www.bancaditalia.it/focus/sandbox/index.html>.

and vice versa.[151] Indeed, said proposal acknowledges that smart contracts may support the implementation of agreements for sharing data[152] and that, with a view to enhancing interoperability, it is necessary to lay down essential requirements of said smart contracts.[153] The essential elements involve a) robustness; b) safe termination and interruption; c) data archiving and continuity; d) access control.[154] The interested parties shall run a self-assessment on the conformity of the smart-contract to such essential elements and are liable for their declaration of conformity.[155] However, a smart contract that meets the harmonised standards or the relevant parts thereof drawn up and published in the Official Journal of the European Union shall be presumed to be in conformity with the essential requirements.[156] To this end, the Commission may request one or more European standardisation organisations (ESOs) to draft harmonised standards that satisfy the essential requirements.[157] The Commission may even adopt implementing acts to lay down common specifications in case harmonised standards do not exist or are insufficient to ensure conformity with the essential requirements in a cross-border context.[158] In sum, while regulating from different perspectives, the smart contract MoU and Data Act proposal may both be relevant to shape some of the technological-design issues posed by the crypto landscape, and, in particular, DeFi and DAOs.

6.   The regulation of crypto-assets as a case study to experiment 'participatory regulation'

Regulating emerging crypto-related activities interfering/intersecting with 'traditional' financial services is a particularly challenging task. On the one hand, the identification of the optimal level of regulation typically requires a stand-still period of observation. Indeed, when it comes to nascent high-tech sectors, there is poor empirical evidence

on risks and opportunities deliverable by market forces, so that a wrongly routed regulatory strategy would likely have adverse effects on innovation. At the same time, however, factors such as disintermediation, lack of transparency on the underpinning technological architecture and the governing consensus mechanism, and the tendency of DLTs to disseminate the main actors of the blockchain ecosystem across jurisdictions, may represent the perfect habitat for criminal behaviour and investors'/consumers' harm. Further, the risk of negative systemic externalities on financial stability shall not be overlooked. Hence, the decision whether being driven by the promises or perils of crypto-assets (or, more properly, to what extent favouring one over the other) shows a clear trade-off.

Far from being inherent to crypto-asset, this conundrum is part of a broader and more complex problem.

For the purpose of this analysis, it suffices to say that dilemmas of this nature often intersect with two pairs of dichotomies.

The first one stands in the distinction between hard law and soft law. The former delivers higher legal certainty but struggles to keep up with technological innovation and may prove untimely and even unfit, due to insufficient technical expertise of the law-maker. In contrast, the latter is more flexible and might be swiftly updated throughout continuous roundtables with stakeholders. However, soft law is not legally binding, as it possesses a persuasive force, not a coercive one.[159] Thus, it ensures lower legal certainty (let alone the deficit of democratic legitimation).

The second dichotomy concerns the role assigned to the public and private sector in regulatory drafting. In this respect, along with the traditional command and control (or top-down) scheme, where the role of public sector is maximum, two alternative models of regulation have emerged: i) self-regulation (which, at times, may be 'enforced' or 'audited'), where private autonomy is pushed to the extreme; ii) co-regulation, which basically stands between command and control and self-regulation.[160] While legal scholarship attached various meanings to said terms,[161] this paper adopts the definition

[151] Proposal for a Regulation of the European Parliament and of the Council on harmonised rules on fair access to and use of data (Data Act) (2022/0047(COD)). The Data Act proposal seek to foster business to consumer (B2C) and business to business (B2B) data sharing; enhance business to government (B2G) data sharing; facilitate switching and interoperability between cloud service providers and data spaces; favour international access and data transfers. See Giuseppe Colangelo (2022). 'European Proposal for a Data Act – A First Assessment', Report for CERRE, <https://cerre.eu/wp-content/uploads/2022/07/200722_CERRE_Assessment-Paper_DataAct.pdf>; Jan Krämer (2022). 'Improving the Economic Effectiveness of the B2B and B2C Data Sharing Obligations in the Proposed Data Act', Report for CERRE, < https://cerre.eu/wp-content/uploads/2022/11/ImproveEffectiveness_DataAct.pdf>; Wolfgang Kerber, 'Governance of IoT Data: Why the EU Data Act Will not Fulfill Its Objectives', (2023) GRUR International 72(2) 120–135.
[152] Pursuant to Art. 2(16) of the Data Act proposal 'smart contract' means 'a computer program stored in an electronic ledger system wherein the outcome of the execution of the program is recorded on the electronic ledger.'
[153] Recital 80 Data Act proposal.
[154] Art. 30(1) Data Act proposal.
[155] Art. 30(2)(3) Data Act proposal.
[156] Art. 30(4) Data Act proposal.
[157] Art. 30(5) Data Act proposal.
[158] Art. 30(6) Data Act proposal.

[159] The influential definition is attributable to Jean Carbonnier, Droit Flexible (Librairie générale de droit et de jurisprudence 1992). For an overview on the role of soft law as an 'institutional governance' mechanism, see, *inter alia*, Fabien Terpan, 'Soft Law in the European Union. The Changing Nature of EU Law', (2015) European Law Journal 21(1) 68-96.
[160] See Fabio Bassan, 'Digital Platforms and Blockchains: The Age of Participated Regulation (*supra* note 13)' 3-8.
[161] Legal scholarship defined co-regulation as a form of industry-association self-regulation with some oversight and/or ratification by government (Peter Grabosky and John Braithwaite, Of Manners Gentle: Enforcement Strategies of Australian Business Regulatory Agencies (Oxford University Press in association with Australian Institute of Criminology 1986). Co-regulation shall not be confused with 'enforced self-regulation' or 'audited self-regulation', involving a subcontracting of regulatory functions to regulated private entities: see Ian Ayres and John Braithwaite, Responsive Regulation (Oxford University Press 1992). On the constitutional - and unintended - consequences of audited self-regulation, see Silvester Van Koten (2015). 'Self-Regulatory Organizations under the Shadow of Governmental Oversight: Blossom or Perish?', EUI Working Paper RSCAS

provided under the 2003 EC Interinstitutional Agreement.[162] In particular, 'self-regulation' is 'the possibility for economic operators, the social partners, non-governmental organisations or associations to adopt amongst themselves and for themselves common guidelines at European level (particularly codes of practice or sectoral agreements).'[163] In turn, 'co-regulation' is 'the mechanism whereby a Community legislative act entrusts the attainment of the objectives defined by the legislative authority to parties which are recognised in the field (such as economic operators, the social partners, non-governmental organisations, or associations).'[164]

So far, the EU pursued a genuine co-regulation approach in limited areas,[165] such as standardisation[166] and implementa-

tion of social policies.[167] Further experiences with some elements of co-regulation may be considered, for instance in the privacy sector.[168] In few cases, the EU encouraged self-regulation,[169] although sometimes it had to recognise, in the course of *ex post* evaluations, the limited outcome of the attempt.[170] In the light of the above, so far the EU has opted for a compromise solution: while adopting command and control top-down legislation, it involves social parts and market forces in legal drafting. Namely, the Union tries to reconcile the need

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2015/84, <https://cadmus.eui.eu/bitstream/handle/1814/37886/RSCAS_2015_84.pdf?sequence=1&isAllowed=y>; Emily Hammond, 'Double deference in administrative law', 2016 Columbia Law Review, 116(7) 1706-1771; Nolan McCarty, 'The Regulation and Self-Regulation of a Complex Industry', (2017) The Journal of Politics 79(4) 1220-1236). For a broader overview on said distinctions, see Anthony Ogus, 'Rethinking Self-Regulation', (1995) Oxford Journal of Legal Studies 15(1) 97-108; Julia Black, 'Constitutionalising Self-Regulation', (1996) Modern Law Review 59(1) 24-55; Robert Baldwin, Martin Cave, Martin Lodge, Understanding Regulation: Theory, Strategy, and Practice, (Oxford University Press 2012, 2nd ed.) 146 ff. More recently, with specific respect to the regulatory challenges posed by the rise of Internet, first, and by over the top digital platforms, then, see Christopher T. Marsden, Internet co-regulation: European law, regulatory governance and legitimacy in cyberspace (Cambridge University Press 2011); Michèle Finck, 'Digital Co-Regulation: Designing a Supranational Legal Framework for the Platform Economy', (2018) European Law Review 41(1) 33-67; Ira S. Rubinstein, The Future of Self-Regulation is Co-Regulation. in Evan Selinger, Jules Polonetsky and Omer Tene (eds), The Cambridge Handbook of Consumer Privacy (Cambridge University Press 2018) 503-523. Going a step further, and arguing that some large digital platforms resemble, from an international law perspective, private legal orders, Fabio Bassan, Digital Platforms and Global Law (Edward Elgar Publishing 2021), proposing the move, at least for largest players, from 'co-regulation' to 'negotiation.'

[162] European Parliament – Council – Commission, 'Interinstitutional agreement on better law-making' (2003/C 321/01).

[163] Ib., Section 22, further noting that, 'as a general rule, this type of voluntary initiative does not imply that the Institutions have adopted any particular stance, in particular where such initiatives are undertaken in areas which are not covered by the Treaties or in which the Union has not hitherto legislated. As one of its responsibilities, the Commission will scrutinise self-regulation practices in order to verify that they comply with the provisions of the EC Treaty.'

[164] Ib., Section 18, further noting that 'this mechanism may be used on the basis of criteria defined in the legislative act so as to enable the legislation to be adapted to the problems and sectors concerned, to reduce the legislative burden by concentrating on essential aspects and to draw on the experience of the parties concerned.'

[165] For a general discussion, see Herwig C.H. Hofmann, Gerard C. Rowe and Alexander H. Türk, Administrative Law and Policy of the European Union (Oxford University Press 2011) 587-621.

[166] Regulation (EU) 2022/2480 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 1025/2012 as regards decisions of European standardisation organisations concerning European standards and European standardisation deliverables. For a general overview, see Laszlo Goerke, Manfred Holler, 'Strategic Standardization in Europe: a Public Choice Perspective', (1998) European Journal of Law and Eco-

nomics 6(2) 95-112, discussing the Communication from the Commission 'Standardization in the European Economy (Followup to the Commission Green Paper of October 1990)' (COM/91/521 final); following the adoption of harmonized standards (HSs) within the framework of the 'New Approach' marked by Communication from the 'Enhancing the Implementation of the New Approach Directives' (COM/2003/0240 final), see the on-topic issue published on (2017) Legal Issues of Economic Integration 44(4), with contributions, among others, by Linda Senden, 'The Constitutional Fit of European Standardization Put to the Test', 337-352; Megi Medzmariashvili, 'Delegation of Rulemaking Power to European Standards Organizations: Reconsidered', 353-366; Matteo Gnes, 'Do Administrative Law Principles Apply to European Standardization: Agencification or Privatization?', 367-380; Morten Kallestrup, 'Stakeholder Participation in European Standardization: A Mapping and an Assessment of Three Categories of Regulation', 381-393; Mariolina Eliantonio, 'Judicial Control of the EU Harmonized Standards: Entering a Black Hole?', 395-407. For a general discussion, see Mariolina Eliantonio, Caroline Cauffman (eds), The Legitimacy of standardisation as a Regulatory Technique. A Cross-disciplinary and Multi-level Analysis (Edward Elgar Publishing 2020), and, with a specific focus on ICT standardization, Olia Kanevskaia, The Law and Practice of Global ICT Standardization (Cambridge University Press 2023). For a critical overview on the influence of the private sector in global administrative law, see Maurizia De Bellis, 'Public law and private regulators in the global legal space', (2011) International Journal of Constitutional Law 9(2) 425-448, considering the impact of transnational standard setting bodies in different economic fields (e.g., accounting principles; financial rating; environmental certifications; etc.).

[167] E.g., social partner agreements concluded under Article 155 TFEU.

[168] Article 40 GDPR introduces a non-genuine form of co-regulation. While, under paragraph 5, the Code of conduct enacted by the private order can be 'validated' by the public authority, with no general effect, under paragraph 9 the Code of conduct may acquire 'general validity within the Union', following a Commission implementing act adopted in accordance with the procedure set forth in Article 93(2) GDPR. The voluntary adherence to such Codes of conduct may have an impact, together with certification mechanisms approved pursuant to Article 42 GDPR, on fines imposed on a controller or processor, either as a mitigating or aggravating factor (Article 83(2)(j) GDPR). See Irene Kamara, Article 40 Codes of Conduct. in Cristopher Kuner, Lee A. Bygrave, Christopher Docksey and Laura Drechsler (eds), The EU General Data Protection Regulation (GDPR): A Commentary (Oxford University Press 2020) 716-724.

[169] E.g., Article 10 Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market.

[170] For instance, see the Principles of Good Practice in vertical relationships in the Food Supply Chain developed in the context of the Supply Chain Initiative – SCI (<https://www.supplychaininitiative.eu/sites/default/files/b2b_principles_of_good_practice_in_the_food_supply_chain.pdf>). The EU law-maker noticed that significant imbalances in bargaining power between suppliers and buyers of agricultural and food products persisted despite the initiatives based on voluntary adherence. Therefore, the EU

for flexibility and technical expertise with that for legal certainty by ensuring procedural participation of stakeholders in (both hard-law and soft-law) regulatory process, pursuant to a 'notice and comment' scheme.[171] Procedural participation in the EU takes various forms. For instance, stakeholders are entitled to participate in pre-legislative consultation conducted, together with impact assessments, by the European Commis-

sion before drafting a legislative proposal.[172] Stakeholders are also entitled to participate in public consultations launched by sectoral regulatory authorities, when it is up to them drafting an implementing act or proposal.[173] The effort sustained by the Union in terms of inclusiveness of the law-making process is intended to increase both the level of legitimacy of EU law and its technical soundness.[174] Notably, the two objectives constitute the backbone of the 'better regulation' agenda.[175]

However, procedural safeguards of this kind can fall short, especially when it comes to highly technological and innovative markets.[176] First, under the notice and comment scheme no guidance is given to the market until the regulatory process is completed. Therefore, by the time legislation enters into force, operators may have consolidated well-established

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[171] opted for a command-and-control intervention (Directive (EU) 2019/633 of the European Parliament and of the Council of 17 April 2019 on unfair trading practices in business-to-business relationships in the agricultural and food supply chain). The Directive applies alongside voluntary governance measures, such as national codes of conduct or the SCI (Recital 41). Similarly, the Free Flow of Non-Personal Data Regulation (Regulation (EU) No 2018/1807) laid down a horizontal framework encouraging service providers to effectively develop and implement self-regulatory Codes of conduct covering best practices for, *inter alia*, facilitating the switching of data processing service providers and the porting of data. It followed a self-regulatory approach to cope with the problem of 'vendor lock-in' at the level of providers of data processing services, by introducing codes of conduct to facilitate switching data between cloud services. This brought to the industry-developed 'Switching Cloud Providers and Porting Data (SWIPO)' Codes of Conduct (<https://swipo.eu/>). However, the *ex post* evaluation/fitness check showed the limited effect of the SWIPO Codes of Conduct. Building on this, the European Commission, considering also the 'general unavailability of open standards and interfaces,' found that 'it is necessary to adopt a set of minimum regulatory obligations on providers of data processing services to eliminate contractual, economic and technical barriers to effective switching between data processing services' (Data Act proposal, *supra* note 151, Recital 70). Although in principle creation of a seamless multi-vendor cloud environment should in the first stage the be left to the market, 'as market-driven processes have not demonstrated the capacity to establish technical specifications or standards that facilitate effective cloud interoperability at the PaaS (platform-as-a-service) and SaaS (software-as-a-service) levels, the Commission should be able to request European standardisation bodies to develop such standards, particularly for service types where such standards do not yet exist,' and subsequently, if necessary, to 'mandate the use of European standards for interoperability or open interoperability specifications for specific service types' (Recital 76, Articles 28(4)(5), and 38). This regulatory approach is similar to that pursued by the Data Act proposal with respect to smart contracts (*supra* notes 157 and 158).

[171] The idea of pursuing legitimation through inclusion led some scholars to label notice-and-comment schemes as 'participative regulation.' For a quantitative study on the actual level of stakeholders' involvement in policy making, see Hanan Haber, Eva Heims, 'Regulating with the masses? Mapping the spread of participatory regulation', (2020) Journal of European Public Policy 27(11) 1742-1762. With specific respect to the optimal crafting of the obligations imposed on digital platforms that are designated as gatekeepers under the Digital Markets Act (*supra* note 117), see Vikas Kathuria, 'The Rise of Participative Regulation in Digital Markets', (2022) Journal of European Competition Law & Practice 13(8) 537–548, taking inspiration by Nobel Prize Jean Tirole's interview (Allison Schrager, A Nobel winning economist's guide to taming tech monopolies, June 27, 2018, QUARTZ, available at <https://qz.com/1310266/nobel-winning-economist-jean-tirole-on-how-to-regulate-tech-monopolies>) and noting that Art. 6 DMA provides for the participation of the regulated firm only, excluding consumers and competitors from the dialogue, as opposed the UK model. As

we will see, in the context of this paper the term 'participatory regulation' is used in a different sense.

[172] Interinstitutional agreement on better law-making (2003/C 321/01) *supra* note 162, Sections 26-27; Joana Mendes, Participation in EU Rule-making: A Rights-Based Approach (Oxford University Press 2011). Consultation takes normally place also before the Commission adopts a delegated or implementing act (Articles 290 and 291 TFEU) or, where the Treaties so provide, a secondary legislative act (e.g., Article 106(3) TFEU). For a general overview, see Alberto Alemanno, 'Levelling the EU participatory playing field: A legal and policy analysis of the Commission's public consultations in light of the principle of political equality,' (2020) European Law Journal 26(1-2) 114-135.

[173] For instance, where the Capital Requirement Directive (No 2013/36/EU, as amended by Directive No 2019/878/EU) and Regulation (No 575/2013/EU, as amended by Regulation No 2019/876/EU) so require, in the field of prudential legislation EBA adopts proposals of 'regulatory technical standards' and 'implementing technical standards' (Articles 10-11 Regulation (UE) No 1093/2010) following a public consultation with the 'Banking Stakeholder Group' (ib., Article 37).

[174] Dagmar Schiek, 'Private Rule-Making and European Governance – Issues of Legitimacy', (2007) European Law Review 32(4) 443-466). However, according to Paul Verbruggen, 'Does Co-Regulation Strenghten EU Legitimacy?', (2009) European Law Journal 15(4) 425-441, 426 'the EU should set out in greater detail and in a consistent fashion what it aspires to do with co-regulation, under what conditions co-regulation may be applied and what effects co-regulation may generate.'

[175] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Better Regulation for Better Results - An EU Agenda', COM(2015) 215; Alberto Alemanno, 'How much better is better regulation? Assessing the impact of the Better Regulation Package on the European Union: A research agenda', (2015) European Journal of Risk Regulation 6(3) 351-355; Mark Dawson, 'Better regulation and the future of EU regulatory law and politics', (2016) Common Market Law Review 53(5) 1209-1236; Sacha Garben, Inge Govaere (ed), The EU Better Regulation Agenda. A Critical Assessment (Hart Publishing 2018); Felice Simonelli and Nadina Iacob, 'Can We Better the European Union Better Regulation Agenda?', (2021) European Journal of Risk Regulation 12(4) 849-860.

[176] For a general discussion on regulatory failure, see Robert K. Merton, 'The Unintended Effects of Purposive Social Action', (1936) American Sociological Review 1(6) 894-904; Cass R. Sunstein, 'Paradoxes of the Regulatory State', (1990) University of Chicago Law Review 57(2) 407-441; Peter N. Grabosky, 'Counterproductive Regulation', (1995) International Journal of the Sociology of Law 23(4) 347-369; Robert Baldwin, Martin Cave, Martin Lodge, Understanding Regulation: Theory, Strategy, and Practice (*supra* note 161), 68-77.

dynamics, which the law may hardly correct. Second, regulators are not bound to consider the evidence collected from the market.[177] Third, regulators may suffer an asymmetry of information and, in the end, be victims of regulatory capture.[178]

Against this background, the BoI Communication on financial DLT technologies and crypto-assets (and its first move, the smart-contracts MoU) may fuel a partial re-orientation of the debate.

The starting point of the analysis is that there might be cases where it is impossible to deal with crypto-related activities without first considering the rules governing the underlying technologies. Given the above, a consensus is emerging that regulation should (also) concern technology as such, shaping its design and architecture, to the extent that this is necessary to safeguard the public interests to financial stability, contrasting crime (money laundering or financing of terrorism), protecting investors/consumers, ensuring informational transparency, granting data protection and cybersecurity, preserving competition and innovation, where necessary mandating open protocols and standards.

Such proposals are part of a broader discussion. Building upon the 'code is law' approach,[179] proponents of expression such as 'lex cryptographia'[180] and 'law+

technology,'[181] although referring to slightly different concepts, share the view that legal reasoning should enter coding, so that legal principles can be embedded in technology ('regulation by technology').[182]

Keeping in mind the FinTech lexicon, it must be clarified that regulation by technology is something apparently familiar to, but fairly different from using technology as an instrument to ensure regulatory compliance and re-engineer/reform regulatory systems ('RegTech'), or to enhance/automatise the exercise of supervisory tasks ('SupTech').[183] Rather, the attention point here is that, insofar as emerging innovative services are inextricably linked to a qualifying technology, regulation cannot dispense with addressing said technology, limited to those technological aspects which can have an appreciable impact on the safeguard of the public interests pursued by financial law. For instance, given the difficulty, in the case of 'pure DeFi' models, of identifying specific entities to which to apply certain requirements, the BoI announced that 'the possibility of intervening in the processes of drawing up and developing the technological standards used, with a view to strengthening the necessary risk mitigation safeguards, merits further investi-

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[177] Hence, no delegation of rule-making power takes place under the notice and comment scheme.

[178] George J. Stigler, 'The Theory of Economic Regulation', (1971) Bell Journal of Economics and Management 2(1) 3-21, 10, noting that 'many industries are able to employ the political machinery to their own ends.' Recently, see also Caroline Devaux, 'Towards a legal theory of capture,' (2018) European Law Journal 24(6) 458-473.

[179] In the early 1990s, as the Internet gained popularity, the question emerged as to whether there was a need for a new body of law, with its own logics and rationales (*cyberlaw*). By comparing the Law of Cyberspace with the Law of the Horse, Professor Frank Easterbrook took a negative position on this issue (Frank H. Easterbrook, 'Cyberspace and the Law of the Horse', (1996) University of Chicago Legal Forum 1996(1) 207-216). The overcoming of this reading is commonly attributed to the research of Lawrence Lessig, arguing, in a nutshell, that the strong malleability of 'code' can itself be turned into law (Lawrence Lessig, 'The Law of the Horse: What Cyberlaw Might Teach', (1999) Harvard Law Review n. 113(2) 501-546, further developed in Code and Other Laws of Cyberspace (Basic Books 1999) and Code. Version 2.0 (Basic Books 2006).

[180] Aaron Wright and Primavera De Filippi, 'Decentralized blockchain technology and the rise of lex cryptographia', 20 March 2015 (last revised 25 July 2017), <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664>, further developed in Blockchain and the Law. The Rule of Code (Harvard University Press 2019). The Authors maintain that while *Lex Mercatoria* and *Lex Informatica* rely on self-regulation, and consist of a system of customary rules (or standards) and technical norms elaborated by online users for internal use by community members, the progressive deployment of blockchain technology may give rise to yet another body of law (*Lex Cryptographia*) characterised by a set of rules administered through self-executing smart contracts and decentralised (and potentially autonomous) organizations. According to Fabio Bassan, Digital Platforms and Global Law (*supra* note 160) 79 'It is public law that affects smart contracts, not private law (the *lex cryptographia*, a new *lex mercatoria* also authoritatively envisaged, being still utopic); however […] such distinction is useless, now that the two are communicating vessels.'

[181] Thibault Schrepel (2022). 'Law + Technology', Stanford CodeX Working Paper, 19 May 2022, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4115666>, suggests addressing the negative ramifications of technology while leveraging its positive regulatory power. Indeed, 'adding law and technology (+) rather than considering them separately (&) produces a combination of social and technical constraints that leverage their strengths.' Although 'code using law' would be widely accepted, as President Biden's executive order on crypto-asset suggests (Exec. Order No. 14067 of Mar. 9, 2022, 87 Fed. Reg. 14143, 14 March 2022), '«code using law» is outside the «law + technology» scope, as the law only assists technology without creating a positive effect on law. «Law + technology» ambitions to maximize synergies between law and technology, not to use one for the sake of helping the other' (pp. 3-4). A crucial role shall be assigned here to Complexity Science. Law + technology would combine and reconcile the methods Code as Law and Law as Code (pp. 8-14). The Law + Technology approach is the backbone of the 'Computational Antitrust' research project (<https://law.stanford.edu/codex-the-stanford-center-for-legal-informatics/computational-antitrust/>).

[182] Fabio Bassan, 'Digital Platforms and Blockchains: The Age of Participated Regulation (*supra* note 13)' 13 and 25; Ib., 'Web3 in transition (*supra* note 13)' 7.

[183] Ioannis Anagnostopoulos, 'Fintech and regtech: Impact on regulators and banks', (2018) Journal of Economics and Business 100(1) 7-25; John Ho Hee Jung, Regtech and suptech: the future of compliance. in Jelena Madir (ed). FinTech: Law and Regulation (*supra* note 2) 255-279: RegTech is 'a subset of FinTech that focuses on technology within the financial industry to facilitate the delivery of regulatory requirements more efficiently and effectively than existing capabilities. RegTech can take the form of any tool, application or platform that makes regulatory compliance more efficient through automated processes and reduction in costs.' In turn, 'SupTech helps supervisory agencies to digitise reporting and regulatory processes, resulting in more efficient and proactive monitoring of risk and compliance at financial institutions. SupTech enables regulators to conduct supervisory work and oversight more effectively and efficiently.' The potential of RegTech and SupTech is extensively discussed in Janos Barberis, Douglas W. Arner, Ross P. Buckley (eds), The RegTech Book (Wiley 2019).

gation.'[184] And the smart-contract MoU seems to follow precisely that direction.

Once the scene is set, two issues remain to be addressed: the first one is content-based, and concerns the research for the optimal drafting of such a technology-based regulation (Section 5.1); the second one, strictly related to the former, is process-oriented, and regards the identification of the best way to elaborate such rules (Section 5.2).

7.   Technology neutrality principle *vis-à-vis* technology-based regulation

The first issue calls into question the boundaries of the technology neutrality principle, intended as 'same activities, same risks, same rules.' It is a cornerstone of EU and US law,[185] and shall not be ruled out. According to such principle, insofar as the risks arising from a single type of activity performed through a range of different technologies are the same, legislation should not interfere with the design of the different technologies available on the market, neither directly (mandating the use of a given technology), nor indirectly (encouraging the use of some technology instead of others). Therefore, and in this sense, legislation should remain, in principle, neutral to technology.

However, there might be cases where, as a matter-of-fact, technology is not neutral to law. As shown, at times the nexus between the technology's architecture and the activity built on it is inextricable, and some of those technological features, in specific cases, may hinder full compliance with the law. In this scenario, technology-based regulatory intervention may be justified. Although apparently selective, the final outcome of technology-based regulation is, in the end, neutral, as it serves, on a broader scale, the need to ensure a level playing field between different technologies, preventing regulatory arbitrage. Indeed, if recourse to an innovative technology ensured a softening of the regulatory burden, or even allowed operating in an unregulated safe-harbour, then the remaining technologies on the market, which instead are covered by the existing regulation, would be discriminated. The argument works also the other way around: regulating (or at least encouraging) only a limited range of technologies may be perceived as a form of public legitimation limited to them, to the detriment of the others. This may convey the underlying message that only regulated technologies are reliable and trustworthy. In a way, both the described scenarios are

present in the Digital Financial Package. As demonstrated, several provisions of MiCA and DLT Pilot seem unfamiliar to public permissionless blockchains (provided that those technologies are often used to build unbacked or unstable assets, such as Ethereum, used for BitCoin, and these kinds of assets are not directly covered by MiCA). Moreover, several provisions seem unfit to regulate given aspects of DeFI and DAOs (especially the DLT Pilot implies, even in the light of Mifid II, a certain level of centralisation, which is hard to reconcile with unhosted wallet systems). Additionally, NFTs are out of scope. The political attempt to ban energy-consumptive DLTs relying on PoW consensus mechanisms (again, Ethereum, used by Bit-Coin), albeit failed, shall be recalled too.

In the light of the above, we can see areas of the crypto environment which, at least in the early stage of the EU law-making process, may face both advantages (in terms of lower regulatory burdens) and disadvantages (in terms of lower trust and legitimation that investors may perceive around unregulated avenues).

In this context, should the EU law-maker decide (neither to ignore, nor to ban at all, but hopefully) to regulate, at least in part, some of these phenomena, it would be hard to deny that such an intervention would encapsulate elements of technology-based regulation. Such a regulatory stance would not call into question the technology neutrality principle. Rather, the policy choice to encourage the adoption of a given technological solution instead of others would be grounded on a well-established legal tradition, insofar as this appears necessary to pursue, under the proportionality principle, objectives of general interest.[186]

Hence, technology neutrality principle is not at odds with technology-based regulation.[187]

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[184] BoI Communication, 14.

[185] The technology neutrality principle is cross-sectoral in nature. In the field of telecommunications, see, for a recent discussion on the best framework to attract investments in very high capacity networks (VHCN), Wolfgang Briglauer, Volker Stocker, Jason Whalley, 'Public Policy Targets in EU Broadband Markets: The Role of Technological Neutrality', (2020) Telecommunications Policy 44(5) 1-15; in the patent and copyright sector, see Dan L. Burk, Mark A. Lemley, 'Policy Levers in Patent Law', (2003) Virginia Law Review 89(7) 1575-1696, 1637-38, arguing in favour of a uniform patent system that provides technology-neutral protection to all kinds of innovation, as opposed the US copyright law, marked by 'industry-specific rules and exceptions have led to a bloated, impenetrable statute that reads like the tax code.'

[186] Such a possibility was recognised since the Telecommunications Framework Directive. Indeed, Recital 18 of Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services stipulated that 'the requirement for Member States to ensure that national regulatory authorities take the utmost account of the desirability of making regulation technologically neutral, that is to say that it neither imposes nor discriminates in favour of the use of a particular type of technology, does not preclude the taking of proportionate steps to promote certain specific services where this is justified, for example digital television as a means for increasing spectrum efficiency.' The same principle is today enshrined under Recital 114 of Directive (EU) 2018/1972 of the European Parliament and of the Council of 11 December 2018 establishing the European Electronic Communications Code, according to which 'restrictions to the principle of technology neutrality should be appropriate and justified by the need to avoid harmful interference, for example by imposing emission masks and power levels, to ensure the protection of public health by limiting public exposure to electromagnetic fields, to ensure the proper functioning of services through an adequate level of technical quality of service, while not necessarily precluding the possibility of using more than one service in the same radio spectrum band, to ensure proper sharing of radio spectrum, in particular where its use is subject only to general authorisations, to safeguard efficient use of radio spectrum, or to fulfil a general interest objective in accordance with Union law.'

[187] In this sense, see also Mireille Hildebrandt, Laura Tielemans, Data protection by design and technology neutral law, (2013) Computer Law & Security Review 29(5) 509-521, noting that, in order to

This having said, the trickiest part of the discussion concerns the identification of the optimal content of the above-mentioned technology-based regulation. Indeed, designing those legal frameworks with the bias that emerging technologies shall be built in such a way to comply with rules that have been conceived for other technologies could hinder the development of alternative models and ultimately favour traditional operators, to the detriment of society at large. Moreover, equalizing highly innovative products or services to existing activities, with the consequence of subjecting them to the same legal rules, could be a form of discrimination. In fact, the technological characterisation of the product or service at hand may be such as to identify an entirely new area of activity, to be subjected, then, to peculiar rules and logic. In sum, crafting technology-based regulation proves to be a daunting exercise.

So far, when dealing with complex technological aspects the EU legislator has favoured a risk-based approach. Several pieces of legislation (e.g., NIS Directive; DORA; AI Act proposal; etc.) use general principles to define the risks to be mitigated or avoided and the liabilities thereto attached. They fix the objectives, while leaving to economic players the ultimate choice on the most suitable measure to achieve them ('accountability principle').[188] In abstract, the combination of principle-based legislation with the accounting principle may provide the perfect framework for regulating technology without stifling innovation, as it would be for the involved parties to identify, following a careful self-assessment, the most suitable measures.

However, an excessive distance between the principle-based rule and its effective implementation leads, in the end, to legal uncertainty. In an economic area where the devil is in the details, a reasonable degree of *horror vacui* may be healthy, provided that primary public interests (such as financial stability, AML, and investors' protection) are involved.

7.1. Bridging public and private sector: 'participatory regulation'

The described gap between principle-based rules and their effective implementation may be filled by 'participatory regulation,'[189] an emerging rule-making paradigm which allows

bridging in a more comprehensive manner the public and private sector.

Participatory regulation tries to make sense of the failures so far attributed to co-regulation and self-regulation models, on the one hand, and command-and-control systems following a notice-and-comment scheme, on the other. As shown, self-regulation is by definition unable to internalise negative externalities generated by market forces, as it stems from the market itself. In turn, co-regulation suffers a problem of moral hazard and asymmetry of information, because the 'entrusted' private entity becomes the rule-setter, and public regulator may strive to duly control the law-making process. At the same time, command-and-control regulation is not flexible enough, is often untimely and may lack sufficient technical expertise. Further, it is prone to political pressure. By using procedural participation as a transparency instrument, normally in the hands of technical and non-representative institutions, the notice-and-comment scheme helps mitigating these factors, but can still fall short. Indeed, public consultations are launched on a proposal drafted by the public regulator itself ('notice'). In addition, the Regulator is not bound to consider the evidence collected from the market ('comment'). Furthermore, the independency of regulators reduces – but does not completely eradicate – the problem of industry pressure, which may take the form of regulatory capture.

Building on this, participatory regulation proposes a partial re-orientation of the public-private relationship. While rejecting the idea of an overtake of the private sector on the public one,[190] it basically proposes a reversal of the roles assigned in the notice-and-comment scheme, with the view of maxi-

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achieve a technology neutral law, technology specific law is sometimes required.

[188] A prominent example is provided by Article 5(2) GDPR. The principle 'requires that controllers put in place internal policies and mechanisms to ensure compliance and provide evidence to demonstrate compliance to external stakeholders, including supervisory authorities [… A]ccountability is scalable, enabling the determination of the concrete measures to be applied depending on the processing being carried out, the types of data processed and the level of risk to data subjects of that processing:' see Christopher Docksey, Article 24. Responsibility of the controller. in Lee A Bygrave, Christopher Docksey, Laura Drechsler (eds), The EU General Data Protection Regulation (GDPR) (*sura* note 168) 555-570, 557 and 562. The codification of the principle has been inspired by WP29, Opinion 3/2010 on the principle of accountability, adopted on 13 July 2010 (00062/10/EN WP 173).

[189] Fabio Bassan, 'Digital Platforms and Blockchains (*supra* note 13).' The Author submits that, for many years, the EU approach to regulated market has been marked by the 'regulatory matrix,'

which identified the applicable law at the intersection between horizontal regulation (competition law, data protection, consumer protection) and vertical silos (banking, financial, insurance, transport, energy, telecommunication, etc.). This created legal uncertainty, due to the ambiguities attached to the concepts of 'speciality' and 'prevalence', which – instead of pursuing cooperation/coordination – were intended to solve positive conflicts of law. A new form of co-regulation, termed 'regulatory circle,' would help developing ready-for-use regulation 'by product'/'by technology': in a nutshell, according to the proposed scheme 'the rules arise from the market, they become benchmarks that the national supervisory and regulatory authorities transform into standards, which they share in the network of European authorities and, if necessary, send to the European Commission, which adopts executive acts or, if appropriate, proposes legislative acts, which fall back on the market, closing the circle.' The regulatory circle has the advantage that, even before the circle is closed, the rules are already there in place. In addition, hurdles deriving from the principles of speciality and prevalence are reduced by the fact that 'the instruments are chosen by the markets themselves: the legislator only makes them mandatory, following the wake of the market […]. The process becomes particularly relevant in the digital transition: in digital markets, rules are embedded in the technology and only the operators know how to set them.' See also ib., Digital Platforms and Global Law (*supra* note 160) 16-17.

[190] Criticising the discussion offered, among others, by Marcella Atzori, 'Blockchain Technology and Decentralised Governance: Is the State Still Necessary?', (2017) Journal of Governance & Regulation 6(1) 45-62, Miriam Allena, 'Blockchain Technology and Regulatory Compliance: Towards a Cooperative Supervisory Model', (2021) European Review of Digital Administration & Law 2(2) 37-43 discards the idea that the decentralisation paradigm embedded in

mizing the benefits of private regulation without downplaying the importance of thorough, targeted public oversight and validation. Namely, instead of allowing private stakeholders to participate in the regulatory process, regulators should participate in the early development of nascent hi-tech markets, acting as qualified observers. This difference is not merely adjectival: in this different setting, it would be directly for market forces to make proposals, and for public power to select the best options on the table.

At the same time, participatory regulation is not all about observation and choice. It is also accompanied by an important 'signalling' function. Not only it is used to communicate regulator flexibility towards innovative enterprises ;[191] it also recognises the importance of establishing a point of contact, so that early, informal opinions can be exchanged between the public and private sector on the viability and sustainability of a given solution.

Overall, participatory regulation gets the most out of self and co-regulation while mitigating their limits. First, and different from self-regulation, participatory regulation accompanies the law-making process from the outset, thus influencing or at least guiding the rule-setting activity undergone by private forces. Second, and different from co-regulation, delegation of power is absent in participatory regulation.

At the same time, the two main virtues of self and co-regulation – respectively: flexibility and public validation – are preserved in participatory regulation.

The research of the optimal vehicle to implement participatory regulation has not yet come to an end. So far, various solutions have been tested, which can be grouped in two categories: innovation hubs[192] and regulatory sandboxes (or pilots).[193] The former represents forms of 'unstructured ex-

perimentalism;' the latter of 'structured experimentalism.'[194] Both of them are subject to voluntary adherence.[195]

This complex activity can fuel the elaboration of legal standards[196] acting as balance bearers between the private and public sector, reconciling vitalism and legal certainty. In principle, legal standards of this kind should be as least intrusive as possible. Further, their elaboration should be without prejudice to the possibility of the private sector to develop alterna-

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blockchain technology would have the potential to displace (centralised) public control.

[191] Douglas W. Arner, Dirk A. Zetzsche, Ross P. Buckley, Joan N. Barberis, 'FinTech and RegTech: Enabling Innovation While Preserving Financial Stability', (2017) Georgetown Journal of International Affairs 18(3) 47-58, 51.

[192] At the international level, see the EBA FinTech Knowledge Hub (<https://www.eba.europa.eu/financial-innovation-and-fintech/fintech-knowledge-hub>), the Commission EU FinTech Lab (<https://finance.ec.europa.eu/publications/first-meeting-eu-fintech-lab_en>), both established in 2018, the Global Financial Innovation Network (GFIN) (<https://www.thegfin.com/>), established in 2019 (so far, only five supervisors of the European continent decided to join the project: UK, Gibraltar, Malta, Hungary and Ukraine). For an overview, see Radostina Parenti (2020). 'Regulatory Sandboxes and Innovation Hubs for FinTech. Impact on innovation, financial stability and supervisory convergence', Study for the committee on Economic and Monetary Affairs, Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament, <https://www.europarl.europa.eu/RegData/etudes/STUD/2020/652752/IPOL_STU(2020)652752_EN.pdf>.

[193] The regulatory sandbox model has been pioneered by the UK Financial Conduct Authority (following the Project Innovate launched in October 2014, in June 2016 the FCA launched the Sandbox project: see the speech by Christopher Woolard 'UK FinTech: Regulating for Innovation', available at <https://www.fca.org.uk/news/speeches/uk-fintech-regulating-innovation>). On topic, see Hilary J. Allen, 'Regulatory Sandboxes' (2019) The George Washington Law Review 87(3) 579-635; Byungkwon Lim, Charles Low, Regulatory sandboxes. in Jelena Madir (ed), FinTech:

Law and Regulation (supra note 2) 302-325, 307-315 identify four benefits: 1) participant-regulator dialogue; 2) reduced time and cost of market penetration; 3) stronger appeal to stakeholders/investors; 4) market signalling). However, they identify also four shortcomings: 1) multi-tiered – and potentially discriminatory – regimes with several classes of participants; 2) due to scarce resources, regulators are de facto obliged to do door keeping, pre-judging innovative value; 3) uncertain scalability of the outcomes of the experimental regulation; 4) race to the bottom, if regulators lacking sound fintech competence strive to attract start-ups, thus lowering the entry criteria. Following a comparative analysis, at 323 they conclude that the national dimension of regulatory sandbox shows its limits, particularly in the FinTech industry, where developers seek for their innovations to be employed on a cross-border basis. This is why a regional or global regulatory sandbox is a natural progressive step after a stable national regulatory sandbox programme is established. Although regulatory sandboxes have been conceived to harness Fintech, the model has been tested in other sectors too. For instance, the Greek competition authority established a regulatory sandbox in order to monitor and evaluate sustainability agreements under antitrust law (see HCC, Press Release – Creation of the Sandbox for sustainable development and competition, <https://www.epant.gr/en/enimerosi/press-releases/item/2226-press-release-creation-of-the-sandbox-for-sustainable-development-and-competition.html>).

[194] In particular, Dirk A. Zetsche, Ross P. Buckley, Joan N. Barberis, DouglasW. Arner, 'Regulating a revolution: from regulatory sandboxes to smart regulation', (2017) Fordham Journal of Corporate & Financial Law, 23(1) 31-103, 32 describe regulatory sandboxes in terms of 'structured experimentalism'; whereas in 'FinTech and RegTech: Enabling Innovation While Preserving Financial Stability (supra note 191)' 48 they use the expression 'restricted experimentation.'

[195] Rob van Gestel and Gijs van Dijck, 'Better regulation through experimental legislation', (2011) European Public Law 17(3) 539-553, 552-553: 'Not only ex post evaluations should receive a more prominent role in legislative policy, but also the pros and cons of experimental clauses need to be considered since experiments may provide a much more solid evidence base for new laws than consultations, expert opinions, and IAs. […] Inequality concerns may be reduced by requiring consent of the subjects participating in the experiment, although participating on a voluntary basis can be detrimental to the methodological quality, as voluntary subjects may behave very differently compared to those who do not volunteer. […] Experimental rules are particularly suited for situations of great scientific or societal uncertainty that entail possible new risks. In such a case, experimenting represents 'Smart Regulation'. It seems only wise to act with caution in such situations by trying out new rules and regulations first in limited areas before applying them to a broader population.'

[196] The multi-faceted term is used in a broad sense here. The concept of 'legal standard' was developed in the US and in France around the beginning of the 20th century to indicate a specific component of the legal system. In particular, relying on common sense standards allow the interpreter to extrapolate the rule of the case from indeterminate legal rules and general clauses contained by the law (see Roscoe Pound (1919). 'Administrative Application of

tive and equivalent (or even protection-enhancing) solutions. Pursuant to the proportionality principle, legal standards arising from participatory regulation should be, at least in the first instance, not binding. Hard law solutions would still be possible for the sake of legal certainty, where the market does not align itself to the best practices drawn via participatory regulation and the importance of the public interests involved so requires.

Combining different tools and regulatory strategies in the best possible way is, in the end, the very essence of what has been termed 'smart regulation.'[197]

In this context, DLT technologies can represent a valuable tool in the hands of public power. In this respect, it is worth noting that the architecture used to regulate (RegTech) and supervise (SupTech) may diverge from that regulated or supervised. For instance, nothing prevents a permissioned DLT architecture to be used to implement, via participatory regulation, the best regulatory framework for pure DeFi business models built on permissionless DLTs.[198]

Legal Standard', Annual Report of the American Bar Association, 445-467, presented at the meeting of the Section of Public Utility Law of the American Bar Association, at Boston, Mass., September 2nd, 1919; Sanhuri (Sanhoury) 'Abd al-Razzaq al-', Le standard juridique, Recueil d'études sur les sources du droit en l'honneur de François Gény, vol. 2, (Librabie du Recueil Sirey 1935) 144-156). In this sense, the legal standard draws on social sciences. In parallel, a linguistically close, but conceptually different notion of standard has developed. Namely, this is the case of technical standards elaborated by private bodies ('standardisation'). According to Michel Paroussis, Standards. in Mark Tebbit, The Philosophy of Law: An Encyclopedia (Taylor & Francis Group 1999) 830-832, 830, standards are 'minimum, generally plausible requirements for ascribing rightness, correctness, goodness, or acceptability to behavior or a state of affairs.' The Author identifies four categories of standard: i) technical (which 'express the current state of art, that is, a generalized use of certain technologies between the levels of the 'past' and the 'advanced'); ii) social (which 'represent empirically ascertainable regularities of behavior in social groups'); iii) ethical (which 'form a basic threshold of decency; one cannot go beyond them, without rejecting one's moral code'); iv) legal (which 'function as the limits of permitted action by presupposing commonly expected criteria of right conduct'). From an economic perspective, see Louis Kaplow, 'Rules Versus Standards: An Economic Analysis', (1992) Duke Law Journal 42(3) 557-629.

[197] Douglas W. Arner, Dirk A. Zetzsche, Ross P. Buckley, Joan N. Barberis, 'FinTech and RegTech: Enabling Innovation While Preserving Financial Stability (*supra* note 191)' 51-54 identify four possible regulatory approaches to FinTech innovation: 1) doing nothing; 2) flexibility and forbearance (under which existing rules are relaxed in specific contexts); 3) restricted experimentation (e.g., sandboxes or piloting); and 4) regulatory development (in which new regulations are developed to cover emerging activities and entrants). They argue that 'what is needed is 'smart regulation,' a distinct approach that transcends these boxed ways of thinking and uses each of them, and more, in an integrated approach to balancing the need for stability and the promotion of innovation and consumer protection.'

[198] This example takes a step further compared to Miriam Allena, 'Blockchain Technology and Regulatory Compliance (*supra* note 190)' 42, investigating whether (permissioned) blockchains including supervisors, supervised entities and stakeholders may represent a viable solution to overcome both state and market failures and fuel a paradigm shift from a binary controller-controlled mechanism to a 'dispersed' verification of compliance model. Ac-

8.   Conclusion

While early regulatory intervention in nascent high-tech markets may have adverse effects on innovation, awaiting the full maturation of the emerging sector may render the legislative intervention untimely and unfit to correct endemic dynamics.

This trade-off is particularly evident in crypto-related financial markets, where disruptive technologies meet highly sensitive public interests. The economic function of these instruments dangerously intersects with the perimeter of financial (payment and investment) services, with the risk of creating regulatory gaps and negative spill-overs. At the same time, DLTs may boost innovation and favour financial inclusion and competition.

The Digital Financial Package represents a first attempt to strike a right balance between the two compelling needs, laying down a set of minimum EU-wide rules (MiCA; DORA) and creating a regulatory space to test the impact of new technologies on traditional financial instruments (DLT Pilot).

The legislative package shows virtues and limits. Time will say. Meanwhile, however, many technological aspects remain unaddressed.

In this context, the BoI Communication on financial DLT technologies and crypto-assets and its first move, the smart-contracts MoU, represent a valuable case-study to discuss the potential of participatory regulation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

No data was used for the research described in the article.

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cording to the Author, this would be an 'entirely innovative approach under which dynamic forces within society become directly involved both in the performance of functions that have previously fallen within the purview of public agencies as well as in reconfiguring certain traditional market mechanisms in innovative and potentially more effective terms.'