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### Lex cryptographica financiara

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# Chapter 7`

## *Lex Cryptographia Financiera*

R.M. Lastra<sup>1</sup> and J.G. Allen<sup>2</sup>

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### 1. Introduction

The past year has witnessed significant growth in the size, and mainstream profile, of financial markets built on distributed ledger technology (“DLT”), in particular “blockchain”.<sup>3</sup> In February 2021, the market capitalisation of the cryptoasset Bitcoin, which is built on the first operational blockchain, topped USD 1 trillion.<sup>4</sup> So-called decentralised finance (“DeFi”), built mostly on the Ethereum blockchain, grew from less than USD 1 billion to over USD 80 billion in May 2021.<sup>5</sup> Even if one adopts a sceptical posture towards these developments, “crypto” markets cannot be ignored by scholars or practitioners of financial and monetary law.<sup>6</sup>

In the broadest terms, the DLT phenomenon has emerged from a cultural *milieu* fundamentally antagonistic to the normative claims of sovereign states (and, by extension, the international normative structures built by those states).<sup>7</sup> This is of diminishing importance today, in our view—

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<sup>3</sup> See Michel Rauchs and others, ‘Distributed Ledger Technology Systems: A Conceptual Framework’ (Cambridge Centre for Alternative Finance, August 2018), <<https://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/distributed-ledger-technology-systems/>> accessed 7 July 2021.

<sup>4</sup> See Gertrude Chaves-Dreyfuss and Tom Wilson, ‘Bitcoin hits \$1 trillion market cap, surges to fresh all-time peak’ (Reuters, 19 February 2021) <<https://www.reuters.com/article/us-crypto-currency-bitcoin-idUSKBN2AJ0GC>> accessed 7 July 2021.

<sup>5</sup> See Wharton Blockchain and Digital Asset Project, ‘DeFi Beyond the Hype: The Emerging World of Decentralised Finance’ (May 2021), <<https://wifpr.wharton.upenn.edu/wp-content/uploads/2021/05/DeFi-Beyond-the-Hype.pdf>> accessed 7 July 2021.

<sup>6</sup> Cf RM Lastra and JG Allen, ‘Virtual Currencies in the Eurosystem: Challenges Ahead’ (2019) 52 *The International Lawyer* 178. For data on the growth of the market, see the 1<sup>st</sup> (2017), 2<sup>nd</sup> (2019) and 3<sup>rd</sup> (2020) Global Cryptoasset Benchmarking Studies by the Cambridge Centre for Alternative Finance <<https://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/3rd-global-cryptoasset-benchmarking-study/>> accessed 7 July 2021.

<sup>7</sup> See JG Allen and RM Lastra, ‘Border Problems: Mapping the Third Border’ (2020) 83 *Modern Law Review* 505, 531.

we have entered the age of “pragmatic crypto”; indeed, we have moved from “cryptoanarchy” to “institutional engagement”, and it is not uncommon to see DLT-based businesses actively seeking regulation.<sup>8</sup> However, there are aspects of DLT-based financial technology (“Fintech”) that raise difficulties. DLT-based business models often bear characteristics of novelty and hybridity, or otherwise sit uneasily within conventional legal and regulatory categories. For example, the property status of “cryptoassets” remains unclear (although it is the subject of serious scholarly and practical engagement).<sup>9</sup> Transaction flows are typically disintermediated, or intermediated differently to conventional ones,<sup>10</sup> and are natively transnational. Of particular relevance to this volume, some digital “tokens” used as payment media make a (more or less credible) bid for “money status”, and in so doing raise some basic and important questions about the concept of money itself.<sup>11</sup> Private “stablecoins”—digital “tokens” tied by various (whether more or less reliable) private law structures to an underlying asset or bundle of assets—have galvanised international financial institutions, national and regional central banks into action and will, perhaps, be seen to have accelerated the advent of central bank digital currencies (“CBDCs”).

The theme of this chapter is not any of these specific developments *per se*, but the emergence of an “international financial and monetary law” in the context of DLT-based Fintech. It builds on the concept of *lex financiara*<sup>12</sup>—an international financial and monetary law that includes both “hard” and “soft” components that is enforced by a mix of national and international institutions. It seeks to use this idea of *lex financiara* to ground an emerging body of norms that are encoded into DLT-based technical infrastructures themselves.

In earlier work, we explored some of the difficulties of regulating financial activities based in “cyberspace”, and called for the further exploration of the bi-directional dynamic of interaction between market innovations and law (broadly defined).<sup>13</sup> We argued that soft law, in particular, offered a promising site of development from which increasingly formal rules of international

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<sup>8</sup> For example, Steve Vallas, CEO of industry association Blockchain Australia, has been quoted as saying that the organisation ‘welcomed the offer to engage more closely with [the Australian Securities and Investment Commission]. We have been asking for it, there is a willingness across the industry to engage as much as possible, and we welcome the comments today on being open to dialogue.’ Cited in James Eyers, ‘ASIC wants to define “regulatory perimeter” for cryptoassets’ (Financial Review, 22 April 2021), <<https://www.afr.com/companies/financial-services/asic-wants-policy-to-define-regulatory-perimeter-for-crypto-assets-20210422-p571f6>> accessed 15 July 2021.

<sup>9</sup> See, eg, JG Allen, ‘Cryptoassets in Private Law’ in Iris Chiu and Gudula Deipenbrock (eds), *Routledge Handbook of Financial Technology and Law* (Routledge 2021). See also the UK Jurisdiction Taskforce’s seminal *Legal Statement on Cryptoassets and Smart Contracts*, cited with approval in *AA v Persons Unknown* [2019] EWHC 3556 (Comm); UNIDROIT, ‘Digital Assets and Private Law’ (Study LXXXII) <<https://www.unidroit.org/work-in-progress/digital-assets-and-private-law>> accessed 15 July 2021; Law Commission of England and Wales ‘Digital Assets’ (Law Commission Project) <<https://www.lawcom.gov.uk/project/digital-assets/>> accessed 15 July 2021.

<sup>10</sup> See, eg, Angela Walch, ‘In Code(ers) We Trust: Software Developers as Fiduciaries in Public Blockchains’ in Philipp Hacker and others (eds), *Regulating Blockchain: Techno-Social and Legal Challenges* (Oxford University Press 2019); SJ Hughes and ST Middlebrook, ‘Advancing a Framework for Regulating Cryptocurrency Payment Intermediaries’ (2015) 32 *Yale Journal on Regulation* 495.

<sup>11</sup> See, eg, Simon Gleeson, *The Legal Concept of Money* (Oxford University Press 2019).

<sup>12</sup> See inaugural lecture as Sir John Lubbock Chair in Banking Law at QMUL CCLS by RM Lastra, ‘The Quest for International Financial Regulation’ (Queen Mary University, 23 March 2011) <[https://www.qmul.ac.uk/law/media/law/docs/podcasts/lastra2011\\_transcript.pdf](https://www.qmul.ac.uk/law/media/law/docs/podcasts/lastra2011_transcript.pdf)> accessed 15 July 2021.

<sup>13</sup> Allen and Lastra, ‘Border Problems’ (n 7) 535.

financial law might emerge, including through “encoding” in technical systems themselves. The main argument of this chapter is that the serious legal engagement now occurring with DLT-based transactional structures (particularly those with payment and investment functions) will result in something accurately described (drawing on a term in the emerging blockchain literature<sup>14</sup>) as “*lex financiara cryptographia*”—namely those aspects of international financial law (*lex financiara*) that are incorporated into DLT-based systems themselves (*lex cryptographia*). This chapter will trace the contours of this emerging field of international financial and monetary law and to ground it jurisprudentially—including by way of critical reflection on existing approaches. We look, in the first instance, at the dynamic of interaction between the world of DLT-based Fintech and the “world of (conventional) law”. This brings to the fore the mode of interaction between law (especially national law) and technical structures that are regulative in function, but are products of market initiative rather than public authority. This interface is a site of contestation, and the relevant dynamic is one of both competition and accommodation—a kind of reflexive structure or feedback loop in which the market at once challenges conventional legal categories *but also* relies on the law to provide stability and legitimacy.<sup>15</sup> In our view, however, the leading accounts to date have neither fully described this dynamic nor grounded it jurisprudentially. This chapter therefore seeks to open some more promising pathways for theory.

The structure of this chapter is as follows. In Section 2, we sketch out the challenges of DLT-based financial innovation. Looking at DLT-based innovations from the perspective of regulation, policy, and private law, we identify problems of hybridity, jurisdiction, and intermediation and examine each in turn by way of illustration. In Section 3, we turn to the high-level question of how the law applicable to DLT should be understood. One leading account suggests that “cryptolaw” should be conceptualised as (or as analogous to) a foreign legal system from which “cryptolegal structures” can be transplanted into state law. In contrast to this approach, we highlight the basic problems of authority and sources of law. The framework of legal pluralism, rather than comparative law, would seem to provide a better approach to “cryptolaw” and would keep the emerging cryptolaw debate connected to parallel debates about international and transnational norm-generation. We also discuss another leading account, which argues for the emergence of a *lex cryptographia*. What makes such arguments about the interaction of DLT and state law jurisprudentially interesting—and problematic—is the implicit claim that privately-generated norms encoded in DLT-based networks should be adopted as national law by national lawmakers. (If the argument were simply that national lawmakers should harness the power of DLT themselves, “cryptolaw” would simply be “RegTech”). In Section 4, we set out our preferred approach to thinking about this emerging field of law, building on the idea of the *lex financiara*. The *lex financiara cryptographia* is a sub-set of the *lex financiara* that (i) is recognised to a certain extent by and interacts with “law, properly so called” and is (ii) encoded into “crypto” data structures.

## 2. The Challenges of Distributed Ledger Technology for Financial Regulation

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<sup>14</sup> See Primavera Di Filippi and Aaron Wright, *Blockchain and the Law* (Harvard University Press 2018), especially ch 11 and ch 12.

<sup>15</sup> See also Katharina Pistor, ‘A Legal Theory of Finance’ (2013) 41 *Journal of Comparative Economics* 315, 315.

DLT presents challenges for regulation, policy, and private law alike. It also challenges traditional notions of sovereignty and the territorial borders typically associated with the jurisdiction of the Westphalian nation-state. For regulators, DLT enables hybrid business models that often straddle regulatory perimeters. The definition of DLT-based “tokens” themselves remains unsettled; a taxonomy of their sub-types is a work in progress,<sup>16</sup> and different taxonomies may be appropriate for different purposes. A thorny problem is encountered already in the choice of “cryptoassets” versus “cryptocurrencies”: although Bitcoin was avowedly created as “money”, it is probably not (notwithstanding El Salvador’s recent adoption of Bitcoin as legal tender);<sup>17</sup> other “coins”, however, have probably entered the ranks of shadow money.<sup>18</sup> Although the claims to DLT-based disintermediation are generally overblown,<sup>19</sup> “crypto” intermediaries are different to their incumbent counterparts. Reflecting the (apparently) borderless nature of the technology itself, cryptoasset activities are often global, posing an inherent challenge to state-based regulation.<sup>20</sup> The adoption of new technology in financial services allows actors to do more, faster—which, as Saule Omarova has pointed out, can amplify negative patterns as well as enabling innovation.<sup>21</sup> The accelerating pace of change underlines the need to develop new technological tools for regulatory oversight in the form of regulatory technology (“RegTech”). But, as Omarova argues, the problem is not just a practical one; Fintech poses an implicit challenge to both the conceptual model of regulation and its normative foundations.

For policymakers, novel consumer protection, systemic risk, and financial crime risks have arisen. Cryptoassets—in particular privately issued “stablecoins”<sup>22</sup>—have forced conversations about

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<sup>16</sup> See JG Allen and others, ‘Legal and Regulatory Considerations for Digital Assets’ (Cambridge Centre for Alternative Finance, 2020), <<https://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/legal-and-regulatory-considerations-for-digital-assets/>> accessed 6 July 2021, pt I; Cf Financial Markets Law Committee, ‘Taxonomical Approaches to Cryptoassets: Response to European Commission Consultation—Part I’ (March 2020), <[http://fmlc.org/wp-content/uploads/2020/03/FMLC\\_UP\\_11706611\\_v\\_1\\_Part-I-Response-to-EC-Consultation-on-regulating-cryptoassets-taxonomy.pdf](http://fmlc.org/wp-content/uploads/2020/03/FMLC_UP_11706611_v_1_Part-I-Response-to-EC-Consultation-on-regulating-cryptoassets-taxonomy.pdf)> accessed 6 July 2021.

<sup>17</sup> See, eg, Alexander Lipton, ‘Cryptocurrencies Change Everything’ (2021) 21 *Quantitative Finance* 1257, 1258.

<sup>18</sup> See, eg, Daniela Gabor and Jakob Vestergaard, ‘Towards a Theory of Shadow Money’ (Institute for New Economic Thinking, 14 April 2016) <<https://www.ineteconomics.org/perspectives/blog/towards-a-theory-of-shadow-money>> accessed 7 July 2021.

<sup>19</sup> See, eg, Andy Yee, ‘The Regulation of Cryptocurrencies: From Disintermediation to Reintermediation’ (Internet Policy Review, 14 January 2015) <<https://policyreview.info/articles/news/regulation-cryptocurrencies-disintermediation-reintermediation/350>> accessed 7 July 2021; Anastasia Sotiropoulou and Stéphanie Ligot, ‘Legal Challenges of Cryptocurrencies: Isn’t it Time to Regulate the Intermediaries?’ (2019) 16 *European Company and Financial Law Review* 652.

<sup>20</sup> See, eg, Adam Samson and Brooke Masters, ‘Binance Crackdown: Regulators Tussle with “Wild West” of Crypto’ *Financial Times* (2 July 2021) <<https://www.ft.com/content/a10c297f-c8dd-48b1-9744-09d4ff2e89ca>> accessed 7 July 2021; see also Allen and Lastra, ‘Border Problems’ (n 7).

<sup>21</sup> See ST Omarova, ‘Technology v Technocracy: FinTech as a Regulatory Challenge’ (2020) 6 *Journal of Financial Regulation* 1.

<sup>22</sup> A ‘stablecoin’ is generally a DLT token whose value is ‘tied’ to some underlying asset or basket of assets; what those assets are, and how the ‘tie’ is established, varies considerably. The most conspicuous example of a stablecoin forcing central bank action is the Libra/Diem proposal by Facebook and a consortium of partners, originally announced in 2019: see Mike Isaac and Nathaniel Popper, ‘Facebook Plans Global Financial System Based on Cryptocurrency’ *New York Times* (18 June 2019), <<https://web.archive.org/web/20200519040623/https://www.nytimes.com/2019/06/18/technology/facebook-cryptocurrency-libra.html?action=click&module=Top%20Stories&pgtype=Homepage>> accessed 7 July 2021.

central bank operations, including the technology they use and the ends they should seek,<sup>23</sup> as the significant literature on central bank digital currency (“CBDC”) attests.<sup>24</sup> Quite plausibly, quantitative easing (“QE”) driven responses to the COVID-19 crisis have driven rising asset prices, exacerbated intergenerational wealth inequalities, and threaten to drive inflation. This is indeed one of the main findings of the 2021 House of Lords Economic Affairs Committee Report on Quantitative Easing.<sup>25</sup> And certainly, the role of the national government (a role delegated to the central bank) in the monopoly of note issue and in the conduct of monetary policy influenced the views taken by many within the “crypto movement” itself; the inventor of Bitcoin wrote during the global financial crisis (“GFC”) of the untrustworthiness of central and commercial banks alike,<sup>26</sup> and the “genesis block” of the Bitcoin blockchain memorialises a *Times* headline about bank bailouts.<sup>27</sup>

Cryptoassets also raise a host of questions for private law and legal theory. What is the legal effect of so-called “smart contracts” that automate value transfers in a DeFi investment platform? Can computers form valid contracts with each other, without human intermediation?<sup>28</sup> Are cryptoassets “property”, with all that entails? (Think inheritance or insolvency.<sup>29</sup>) How should the “actions” of an automated investment vehicle in a blockchain network (a so-called decentralised autonomous organisation or “DAO”) be treated in law?<sup>30</sup> How might DLT hamper or enhance the enforcement of legal claims between parties and over assets? On a deeper level, is performance compelled through automation a form of “enforcement” akin to a judicial order or something different that exists in parallel—a function equivalent but no bird of a feather? A feature of the hybridity problem also relates to the interaction of private law and regulation, which have constructed different taxonomies of DLT-based objects (i.e., digital “coins” or “tokens”). Features that are relevant from the perspective of financial or macro-prudential regulation are not necessarily dispositive from the

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<sup>23</sup> See, eg, Raphael Auer, Giulio Cornelli and Jon Frost, ‘The Rise of the Central Bank Digital Currencies: Drivers, Approaches, and Technologies’ (August 2020) BIS Working Paper No. 880 <<https://www.bis.org/publ/work880.pdf>> accessed 7 July 2021.

<sup>24</sup> The Bank of England has been relatively late to this party, but announced on 19 April 2021 the formation of a joint task force with HM Treasury and released a discussion paper: Bank of England, ‘New Forms of Digital Money’ (Discussion Paper, 7 June 2021) <<https://www.bankofengland.co.uk/paper/2021/new-forms-of-digital-money>> accessed 7 July 2021.

<sup>25</sup> See Economic Affairs Committee, *Quantitative Easing: A Dangerous Addiction?* (HL 2020-21, 41). One of us (Lastra) acted as specialist adviser to the Committee during the inquiry and contributed to the final evidence-based report.

<sup>26</sup> ‘The central bank must be trusted not to debase the currency, but the history of fiat currencies is full of breaches of that trust. Banks must be trusted to hold our money and transfer it electronically, but they lend it out in waves of credit bubbles with barely a fraction in reserve’: see Satoshi Nakamoto, ‘Bitcoin open source implementation of P2P currency’ (Forum Post, P2P Foundation, 11 February 2009) <<http://p2pfoundation.ning.com/forum/topics/bitcoin-open-source?id=2003008%3ATopic%3A9402&page=1>> accessed 7 July 2021.

<sup>27</sup> See ‘main.cpp’ <<https://sourceforge.net/p/bitcoin/code/133/tree/trunk/main.cpp#l1638>> accessed 7 July 2021 .

<sup>28</sup> See Simon Gleeson, ‘Automated Mistake’ in JG Allen and Peter Hunn (eds), *Smart Legal Contracts: Computable Law in Theory and Practice* (Oxford University Press forthcoming 2022).

<sup>29</sup> Most famously, a Japanese court held in 2015 that bitcoins were not ‘things’ within the meaning of the Japanese civil code, which provides in Art. 85 that only corporeal objects are ‘things’ that can be the object of the right of ownership. An abridged English translation is available at <[https://www.law.ox.ac.uk/sites/files/oxlaw/mtgox\\_judgment\\_final.pdf](https://www.law.ox.ac.uk/sites/files/oxlaw/mtgox_judgment_final.pdf)> accessed 20 September 2021.

<sup>30</sup> See JG Allen, ‘Bodies Without Organs: Law, Economics, and Decentralised Governance’ (2021) 4 *Stanford Journal of Blockchain Law & Policy* 53.

private law perspective, and *vice versa*; generally, regulation-driven taxonomies were the first to evolve and private law is still playing catchup.<sup>31</sup>

### *The law of digitalisation*

Increasingly, it seems plausible that a new genre of law is emerging, which should be acknowledged and developed in its own right. Carla Reyes, for example, has argued that DLT enables structures that will change substantive law and legal culture and, ultimately, bear on the concept of “law” itself.<sup>32</sup> In her view, this makes “cryptolaw” an important, if still-emerging, discipline. The value of “conceptualising cryptolaw”, according to Reyes, is that it allows us to broaden our focus beyond the new legal *problems* that DLT raises and towards the new legal *solutions* that DLT affords. As the current rise and rise of RegTech, supervisory technology (“SupTech”) and legal technology (“LegalTech”) shows, the possibility of encoding legal norms into the technical layer of socio-technical structures is indeed promising. The unique affordances of DLT—such as automation, publicness, and so forth—support Reyes’ arguments, and warrant further investigation.

Jan Oster draws an important distinction between the “law of digitalisation” and the “digitalisation of law”.<sup>33</sup> The former describes the substantive and procedural changes made to the law in response to new objects, events, and actions that take place between legal subjects in environments provided by digital computers and networks. The latter refers to the law itself going digital, that is, employing (or deploying) digital “agents” to effect its processes.<sup>34</sup> DLT potentially accelerates both the law of digitalisation and the digitalisation of law. The law of digitalisation is important, and challenging, but it is just the latest chapter in a very long history of human societies responding to a changing world. Conventional financial law, for example, can be applied in a technology-neutral fashion to financial transaction flows that utilise DLT; there may be some lag, creating opportunities for regulatory arbitrage, but the response is to regulate novel technology-driven practices in a more or less conventional way. The pace of digitalisation has accelerated in the context of the pandemic. COVID-19 has moved from the physical to the online world (relying upon new technologies) whole sectors of business, health, government, knowledge and education. Financial digital innovation is in this regard not unique to finance, but a part in a general trend towards digitalisation.

There is a school of opinion that is dismissive of the law of digitalisation. The *locus classicus* in this regard is Frank Easterbrook’s “law of the horse” critique of the mid-1990s. According to Easterbrook, the “law of property in cyberspace” is not a useful category; we are rather concerned

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<sup>31</sup> See JG Allen, ‘Cryptoassets in Private Law’ (n 9); Joseph Lee, ‘Law and Regulation for a Crypto-Market: Perpetuation or Innovation?’ in Iris Chiu and Gudula Deipenbrock, *Routledge Handbook of Financial Technology and Law* (Routledge 2021).

<sup>32</sup> Carla Reyes, ‘Conceptualising Cryptolaw’ (2017) 96 *Nebraska Law Review* 384, 386.

<sup>33</sup> Jan Oster, ‘Code is code and law is law—the law of digitalisation and the digitalisation of law’ (2021) *International Journal of Law and Information Technology* (forthcoming) 2.

<sup>34</sup> Oster, ‘Code is code’ (n 33) 7. Oster’s analysis is focussed on machine learning (‘ML’) and artificial intelligence (‘AI’) in particular, ie, on programmes that do not merely ‘store, select and arrange legal content’ but also initiate legally relevant processes or even take legal decisions. Our focus is not on ML and AI in the first instance; however, similar considerations apply to all technologies that automate legal workflows.

with the law of property and should work from first principles.<sup>35</sup> While the current scramble to clarify the private law treatment of purely digital objects suggests that Easterbrook's critique rather hindered than helped the timely development of theory, the critique hits its mark to the extent that DLT impacts many areas of private law and regulatory law; what is needed is development from first principles within the law of property, commercial law, contract law, banking and financial law, monetary law, etc. However, as Reyes has argued, once the discussion moves beyond how to regulate DLT and towards how DLT might change regulation itself—towards the digitalisation of law—something more than a law of the horse emerges.<sup>36</sup> Building on Lawrence Lessig's seminal account of "code as law",<sup>37</sup> Reyes argues for cryptolaw as a "new way of thinking, studying, and talking about the law that anticipates the new issues arising from implementing law through cryptographic, smart-contracting computer code with the capacity for self-execution, embedded predictive technology, and autonomous interaction."<sup>38</sup>

### *The digitalisation of law*

Lessig formulated his account of "code as law" in the context of the Internet's early maturation. The cornerstone of his approach is that software and hardware create "architecture" that "regulates" the actions of subjects within the relevant domain. The architecture of the Internet—for example, the hardware infrastructure and the communications protocols on which it operates—condition how agents can interact within the "cyberspace" that those technological artefacts create.<sup>39</sup> While our actions in physical space are enabled and constrained by the laws of physics, our actions in the "space" constituted by a technical system are enabled and constrained by our abilities and permissions as users of the system.<sup>40</sup> This is a form of "regulation" (albeit in a broader sense than is sometimes used by lawyers) that Lessig lists along with three other forms, namely law, market forces, and informal social norms. Under the compelling tagline "code is law", Lessig argued:

The code of cyberspace—whether the Internet, or a net within the Internet—defines that space. It constitutes that space. And as with any constitution, it builds within itself a set of values and possibilities that governs life there... And the design of code is something that people are doing. Engineers make the choices about how the world will be. Engineers in this sense are governors.<sup>41</sup>

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<sup>35</sup> See FH Easterbrook, 'Cyberspace and the Law of the Horse' [1996] University of Chicago Legal Forum 207; see also JH Sommer, 'Against Cyberlaw' (2000) 15 Berkeley Technology Law Journal 1145, 1147–49.

<sup>36</sup> Reyes, 'Conceptualising Cryptolaw' (n 32) 412.

<sup>37</sup> Lessig argued compellingly, in our view, against Easterbrook's 'law of the horse' critique in the 1990s: see Lawrence Lessig, 'The Law of the Horse: What Cyberlaw Might Teach' (1999) 113 Harvard Law Review 501.

<sup>38</sup> Reyes, 'Conceptualising Cryptolaw' (n 32) 413.

<sup>39</sup> See Lawrence Lessig, *Code and Other Laws of Cyberspace* (1999) 6.

<sup>40</sup> On the 'ontic' functions of computer systems, see Philip Brey, 'The Social Ontology of Virtual Environments' (2003) 62 American Journal of Economics and Sociology 269; on the usefulness of the 'space' metaphor, see D Hunter, 'Cyberspace as Place and the Tragedy of the Digital Anticommons' (2003) 91 California Law Review 439.

<sup>41</sup> Lawrence Lessig, 'Open Code and Open Societies: Values of Internet Governance' (1999) 74 Chicago-Kent Law Review 1405, 1408.



To the extent we engage in legally-relevant activities in cyberspace, those who build its architecture create “laws” that condition our behaviour in that domain. To the extent that the law accepts cyberspace-based action as legally relevant, there occurs an implicit—often tacit—bleeding of “regulation” from the architecture of the technical system into the world of law.

A large part of Lessig’s project has been to make us aware of this bleeding from one domain to another—the tacit transfer of “legislative” power to coders once human interactions are moved into a context constituted by code. An evolution is observable over the subsequent iterations of Lessig’s argument,<sup>42</sup> tracking the shift in thinking about the Internet as a new, non-territorial jurisdiction divorced from territorial jurisdiction to a well-regulated (and even authoritarian) order of regimes in cyberspace that track more or less closely to “real world” geopolitics. In other words, constituted political communities and their authorities should not stand by as private initiatives “legislate” for their citizens in an increasingly essential cyberspace. By extension, subjects should also be alert to the encroachment of authoritarian political controls through apparently innocuous cyber-structures.

### ***DLT and the rise of Regtech***

It is sometimes difficult to tease the law of digitalisation and the digitalisation of law apart. Encoding the law changes it in a number of ways, and Reyes argues that we can clearly observe five modes of “jurisprudential disruption”, namely: (i) substantive legal changes; (ii) new regulatory actors (most importantly, DLT developers); (iii) legal structure changes; (iv) “law-lag” reduction; and (v) legal culture changes. These all seem, at first blush, to be questions of the *law of digitalisation*, but to the extent they result in the creation of what Reyes calls “crypto-legal structures” (which she defines as “the law of any subject matter implemented and delivered through smart-contracting, semi-autonomous cryptographic computer code”<sup>43</sup>), we should seem to be dealing with the *digitalisation of law*. Although blockchain-based “smart contracts”, for example, are not “autonomous” in the sense of an ML or AI agent, they do automate legally relevant actions into *prima facie* end-to-end workflows in potentially disruptive ways.

As an increasing proportion of our financial activity moves online, new challenges arise for financial and monetary law. While certain problems are unique to the DLT space, they are best studied together with problems shared by Fintech generally. As Saule Omarova has argued, the “bigger, better, faster” nature of Fintech threatens to amplify distortions in financial markets and fundamentally challenge New Deal era regulatory paradigms.<sup>44</sup> They therefore demand and deserve serious theoretical engagement.

The general application of big data, artificial intelligence and machine learning is profoundly changing the *modus operandi* of money and finance. The entry of new participants in the market,

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<sup>42</sup> See Michael Schillig, “‘Lex Cryptographia’, ‘Cloud Crypto Land’ or What? Blockchain Technology on the Legal Hype Cycle” (13 March 2021) King’s College London Law School Research Paper <<http://dx.doi.org/10.2139/ssrn.3804197>> accessed 12 July 2021.

<sup>43</sup> Reyes, ‘Conceptualising Cryptolaw’ (n 32) 387.

<sup>44</sup> See Saule Omarova, ‘New Tech vs New Deal: Fintech as a Systemic Phenomenon’ (2019) 36 Yale Journal on Regulation 735; Saule Omarova, ‘Technology vs Technocracy: Fintech as a Regulatory Challenge’ (2020) 6 Journal of Financial Regulation 75.

aided by the technological revolution, is consolidating this change. This is particularly evident in the field of payments, where the traditional role of banks as payment intermediaries is now being challenged from within (e.g., through the emergence of new FinTech players) and from outside the financial system, with telecom operators (M-Pesa for example) and BigTech (Apple Pay, Google Pay among others) populating the financial ecosystem once dominated by banks. Digitalisation has also profound implications for the way we regulate financial services in the light of the objectives of financial regulation, as well as the need to prevent cyber-attacks and the use of the financial system for illicit purposes (money laundering and terrorism financing). The need to revamp Regtech and Suptech in response to digitalisation is not only aimed at (i) the shifting patterns in finance, notably the changes to the traditional commercial banking model that has prevailed in Europe and other parts of the world (where financial systems have been largely bank-dominated), but also (ii) at the emergence of new challenges with the advent of large conglomerates that combine technological and financial prowess, and bring a new dimension to the supervision of systemic risk, and to the understanding of the pervasive too-big-to-fail (“TBTF”) incentives that were a toxic feature during the GFC. The TBTF problems also bring to the fore the need to protect competition, though antitrust considerations go beyond the analysis we present in this chapter.

One crucial part of the response is to harness the affordances of the technology itself to fight fire with fire. The “problematic” technology itself can be used to construct a Regtech framework in which data flows occur in real-time, advanced tools such as ML and AI are brought to bear, and “enforcement” reconceptualised away from *ex post* intervention by (human) regulators against (human) intermediaries and towards *ex ante* stipulation of what is *possible* in the architecture relevant technical system. Separating out the “deontic” from the “capacitative” aspects of regulation—i.e., what a person *may* do and what a person *can* do in the relevant context—underlines the importance of architectures that enable only what is permitted.<sup>45</sup>

For example, Raphael Auer has suggested “embedded supervision” of DLT networks. Focussing his argument on “permissioned” DLT, Auer argues that, while regulation should remain technology neutral (“same risk, same regulation”), and while a level playing field should be maintained between financial service providers whatever their choice of technology, supervision should evolve in parallel with technology and harness its affordances. Instead of trying fit cryptoassets into existing regulations (such as securities law), regulators could adopt an approach by which compliance is automatically monitored just by reading a market’s ledger:

Compliance monitoring would then be automated, by relying on the trust-creating mechanism of decentralised markets for supervisory purposes. For example, for the case of a bank that holds asset-backed tokens, compliance with the Basel III capital standards could be automatically verified. This would be done by computing the ownership of

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<sup>45</sup> See Allen and Lastra, ‘Border Problems’ (n 7) 510; see also Samer Hassan and Primavera De Filippi, ‘The Expansion of Algorithmic Governance: From Code is Law to Law is Code’ (2017) 17 Field Actions Science Reports 88, 90.

(borrowing and lending) balances and the associated risk weights in the relevant distributed ownership ledgers.<sup>46</sup>

This approach, he argues, would have benefits both for regulated businesses and for regulators, and would benefit the market by reducing both the costs of supervision and reducing systemic risk. For our present purposes, the interesting aspect is the use of DLT to automate functions currently performed by some market intermediary in a novel way. This would seem to be an example of a “crypto-legal structure”. For example, central securities depositories could be replaced by blockchain “smart contracts”.<sup>47</sup>

Much of Auer’s discussion relates to the legal significance attached to crypto-economic incentive features in DLT systems.<sup>48</sup> For example, DLT value transfer systems work on the principle that a transaction is “final” once it is unprofitable to reverse. This is distinct from the legal conception of “finality”, but Auer argues that a supervisor can, within the context of DLT systems, “take it at face value” under the right circumstances.<sup>49</sup>

Embedded compliance would replace [the tradition] legal and institutionally based trust with a scheme by which the distributed market applies an economic incentive to achieve agreement (i.e., a consensus) on updates of the ledger (i.e., on transactions). The supervisor would then accept this consensus as valid if it can be proven to be irreversible.<sup>50</sup>

The conditions for “irreversibility” are, in substance, the “cryptoeconomic” design features of a permissioned DLT system—for example, in a permissioned system, the fact that “verifiers” have a “stake” which they forfeit through irregular action.<sup>51</sup> Aside from the substance of Auer’s model (i.e., formal “proofs” that establish the reliability of “economic finality”), the feature of interest from our perspective is the argument that a certain factual state of affairs (i.e., that certain parties have an economic incentive to behave in a certain way) be given a kind of legal stamp of approval. This is implicit in any approach that *presupposes* an overarching legal coordination mechanism that evolves to take crypto-economic finality at face value. What results is—as Auer rightly asserts—something qualitatively different from conventional Regtech in which the regulator adopts novel technologies to more efficiently monitor financial activities: “The key principle of

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<sup>46</sup> Raphael Auer, ‘Embedded supervision: how to build regulation into blockchain finance’ (11 September 2019) BIS Working Paper No. 811, 1 <<https://www.bis.org/publ/work811.htm>> accessed 3 October 2021.

<sup>47</sup> On the legal underpinnings of smart contracts, see generally JG Allen and PG Hunn, *Smart Legal Contracts: Theory and Practice* (Oxford University Press forthcoming 2022). In this context, a ‘smart contract’ is, at base, a persistent script that automates an if/then action in response to some event in the world. Such a script could store the data that constitutes tokenised company shares (for example) and perform the relevant actions (transferring ownership, processing dividend, interest, and principal payments, proxy voting, etc).

<sup>48</sup> See, eg, Chris Berg, Sinclair Davidson, and Jason Potts, *Understanding the Blockchain Economy: An Introduction to Institutional Cryptoeconomics* (Edward Elgar 2019).

<sup>49</sup> Auer, ‘Embedded supervision’ (n 46) 3.

<sup>50</sup> *ibid* 12.

<sup>51</sup> *ibid* 13; see generally JK Brekke and WZ Alsindi, ‘Cryptoeconomics’ (2021) 10(2) Internet Policy Review <<https://policyreview.info/pdf/policyreview-2021-2-1553.pdf>> accessed 21 July 2021.

embedded supervision is to rely on the trust-creating mechanism of decentralised markets for regulatory purposes too.”<sup>52</sup> In the new world of DLT, supervisors must look to whether the market’s implicit economic consensus is strong enough to justify this reliance.

### 3. Conceptualising “Cryptolaw”

In our view, proposals for DLT-based Regtech call for serious jurisprudential engagement. Some convenient disciplinary label is warranted, at least on a heuristic basis, to guide and structure discussion on the scope, content, manner, and true import of the necessary adaptations. The question is how to characterise the emerging discipline. Pre-empting proposals such as Auer’s, Carla Reyes has argued that the concept of an emerging “cryptolaw” allows us to broaden our focus beyond the new legal problems that DLT causes and towards the new legal solutions that DLT affords. The possibility of encoding legal norms into the technical layer of socio-technical structures allows legally-relevant processes to unfold using the affordances of DLT such as automation, publicness, and crypto-economic incentive structures. To this extent, DLT offers an opportunity to construct and deploy structures that Reyes argues will not only change the substantive law and legal culture but bear on the concept of “law” itself.<sup>53</sup> In effect, a new source of regulative norms is emerging—those implicit in the digital architecture of DLT systems.

Some of these norms, *but only some of them*, are translations of state law into code, or code recognised as state law. Others seem to be a result of “bleeding” from technical architecture, designed by coders rather than lawyers, into state law. Whether law is encoded, or code simply becomes law (or its functional equivalent), any cross-over should be subject to scrutiny against the core legal and political values of the relevant society. In our view, this demands that anything like “cryptolaw” must be jurisprudentially grounded in a respectable framework—ideally, one that is continuous with the framework on which similar phenomena of interstitial (i.e., non-state) “law” have been grounded.

Reyes suggests that we use the toolkit of comparative law to ground cryptolaw. For the most part, this consists in (i) analysing the translation of state law into “crypto-legal structures” as an instance of legal transplantation, and (ii) treating cryptolaw as a foreign legal system. Doing so, she argues, creates “analytical space for determining whether—and under which circumstances—the creation of a crypto-legal structure is warranted”<sup>54</sup> because the learning on legal transplants deals with the question when a transplant might be beneficial to the target legal system. While there is much to commend this approach, we think that the toolkit of comparative law is not sufficient, on its own, to create the analytical space to conceptualise the bi-directional translation of norms between “code” and “law”. While Reyes’ sophisticated argument merits more detailed engagement, the short point is that we are concerned with the migration or “bleeding” of *privately-generated* norms into national law as well as the digitalisation of national law, through the translation of norms into code. This is rather a question for legal pluralism (and related disciplines such as transnational

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<sup>52</sup> Auer, ‘Embedded supervision’ (n 46) 20.

<sup>53</sup> Reyes has developed the same core argument in a series of three articles, including Reyes, ‘Conceptualising Cryptolaw’ (n 32) 386. We will use ‘Conceptualising Cryptolaw’ in this chapter for the purposes of discussion.

<sup>54</sup> Carla Reyes, ‘Cryptolaw for Distributed Ledger Technologies: A Jurisprudential Framework’ (2018) 58 *Jurimetrics* 283, 290.

legal theory) than for garden-variety comparative law. Perhaps for this reason, Schillig notices a kind of “incongruous flavour” to Reyes argument. On the one hand, Reye’s claims that the affordances of DLT require a comprehensive re-evaluation of what “law” itself is. On the other hand, however, Reyes pulls back from the brink of staking a claim for “DLT cyber-sovereignty” and affirms the importance of state law, presumably on the basis of a basic commitment to the rule of law and ordinary (presumably democratic) norm-generation processes.<sup>55</sup>

### ***From lex mercatoria to lex cryptographia***

So much is evident in the chosen terminology of another leading account—De Filippi and Wright’s *lex cryptographia*. Both the Internet and DLT raise real questions for the concept of authority and its relation to community and territory. We do not endorse a strong version of cyber-sovereignty claims, but an adequate conception of “cryptolaw” requires sensibility for the importance of sources of law outside the orthodox sources of state law, if only to reconcile them into a (more or less) coherent conceptual framework in which they can coexist with state law and the international legal structures built on top of it.

De Filippi and Wright coined the term “*lex cryptographia*” to refer to a “set of rules administered through self-executing smart contracts and decentralized (autonomous) organizations”—a sort of marriage of the idea of “code as law” (as it has evolved since the 1990s) and the medieval *lex mercatoria*.<sup>56</sup> This idea of order created in the absence of law (i.e., through technological design) is a development of the political implications of information systems architecture. *Lex cryptographia* expresses the idea that certain technological structures “encode” rules that function, as a functional cognate to law, administered through technological artefacts that are affordances of a certain instantiation of computer networks, cryptographic protocols, and economic incentive designs. The *lex cryptographia* emerges from constellations of self-executing “smart contracts” and “decentralised organizations” that operate (to a greater or lesser extent) autonomously from human oversight. Instead of a (human-staffed) bureaucratic apparatus enforcing norms in the “real world”, sub-domains within cyberspace can “encode” norms in their very architecture that constrain the actions of actors within that space. The *lex cryptographia* refers specifically to the new public, “permissionless” distributed ledger platforms that have emerged over the past decade, which incorporate cryptographic protocols into their design. Working within a Lessigian vein, they argue that the *lex cryptographia* would represent a “structural shift of power from legal rules and regulations administered by government authorities to code-based rules and protocols governed by decentralised blockchain-based networks.”<sup>57</sup>

Like Reyes, De Filippi and Wright are among the more optimistic lawyerly voices when it comes to the ability of blockchain to revolutionise the legal system (and the social and economic structures based on it); they, along with Reyes, are cited by Schillig as illustrative of the “peak of

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<sup>55</sup> See Schillig (n 42) 13.

<sup>56</sup> De Filippi and Wright, *Blockchain and the Law* (n 14) 46-48. See also Aaron Wright and Primavera De Filippi, ‘Decentralized Blockchain Technology and the Rise of Lex Cryptographia’ (20 March 2015) <<https://ssrn.com/abstract=2580664>> accessed 16 July 2021.

<sup>57</sup> Di Filippi and Wright, *Blockchain and the Law* (n 14) 7.

inflated expectations” at the tip of the “legal hype cycle”.<sup>58</sup> Yet, like Reyes, they remain lawyers at core, retaining a sensibility for the overarching importance of state law to maintain values such as the rule of law. As such, the same basic ambiguity can be observed in their account. As Mimi Zou has observed, De Filippi and Wright’s key arguments are framed in a binary oppositional manner: “Code is pitted against the law. Regulation is pitted against innovation. Decentralised organisations based on blockchain are pitted against centralised institutions of the state, banks, and big corporations.”<sup>59</sup> Although the authors are candid about the risks of “bad blockchain”—for example, undermining financial stability or AML laws—it is probably not unfair to say that a broadly conventional Law and Economics approach combines with a loosely techno-libertarian outlook to suggest that the emerging *lex cryptographia* not only could but should challenge national law and regulation across broad swathes of human life, including financial and monetary law. Again, while their views require more detailed engagement, in our view it is necessary to examine the relationship between national law and *lex cryptographia* carefully from first principles.

### ***The Medieval Law Merchant in the Information Age***

One’s choice of terminology for a new phenomenon is telling of the assumptions one makes about it. The terminology of “*lex cryptographia*” draws, ultimately, on the idea of the *lex mercatoria*, a non-state legal system that evolved within trading networks across the complex, fragmented political geography of medieval Europe. In virtue of this analogy, the terminology of *lex cryptographia* implicitly points towards the problem of squaring apparently non-territorial (and therefore non-national) decentralised action in cyberspace with national (and therefore territorial) jurisdiction. Not least because our own chosen terminology draws on the idea of the *lex mercatoria*, it is convenient to examine this concept and its use in debates about the regulation of emerging technology.

In their earliest exposition of the theory, Wright and De Filippi walked through a conventional reading of the law merchant as a body of norms that “emerged organically from the interactions of merchants” between and across medieval kingdoms and enforced by merchants’ own institutions including courts. They stopped at the 1990s literature on the *lex informatica*, again a (more or less) coherent body of norms and practices that appears from the perspective of any domestic legal system as based on autonomous contractual dealings between “subjects” rather than “officials”, but appears as a legal order unto itself when viewed from a hermeneutic position.<sup>60</sup> Incorporating Lessig’s insight that code is regulative, they reasoned:

The real innovation brought about by digital technologies is that, in the digital world, technology itself can be regarded as a parallel form of regulation. Such regulation derives from the technical features of various online platforms, which ultimately determine what

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<sup>58</sup> Schillig (n 42) 9.

<sup>59</sup> Mimi Zou, ‘Code, and Other Laws of Blockchain’ (2020) 40 Oxford Journal of Legal Studies 645, 648.

<sup>60</sup> See JR Reidenberg, ‘Lex Informatica: The Formulation of Information Policy Rules Through Technology’ (1998) 76 Texas Law Review 553; Aron Metford, ‘Lex Informatica: Foundations of Law on the Internet’ (1997) 5 Indiana Journal of Global Legal Studies 211; WH Van Boom and JHM Van Erp, ‘Electronic Highways: On the Road to Liability’ in Victor Bekkers and others (eds), *Emerging Electronic Highways: New Challenges for Politics and Law* (Kluwer 1996).

can or cannot be done. Inspired from the notion of *Lex Mercatoria*, this particular form of regulation has been described as *Lex Informatica* (Informatics Law)—a particular set of rules spontaneously and independently elaborated by an international community of Internet users, which constitutes today an alternative normative system consisting of a particular set of rules and customary norms arising directly from the limitations imposed by the design of the infrastructures subtending the network.<sup>61</sup>

The *lex mercatoria* was an important source of inspiration for arguments in the 1990s about the independence of the “space” observed to emerge with the development of the Internet. It was used, for example, as inspiration in the seminal argument by Johnson and Post that communities in cyberspace should be allowed to create their own laws insulated from the laws of territorial sovereigns.<sup>62</sup> The *lex informatica* was a “natural extension” of the *lex mercatoria*, a “complementary toolkit for the regulation of online transactions” that rests ultimately on self-regulation in the form of “standards”, technical norms, and contractual agreements.

The historiography of the *lex mercatoria* is important,<sup>63</sup> and it is important to review it critically. In the 1990s, and still sometimes today, the metaphor of *cyberspace* is the handmaiden of an essentially political project, namely the constitution of a “law space” or jurisdiction by a distributed, voluntary community of Internet users. In the stronger techno-libertarian claims of the cryptocurrency movement, similar observations could be made regarding more recent DLT developments. However, although the independence of the *lex mercatoria* is often stressed, it is also important to note that it interacted positively with national law (as “nation states” emerged) and that it was, ultimately, absorbed into the modern legal systems of Europe. According to J.H. Barker’s seminal study, the independence of the *lex mercatoria* from state law has often been overstated.<sup>64</sup> While it is beyond the scope of our present analysis, a more nuanced and historically balanced concept of *lex mercatoria* would provide a sounder basis from which to analogise current developments in the digital realm.

### ***A legal pluralist response?***

As this discussion shows, the *lex mercatoria* is continues to be deployed to ground claims, whether stronger or weaker, for the norm-generating capacity of distributed communities outside and across territorial boundaries, including in cyberspace. This strand of thinking more clearly reveals the broader, implicitly pluralist claim that often slips into arguments about DLT. This underscores the

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<sup>61</sup> De Filippi and Wright, ‘Lex Cryptographia’ (n 56) 46.

<sup>62</sup> DR Johnson and David Post, ‘Law and Borders: The Rise of Law in Cyberspace’ (1996) 48 *Stanford Law Review* 1367, 1389.

<sup>63</sup> Many of the uncodified usages of trade that constituted the *lex mercatoria* eventually became formal law. Roy Goode recalls in his writings that the *lex mercatoria* or law merchant (which was international rather than English and which was administered by its own mercantile courts) was given full recognition by the common law courts (absorbed in the common law itself). The fertility of the business mind and the fact that a practice which begins life by having no legal force acquires over time the sanctity of law are key factors to which the commercial and financial lawyer must continually be responsive. Roy Goode, *Commercial Law* (2nd edn, Penguin Books 1995) 3.

<sup>64</sup> See JH Baker, ‘The Law Merchant and the Common Law Before 1700’ (1979) 38 *Cambridge Law Journal* 295. See also PR Milgrom, DC North and BR Weingast, ‘The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagne Fairs’ (1990) 2 *Economics and Politics* 1 for an institutional economic view.

persistent ambiguity observed by Schillig. Communities of technical innovators are argued (or, more often, assumed) to be *norm-generating communities* whose claims to authority compete with those of conventional, territorial sovereigns. These strong claims of Internet sovereignty have not, generally, been accepted, and current developments underline just how important a frontier of state action cyberspace has become. However, there are real jurisprudential questions raised for the concept of jurisdiction by the Internet and DLT.

The central thrust of Lessig's "code as law" approach is to prevent the backwards percolation of code-based regulation going unnoticed. In an early contribution, Lessig observed that the newly emerging "space" looked like it was free of legal constraints and that "contract rather than law" governed behaviour there. On this view, cyberspace is an endless America in which restless subjects can remove themselves to beyond the claim of bothersome "real world" sovereigns. Lessig's compelling argument was that this space, too, is constituted (and therefore conditioned) by rules built into its very "architecture". These rules need to be exposed to the same kind of normative assessment as any others. In the context of contracts, for example, public values underlie every contract worthy of being enforced by the organs of the political community (i.e., the courts).<sup>65</sup> In "real space", obligations are conditioned by norms of competition law, consumer protection, principles of equity, and remedies such as rectification:

The cyberspace analogue [i.e., an extra-contractual requirement to comply with some condition in order to access a domain within cyberspace] has no equivalent toolbox. Its obligations are not conditioned by the public values that contract law embraces. Its obligations instead flow automatically from the structures imposed in the code. These structures serve the private ends of the code writer; they are a private version of contract law. But as the Legal Realists spent a generation teaching, and as we seem so keen to forget: contract law is public law. "Private public law" is oxymoronic.<sup>66</sup>

A similar sentiment was expressed by Holt CJ in the early 18<sup>th</sup> century: private subjects cannot dictate changes in the law to the courts by "setting up [a] new sort of specialty" besides the common law which "attempt[s] to give laws to Westminster hall."<sup>67</sup>

However, the empirical reality is that non-state norms *do* play an important role in the life of a community, often *do* percolate into law, and are often *are* relatively "law-like" in important respects. As Joseph Raz has recently observed (or perhaps rather conceded), legal theory's pre-occupation with the state no longer seems justified, if it ever was.<sup>68</sup> While the state remains the most important single category of norm-generating institutional order, it is not the only one. The state is too small a canvas on which to paint the whole of the concept of "law". In evocative description of the great English legal historian F.W. Maitland, early theorists of sovereignty such as Jean Bodin and Thomas Hobbes set to work the "pulverising, macadamising tendency" of early modern theory working on "all that intervenes between Man and State" until, at last, "the absolute

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<sup>65</sup> Lawrence Lessig, 'Law of the Horse' (n 37) 530.

<sup>66</sup> *ibid* 531.

<sup>67</sup> See *Clerk v Martin* (1702) 2 Ld Raym 757, 758 (concerning bills of exchange), cited in Baker (n 64) 299.

<sup>68</sup> Joseph Raz, 'Why the State' in Nicole Roughan and Andrew Halpin (eds), *In Pursuit of Pluralist Jurisprudence* (Cambridge University Press 2017) 136.



State faced the absolute individual.”<sup>69</sup> Empirically, however, the normative universe we actually inhabit has never been so black and white. Norm-generating associations compete with each other for our loyalty, and in order to secure it they often make alliances and concessions with each other.

A pluralist analysis of cryptolaw is beyond the scope of the present chapter, but it would provide some useful methodological impulses,<sup>70</sup> at least by way of provocation. As Christine Parker explains, legal pluralism is a response to the empirical fact that state law does not, in fact, exercise a monopoly on regulating the lives of law’s subjects. The scholarship of legal pluralism therefore asks to what extent things other than state law are properly seen as “law” rather than something else.<sup>71</sup> She discusses a pluralist approach to “regulation” in its various forms—including many forms that do not possess all the indicia of national law:

An extended view of legal pluralism points out that—even beyond all these things that scholars and ordinary people label “law”—in contemporary societies there is a range of other rule systems, normative orderings and symbolic meaning systems that also should, or could, be described as “law”. Families, corporations, ethnic and religious groups, friendship groups and many other semi-autonomous social fields can all generate rules and customs and symbols internally that influence people’s behaviours and consciousness as much as, or more than, official law.<sup>72</sup>

Chris Reed and Andrew Murray, for example, have recently made the argument that cyberspace-based voluntary communities ought to be recognised by domestic sovereigns to have some degree of legitimate norm-generating authority *vis-à-vis* their members, which will compete with the claims made by domestic sovereigns over those members sovereign in the “real world”.<sup>73</sup> While it is possible to ground the norm-generation of non-state communities in something like a Hartian rule of recognition, our present interest is rather the *mode of interaction* between national and non-state law in the context of technology/driven financial and monetary innovations. Rather than comparative law or legal pluralism, our preferred method of grounding the DLT-based digitalisation of law is in the well-established vein of transnational financial and monetary law<sup>74</sup>—the *lex financiera*.

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<sup>69</sup> FW Maitland, *Collected Papers Vol III* (HAL Fisher ed, Cambridge University Press 2013), 311.

<sup>70</sup> See, in particular, Keith Culver and Michael Giudice, *The Unsteady State: General Jurisprudence for Dynamic Social Phenomena* (Cambridge University Press 2017) ch 7; Keith Culver and Michael Giudice, *Legality’s Borders: An Essay in General Jurisprudence* (Cambridge University Press 2010) ch 5.

<sup>71</sup> Christine Parker, ‘The Pluralisation of Regulation’ (2008) 9 *Theoretical Inquiries in Law* 349, 349-350. See also Julia Black, ‘Decentring Regulation: Understanding the Role of Regulation and Self-Regulation in a “Post-Regulatory” World’ (2001) 54 *Current Legal Problems* 103.

<sup>72</sup> Parker, ‘Pluralisation’ (n 71) 352 (citations omitted). Parker refers to Sally Engle Merry, ‘Legal Pluralism’ (1988) 22 *Law and Society Review* 869 and Denis Galligan, *Law in Modern Society* (Oxford University Press 2007).

<sup>73</sup> See, eg, Chris Reed and Andrew Murray, *Rethinking the Jurisprudence of Cyberspace* (Edward Elgar 2018) ch 3; *ibid* ch 5.

<sup>74</sup> See generally RM Lastra, *International Financial and Monetary Law* (Oxford University Press 2015) ch 14; Mario Giovanoli (ed), *International Monetary Law* (Oxford University Press 2000); Diego Devos and Mario Giovanoli (eds), *International Monetary and Financial Law* (Oxford University Press 2010). See also Philip C Jessup, ‘The Concept of Transnational Law: An Introduction’ (1963) 3 *Columbia Journal of Transnational Law* 1 and Peer Zambunson, *The Oxford Handbook of Transnational Law* (Oxford University Press 2021).

#### 4. Towards a *Lex Cryptographia Financiera*

The interaction of national law and norms generated outside (across, within) and between states is well-established—not only in the form of international law (which is the product of interactions between states on the international plane), but also “soft law” such as standards set by voluntary industry associations. Formal (national) law has often developed from informal law, of various kinds, over historical time.<sup>75</sup> Customary international law, based on the practice of states, has developed into formal law, for example, as principles of customary law were codified in the Vienna Convention on the Law of Treaties. “Commercial law” broadly (including much of the law of negotiable instruments) is an example of private ordering percolating, over time, into state law. The doctrine of Multi-Level Governance (“MLG”)<sup>76</sup> may also help us conceptualize the challenges that the emerging *lex cryptographia financiera* poses for national legal systems. Following John Jackson’s notion of ‘sovereignty-modern’, we should “disaggregate and (...) break down the complex array of ‘sovereignty’ concepts and examine particular aspects in detail and with precision to understand what is actually at play.”<sup>77</sup> We need to identify the features or functions that require supra-national or international structures and rules in an increasingly digital environment.

The “international financial architecture” is understood to encompass the rules, guidelines and other “arrangements” governing international financial relations as well as the bodies through which those arrangements are made, monitored, and—in appropriate cases—enforced.<sup>78</sup> The entities and bodies which are directly or indirectly involved in the process of setting international standards for financial markets encompass formal international financial organizations (most prominently the International Monetary Fund or “IMF”); regional organizations (such as the European Bank for Reconstruction and Development or “EBRD”); *de facto* groupings created at the initiative of governments (such as the G20)<sup>79</sup>; financial sector-specific international groupings of supervisors and regulators (Basel Committee on Banking Supervision, International Organization of Securities Committees, International Association of Insurance Supervisors, International Association of Deposit Insurers, and others)<sup>80</sup> and the Financial Stability Board (“FSB”) central bank experts’ committees; market entities and professional associations (the International Accounting Standards Board, the Emerging Markets Trade Association, International

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<sup>75</sup> See Lastra, ‘International Financial Regulation’ (n 12) 13. See also generally Lastra, *International Financial and Monetary Law* (n 74) ch 14. See also John Jackson, Thomas Cottier and Rosa Lastra (eds), Special Issue of the Journal of International Economic Law on the Role of International Law in Monetary Affairs (Vol 13(3), 2010).

<sup>76</sup> For a short explanation, see eg, EU Petersmann, ‘Multi-level governance and public goods’ *Elgar Encyclopedia of International Economic Law* (2017) 571.

<sup>77</sup> See generally John Jackson, ‘Sovereignty - Modern: A New Approach to an Outdated Concept’ (2003) 97 *American Journal of International Law* 782, 801.

<sup>78</sup> See RM Lastra, *Legal Foundations of International Monetary Stability* (Oxford University Press 2006) 449, citing Mario Giovanoli, ‘A New Architecture for the Global Financial Markets: Legal Aspects of International Financial Standard Setting’ in Mario Giovanoli (ed), *International Monetary Law Issues for the New Millennium* (Oxford University Press 2000) 9.

<sup>79</sup> Since 2009 the G20 has taken on the leadership in the coordination of the efforts to reform of the international financial architecture while considering itself as a forum for international economic cooperation.

<sup>80</sup> Chris Brummer refers to them as ‘sectoral standard setters’ in Chris Brummer, *Soft Law and the Global Financial System* (Cambridge University Press 2012) 74-80.

Swaps and Derivatives Association or “ISDA”), the International Chamber of Commerce or “ICC” and its various commissions and working groups, and others); think tanks with a contribution to international financial stability such as the Group of Thirty, and so on.

From a ‘private law’ perspective, the work of the organizations concerned with the harmonization of transnational commercial law, such as the United Nations Commission on International Trade Law (“UNCITRAL”), the International Institute for the Unification of Private Law (“UNIDROIT”) and the Hague Conference on International Private Law, must also be mentioned. While most of the entities involved in the process of international financial standard setting are intergovernmental or official entities, and their principles or recommendations can be characterized as “top down” rules (typically “public law”), the work done by professional associations and market entities (uniform rules and standards, voluntary “codes of conduct”, “codes of practice”, etc) can be characterized as “bottom up” rules, an exercise in self-regulation.

This body of law emerging from diverse sources—some soft, some hard—to achieve the effective international regulation of money and finance has been called by one of us (Lastra) *lex financiaria* by analogy to the *lex mercatoria*.<sup>81</sup> The emerging *lex financiaria* is similar to the *lex mercatoria* in its international character and reliance upon a variety of sources. It is in the confluence of “hard law” (legally enforceable rules), soft law of a “public law” nature (which can complement, coexist, or turn into hard law), and soft law of a “private law” nature (comprising rules of practice, standards, usages, and other forms of self-regulation as well as rules and principles agreed or proposed by scholars and experts) where the future of the *lex financiaria* lies.<sup>82</sup>

Together, we have argued that the reliance on soft law and soft power in international financial and monetary law, both highlights the complexities of regulating Fintech and points to a promising avenue of development:

Soft law is law, after all, and fills a vacuum. Indeed, the role of soft law instruments in internet financial governance ought to be further developed as part of a new “financial *lex cryptographica*”, including “top-down” rules or principles (standards issued by intergovernmental or official entities), “bottom-up” rules issued by private actors, associations and market entities (uniform rules and standards, voluntary codes of conduct, codes of practice, etc.) which are also an exercise in self-regulation, and rules “encoded” in Fintech systems themselves.<sup>83</sup>

In parallel to Reyes’ “crypto-legal structures”, we argued that Fintech systems might “contain technically-encoded norms that are intended to enforce state regulation rather than displace it.”<sup>84</sup> However, although soft-law rules can effectively fill the vacuum left by the absence of state law, greater formalisation may be needed, and the advent of DLT has only underscored this need. In other words, we are not opposed to the percolation of privately-created norms into formal law, whether by the state ratification of crypto-legal structures or otherwise. But we are concerned that

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<sup>81</sup> See Lastra, ‘International Financial Regulation’ (n 12) 13.

<sup>82</sup> See generally Lastra, *International Financial and Monetary Law* (n 74) ch 14.

<sup>83</sup> Allen and Lastra, ‘Border Problems’ (n 7) 31.

<sup>84</sup> *ibid* 32.

it should occur within a coherent jurisprudential framework. The premise of the *lex financiara* seems to us to be the soundest basis from which to conceptualise the regulatory functions of DLT architectures, not least because it already builds on ideas of norm-generation outside the conventional *fora* of national law-making.

### *Towards a synthesis?*

The notion of *lex cryptographia* appears to run, to a certain extent, counter to the notion of *lex financiara*. The latter operates through more or less conventional means, whereas the former avoids the normal “regulatory levers” directed at subjects (such as intermediaries) and relies on automatic enforcement implicit in the structure of the digital platform itself (on the basis of presumptions about economic actors’ motivations). However, there is nothing to say that the *lex financiara* could not incorporate norms “encoded” into Fintech systems like this, or that the designers of Fintech systems might not look to the *lex financiara* for the content of the *lex cryptographia* norms to encode. To this extent, a synthesis seems possible.

The antithesis is, however, rather apparent than real. As we have seen, the *lex cryptographia* is often described in a way that stresses the “bottom up” nature of the *lex mercatoria* and its independence from (rather than engagement with) modern state law.<sup>85</sup> This is amenable to the syncretic, but broadly libertarian, ideology of the “cryptocurrency” movement.<sup>86</sup> However, the Internet predicted by techno-libertarians in the 1990s did not come to fruition;<sup>87</sup> instead, a more complex situation has arisen in which governments and conventional incumbents impinge on the “sovereignty of cyberspace”. As our discussion has made clear, the tools of *lex cryptographia* can be used by anyone—whether to create techno-anarchist pockets of cyberspace or to extend the jurisdictional reach of extant governments. Where others stress the disruptive aspects of this process, we stress the continuity and transformation aspects. As Sir Geoffrey Vos has written in a related context:

It is fashionable to characterise new technologies as disruptive, and indeed in many respects they are. But disruptive technologies which have lasting value are more aptly described as foundational. They may, to some extent, disrupt the *status quo* of commercial practice, but more significantly, they provide a new foundation for those practices. This is something that we all should keep in view — the lawyers to temper their scepticism, and the coders to focus their innovations most constructively.<sup>88</sup>

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<sup>85</sup> For example, see Thibault Schrepel, ‘Anarchy, State, and Blockchain Utopia: Rule of Law versus Lex Cryptographia’ (22 November 2019) <<https://ssrn.com/abstract=3485436>> accessed 4 October 2021.

<sup>86</sup> We have discussed this in our joint paper RM Lastra and JG Allen, *Virtual Currencies in the Eurosystem: Challenges Ahead* (European Parliament, Committee on Economic and Monetary affairs, Monetary Dialogue, July 2018) <[https://www.europarl.europa.eu/cmsdata/150541/DIW\\_FINAL%20publication.pdf](https://www.europarl.europa.eu/cmsdata/150541/DIW_FINAL%20publication.pdf)> accessed 4 October 2021.

<sup>87</sup> See eg John Perry Barlow, ‘A Declaration of the Independence of Cyberspace’ (Electronic Frontier Foundation, 8 February 1996) <<https://www.eff.org/cyberspace-independence>> accessed 4 October 2021.

<sup>88</sup> Sir Geoffrey Vos, ‘End-to-End Smart Legal Contracts: Moving from Aspiration to Reality’ in JG Allen and Peter Hunn (eds), *Smart Legal Contracts: Computable Law in Theory and Practice* (Oxford University Press forthcoming 2021) ch 1 (citations omitted).

Thus, despite the *prima facie* tension between the notion of *lex financiera* as a conventional (institution-dependent) normative order and *lex cryptographia* as a technological regulation of human behaviour, there is the possibility of a synthesis. Our proposed nomenclature for this emerging body of law casts the *lex cryptographia* as a subset of the *lex financiera* which utilises the cryptographic structures and economic incentive designs characteristic of DLT systems themselves.

The advantage of this approach is that the superior jurisprudential grounding of the *lex financiera* can be used for the emerging body of law. The notion of *lex financiera* expresses the evolution of customary usage among market participants into an increasingly coherent and complete set of conventional norms that (more and more closely) approximates the paradigmatic case of “law”. The overall trend is of innovation at the periphery percolating into the centre of the state-centric, conventional concept of “law” along three broad avenues. These include (i) the export or transplantation of national laws across jurisdictions leading to substantive legal harmonisation; (ii) rule harmonisation *via* conventions, model laws, soft law rules or standards; and (iii) centralisation of regulatory functions in a common authority.

Over time, increasing formalisation of the emerging *lex financiera* is expected, and indeed has happened with the rules on cross border resolution of financial crises where the Bank Recovery and Resolution Directive is the first instrument of hard law in this field. The GFC had exposed the inadequacies of the regime for the resolution of conflicts and crises which relied on soft law rules and non-binding memoranda of understanding. The 2011 adoption of the FSB Key Attributes for Effective Resolution of Financial Institutions (a soft law “informal” instrument) acted as a catalyst for the enactment the new bank resolution legislation in the EU with the Bank Recovery and Resolution Directive (“BRRD:”) and the Single Resolution Mechanism Regulation (which are both hard law instruments).

The development of the *lex financiera* has proceeded so far through the harmonization route, generally *via* soft law or the adoption of standards. There are however other techniques of achieving harmonization or normative convergence,<sup>89</sup> such as the adoption of model laws<sup>90</sup> or the centralization of regulatory functions in a common authority to which responsibility is transferred (proposals to revise the IMF Articles of Agreement to grant it powers to act as World Financial Authority have been suggested by one of us<sup>91</sup>). Soft law as opposed to hard law is informal and does not rely on traditional mechanisms of enforcement. Over time though we should expect a degree of formalisation of the emerging *lex financiera* in line with the evolution of law generally, as we have discussed above.

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<sup>89</sup> Some argue that certain national laws can be exported or transplanted into other jurisdictions on the basis of their intrinsic superiority - the case for common law is often made in finance.

<sup>90</sup> The value of a model law is that it can serve as a reference point or guide, a checklist. A model law should however should combine carefully worded and relatively detailed legal text with a high degree of flexibility to be able to adapt to different needs and circumstances A model law is a set of legislative provisions that states can adopt by enacting it into domestic law. According to the website of the United Nations Commission on International Trade Law (UNCITRAL) a model law is a suggested pattern for lawmakers in national governments to consider adopting as part of their domestic legislation. See UNCITRAL, ‘Homepage’ <<http://www.uncitral.org>> accessed 4 October 2021.

<sup>91</sup> See Rosa Lastra, ‘Do We Need a World Financial Organization?’ (2014) 17 *Journal of International Economic Law* 787.

The question that arises is what is the best route for the development of the *lex cryptographia financiaria*? The answer is that it is probably via soft law standards, combining “top down” (official) ones with “bottom up” or privately generated ones (an exercise in self-regulation). This “public-private partnership” in the development of standards might offer a suitable solution to a rapidly changing technological environment. As we have seen, this bi-directional migration between the worlds of “law” and “code”—including the migration of privately-generated norms, via encoding into DLT-based financial infrastructures—is generally assumed by most leading thinkers. The intentional development of the concept of *lex cryptographia financiaria* provides a robust and coherent conceptual framework within which this migration can occur under jurisprudential scrutiny.

By way of illustration, Matthias Lehmann has recently called for private law harmonisation of property law rules to clarify the status of cryptoassets as objects of property rights (up to and including the right of ownership). Such a uniform law, he suggests, “should require signatory states to accept the blockchain as *prima facie* evidence of ownership” without the need for a “real contract” to corroborate the claim to title, lest the efficiency of DLT be diminished and the technology lose its attraction.<sup>92</sup> This envisages a norm-generation procedure wherein the private contractual (or even extra-contractual) dealings of the DLT community are “translated” by a uniform law reform body and then adopted intentionally into state law pursuant to a familiar process of international instrument ratification. This amounts to the (largely wholesale) reception of *lex cryptographia* norms—in this case, the fittingness of cryptoassets as objects of property rights and the presumption of ownership in virtue of control of a private key—into national law. Its effect would be to elevate what is, in effect, a private title registry system to the status of a “public register” which provides at least evidence of title, if not root of title.

## 5. Conclusion

This chapter has introduced some of the major problems for law and regulation posed by the apparent rise and rise of DLT. In doing so, it has engaged, on a preliminary basis, with two leading accounts of DLT-based Regtech in the guise of “cryptolaw” and “*lex cryptographia*” and suggested how the inherent tension between private norm-generation and national jurisdiction might be resolved. Building on the concept of *lex financiaria*, we have argued for a more nuanced and responsible use of the medieval law merchant and the diverse avenues for norm-generation in the field of international financial and monetary law. According to this preliminary analysis, there is much promise in following the idea of “encoded law” and Lessigian “architecture” towards a concept of *lex cryptographia financiaria*. This allows, and indeed requires, a more discerning of the *lex mercatoria* that recognises the inherent interconnectedness normative domains. As DLT structures and the business models they inspire evolve, the *lex cryptographia financiaria* will emerge as a more concrete and coherent body of encoded norms—whether those norms have a broader or a narrower relevance for international financial and monetary law.

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<sup>92</sup> Matthias Lehmann, ‘National Blockchain Laws as a Threat to Capital Markets Integration’ (2021) 26 Uniform Law Review 148, 175.