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SECURITIES, INTERMEDIATION AND THE BLOCKCHAIN – AN INEVITABLE CHOICE BETWEEN LIQUIDITY AND LEGAL CERTAINTY?

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The practice of securities holding, transfer and collateral has significantly changed over the past 200 years – moving from paper certificates and issuer registers to an intermediated environment, and from there to computerisation and globalisation. These changes made transacting more efficient and thus rendered markets more liquid. However, the law has lagged behind and is now itself an obstacle to efficiency because international securities transactions are subject to considerable legal uncertainty. The latest global market development, a cryptographic transfer process commonly called 'the blockchain', is the most recent efficiency-enhancing change. It offers a unique possibility to create a consistent legal framework for securities from scratch, on the basis of a legal concept that to some extent resembles bearer securities. This paper shows what the new international legal framework could look like, in the light of experience gained from earlier developments.

Securities—Liquidity—Intermediation—Globalisation—Property—Blockchain—Harmonisation of commercial law

I. Introduction

In the fable *The hare and the hedgehog*, made popular by the Brothers Grimm in the 19th century, the hare dies after running the same race 74 times, confident of its sprinting prowess, but quite failing to see that the race in which it was competing was fundamentally flawed. The fable springs to mind with respect to the repeated efforts to reform European and international securities law[1] over the past 15 years.

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[1] I will use the term 'securities law' throughout this article. It refers to those rules that are relevant for holding, acquiring and disposing of securities, including the definition of the nature of securities and

Two international Conventions, the Hague and the Geneva Securities Conventions,[2] have been adopted but not implemented and an elaborate European Clearing and Settlement Legal Certainty project[3] ended up tucked away in drawers after years of intensive work.

Since 2015, securities law has been back on the agenda, this time in the context of the European Capital Markets Union.[4] The aim is to increase liquidity in the securities lending market. This means that it should become easier to convert securities into cash, and cash into securities, at will,[5] thereby facilitating financing channels and ultimately the raising of funds for small and medium-sized enterprises. The reform of securities law, including conflict of laws and property law, has been mentioned amongst such liquidity-enhancing measures. However, the caveat that this area is 'political' and 'complex'[6] suggests that the European Commission does not intend to follow the fate of the hare and will not run the same race again. This is an understandable stance. Attempts to reform securities law are locked into the complexities of market practice, idiosyncratic approaches in areas as sensitive as insolvency and property law, and, lastly, the wrangling for market shares between financial centres in Frankfurt and Paris, on the one hand, and the City and Wall Street, on the other hand. This is why fundamental reforms are very unlikely.

This is all the more true as the market is now already moving ahead in its constant search for more efficiency and liquidity, buoyed by the idea of using 'blockchain' technology for securities transactions. As will be explained later, this newly emerging, internet-based concept for recording entitlements may lead to an environment in which securities exist only as pieces of electronic code stored on numerous internet servers, made resilient against fraud and error by using strong cryptographic processes (hence the term 'crypto-securities'). In this environment, disposers and acquirers will be able to transfer securities directly amongst themselves, thereby eliminating the need to use intermediaries such as banks, brokers or custodians. Thus, blockchain is a prime example of disruptive technology in terms of market structure. Importantly, it may be equally disruptive in legal terms as the current legal framework may be unable to accommodate assets that are delocalised and not held and transferred through intermediaries. It is therefore time to think about the role that should be played by securities law and

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covering questions such as how securities are treated in insolvency. In other words, securities law comprises elements of commercial, property, corporate and insolvency law.

[2] Convention on the Law Applicable to Certain Rights in Respect of Securities held with an Intermediary ('Hague Securities Convention'), www.hcch.net/index_en.php?act=conventions.text&cid=72. UNIDROIT Convention on Substantive Rules for Intermediated Securities ('Geneva Securities Convention'); unidroit.org/english/conventions/2009intermediatedsecurities/main.htm.

[3] See, in particular, EU Clearing and Settlement Legal Certainty Group, *Solutions to barriers related to post-trading within the EU – Second Advice* (2008), http://ec.europa.eu/internal_market/financial-markets/docs/certainty/2ndadvice_final_en.pdf accessed 01.04.2016.

[4] European Commission, Green Paper – Building a Capital Markets Union, COM(2015) 63 final, available at http://ec.europa.eu/finance/consultations/2015/capital-markets-union/docs/green-paper_en.pdf, accessed 20.05.2016.

[5] For the purposes of this article I use this very basic definition of liquidity, as proposed by K Pistor, A Legal Theory of Finance (2013) 41 Journal of Comparative Economics 315-330, 316.

[6] Green Paper (n 4), 2, 6, 23, 26; Commission Staff Working Document, Initial reflections on the obstacles to the development of deep and integrated EU capital markets, SWD(2015) 13 final, 15, available at http://ec.europa.eu/transparency/regdoc/rep/10102/2015/EN/10102-2015-13-EN-F1-1-ANNEX-1.PDF, last accessed 20.05.2016.

how the legal framework for crypto-securities transactions should be designed to support legal certainty and liquidity—which, from the legislator's perspective, constitutes an immense challenge and an important opportunity at the same time.

This article traces why past developments aimed at supporting efficiency and liquidity in securities markets have been counterproductive in terms of legal certainty. Drawing on these findings, it identifies the main axioms of a future legal framework that will be legally consistent and safe and thereby support further liquidity gains, benefitting the economy and society as a whole.

Part II analyses how the interplay between market practice in search for more liquidity and the relevant substantive and conflict-of-laws rules has developed, moving from intangible loans to paper certificates and issuer registers, and from there to 'intermediated' holding, computerisation and globalisation. It shows how the law got locked into path dependencies so that today, liquidity levels are high—but at the expense of legal certainty.

Part III discusses the opaque legal nature of securities in the intermediated environment. They mainly display the characteristics of relational rights (*inter partes*), whereas legal thinking and common perception are based on an understanding of absolute rights (*erga omnes*). As this friction leads to considerable legal uncertainty, regulatory compliance of intermediaries has become the linchpin of safe securities holding, acquisition and disposition.

Part IV builds on these findings. Blockchain securities show many of the characteristics of an *erga omnes* right and are therefore, in principle, easier to capture from a legal point of view. However, blockchain securities settlement does not require intermediation, thereby fundamentally challenging the current legal and regulatory approach, which consists of focussing the law and regulation on the intermediary function. Jurisdictions will therefore need to redefine the entire legal framework. This part sets out the main axioms of such a legal framework and addresses the need for legislators to act in a timely manner in order to avoid a new spiral of path dependency and temporary legal vacuum in the market.

II. Three moves for liquidity

In the early days of financing activity there were no 'securities' as such but merely mutual obligations, basically loans, between fund providers and fund receivers. Starting from this primitive state of financing, three different major developments can be identified where the economy's need for increased liquidity has shaped market practice in relation to securities and, as a consequence, the law underlying it, eventually leading to the present situation where securities are transferred electronically and used as collateral on an international scale through a global network of intermediaries. The European Commission's idea of reforming securities law with a view to facilitating financing channels in the economy is therefore by no means a novel one. Rather, it is the continuation of a development that started a long time ago.

Both shares and bonds consist, in substance, of payment obligations and, most visibly in the case of shares, certain participatory rights.[7] All rights in these bundles are, by their very nature, obligations between the parties. For more than five hundred years, shares and bonds and their ancestors have been created and traded, first in Florence, later in Amsterdam and London.[8] However, businesses have also in the past faced difficulties raising as much funding as they needed, while insufficient market liquidity was also a concern.

A major limitation was the unsatisfactory transferability of these investments. Potential investors knew that it might be difficult to find secondary acquirers should they decide to divest, since transferring a bundle of mutual personal obligations to a secondary acquirer was anything but fail-safe. Long before legislators intervened to enhance transferability and thus, liquidity, the market itself developed structures and mechanisms to allow potential investors to avoid an excess of what would today be called 'due diligence'.[9] Concepts emerged capable of enhancing trading in these instruments in a legal environment in which pricing was straightforward and transparent,[10] and legally effective transfers easy to achieve.

First, potential secondary acquirers were in an uncertain position as to the content of the relevant instrument, i.e. the exact legal and economic terms of these personalised instruments were difficult to assess. The market responded by increasingly standardising the object of the transfer in legal and economic terms. Thus, it became easier for secondary acquirers to assess the position they were interested in taking. Financial instruments were issued in batches of economically and legally identical units, up to the point where securities of the same issue became not only identical as regards their content but 'fungible', i.e. no longer identifiable on an individual basis.

The second and third obstacles to transferability concern the process of transfer itself. It was difficult to ascertain whether the seller was empowered to dispose of the relevant rights and whether these were free of encumbrances. Further, assignment as a method of transfer was often unsatisfactory, in particular where only rights could be assigned but not obligations, at least not without the other party's consent.[11]

In this respect, the market developed two different concepts that are still in use today, notably transfer by delivery of a certificate, or transfer through register entries.

Civil law jurisdictions used a—very fictitious—basic legal idea to explain why delivering a certificate to the acquirer transferred a bundle of obligations: the bundle of mutual obligations was coated with a property hull by 'incorporating' it

[7] Also, bonds vest certain participatory rights in a bondholder, notably to participate and vote in the bondholders meeting. See A McKnight, *The Law of International Finance*, OUP 2008, 531; F Nizard, *Les titres négociables*, Economia et Banque Revue, Paris (2003), 17-20.
[8] JS Rogers, 'Negotiability, Property and Identity' (1990) 12 Cardozo Law Review, 470, 471-478.
[9] See Rogers, *ibid.*
[10] E Micheler, 'The legal nature of securities' in L Gullifer and J Payne (eds.), Intermediated Securities, Legal Problems and Practical Issues, Oxford, Hart Publishing, 2010, 145.
[11] See J Benjamin, *Interests in Securities*, Oxford University Press, 2000, 65-67; McKnight, (n 7), section 12.9.1.

in a certificate, resulting in the paper *being* the security.[12] Apart from the fact that the paper legally entitled its bearer to receive payments or to exercise participatory rights, the delivery mechanism of the certificate allowed for *bona fide* acquisition, protecting the acquirer from adverse claims.[13] Professor Rogers argues that marketability of claims did not necessarily require the benefit of good faith acquisition;[14] however, this is precisely what seems to have been the feeling at the time. In 1853, *von Savigny* described the market's need to apply the advantages of the property transfer regime, in particular the possibility of acquiring in good faith, also to obligations.[15] Other options would have been to hand, notably that of providing for the possibility of good faith acquisition of this particular type of claim immediately.[16] However, legislators chose to take the property route, according to which delivery of the certificate transfers property in the certificate and thereby transfers the relevant rights.

In England, bearer bonds are a form of documentary intangible and therefore embody the right; transfer occurs on the basis of delivery of the certificate.[17] This had already been market practice for quite some time before the English courts recognised it in the 17th century[18] and statutory law sanctioned it in the 19th century.[19] Around the same time as Savigny's proposal, in England the Bills of Exchange Act of 1882 recognised the mercantile practice of transferring obligations by endorsement (a scriptural act typically on the back of the certificate) and delivery to the acquirer.[20] This act of 'negotiation' was understood not only to achieve the transfer of the rights but also to ascertain that the *bona fide* acquirer received them unencumbered.[21]

The second option to address difficulties in the process of transfer is registered securities. The issuer's shareholder or bondholder register ensures the integrity of the issue by excluding the creation of excess rights. At the same time, it is a good means of recording encumbrances and as such it protects any future acquirer. The institute of good faith acquisition in the proper sense is therefore unnecessary.[22] In England, where registered securities are the rule, they are regarded as intangibles, or *choses* in action.[23] Historically, *choses* in action constituted a personal obligation and could therefore not be transferred by assignment without the debtor's consent,[24] and in any case assignment was only able to

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[12] See Nizard, (n 7), 294.
[13] Rogers, (n 8), 479.
[14] *Ibid*; See also CW Mooney, 'Property beyond negotiability' (1990) 12 Cardozo Law Review, 305, 398-99.
[15] FC von Savigny, *Das Obligationenrecht als Theil des heutigen römischen Rechts*, Berlin, Veit & Comp., 1853, 97.
[16] Rogers, (n 8), 479.
[17] R Goode and E McKendrick, *Goode on Commercial Law*, 4th ed., London (2010), 32.
[18] *Shelden v Hentley*, 2 Show. 161, cited after W Cranch, Reports of cases argued and adjudged in the Supreme Court of the United States, Washington 1804, 389-390; *Miller v Race*, Court of King's Bench (1758) 1 Burr 452 , 97 Eng. Rep. 398 (K.B. 1758), edited online version by N Szabo, http://unenumerated.blogspot.be/2006/01/from-contracts-to-money.html, last accessed 20.05.2016.
[19] Rogers, (n 8); See also JS Rogers, *The Early History of the Law of Notes and Bills*, Cambridge University Press, 1995, Ch 8.
[20] Benjamin, (n 11), para 3.21.
[21] Benjamin, (n 11), para 3.22.
[22] M Yates and G Montagu, *The Law of Global Custody*, 3rd ed. Tottel, Haywards Heath 2009, 20.
[23] Benjamin, (n 11) paras 2.05, 2.10.
[24] Micheler, *Property in Securities – A comparative Study*, Cambridge University Press, 2007, 21.

transfer the benefit, but not the burdens, of the contract.[25] The solution to this problem came with the acceptance of novation, i.e. a tripartite contract between the alienator, the acquirer and the issuer. The issuer would typically manifest its consent by changing the register. Even though the statutory basis for transfer of securities by novation dates back to 1936 and 1985, novation was already the original basis in Common law.[26]

B. Intermediation and idiosyncratic laws

Later, the industrialised world developed larger and deeper capital markets with higher trading volumes and more frequent transactions. The increasing degree of 'financialisation' necessitated more liquidity in securities markets. Transfers on the basis of negotiation of paper certificates or changes wrought to issuers' registers appeared too cumbersome, given the much higher frequency of transactions. Therefore, as the next step following improved transferability, the concept of securities intermediation through banks and brokers emerged, conceived to allow for more efficient outright transfer and encumbrance procedures. Again, the development was first driven by market practice, long before legislators sanctioned the new structures.[27] Professors *Mooney*, *Einsele, Benjamin, and Nizard* were the first, for their respective jurisdictions, to analyse the legal consequences of that change.[28]

1. Loss of the carrier, pooling and mirroring

In the intermediated set-up, banks, brokers and other intermediaries administer securities holdings and effect transactions for their clients and for themselves through cascades of accounts set up amongst them. All accounts are ultimately linked to a root account typically maintained by a specific kind of financial market infrastructure called central securities depository. There are typically one or more central securities depositories per jurisdiction; they also safe-keep the (paper-) securities certificates, if any. Investors receive, in both cases of bearer and registered securities, a credit entry in their securities accounts with their bank or broker.

This system obliterated the need to move physical security certificates (and in England: endorsement letters[29]) or change the issuer register whenever a change in ownership occurred or when securities were pledged or otherwise encumbered. The first central securities depositories for security certificates were founded in Vienna in 1878 and in Berlin in 1882, both probably modelled on the 18th century London Clearing House[30] for cheques and bank notes. However, huge chunks of securities holdings still remained in separate bank custody or in private hands. It was not until the middle of the 20th century with the advent of computerisation that this practice, now referred to as central clearing and settlement, became

[25] Benjamin, (n 11) para 3.18.
[26] *Ibid*, para 3.06.
[27] For instance, in Germany, securities intermediation was introduced in 1882, whereas the codification of the necessary legal changes occurred in 1937, see D Einsele, *Wertpapierrecht als Schuldrecht*, Mohr, Tübingen (1995), 12-13.
[28] Mooney (n 14); Einsele, (n 27); Benjamin, (n 11); Nizard (n 7).
[29] Benjamin, (n 11) para 3.06.
[30] Einsele, (n 27), 12; Huang, *The law and regulation of central counterparties*, Bloomsbury Publishing (2010) 44.

prevalent, and it has become the norm only recently.[31] However, a number of jurisdictions, typically smaller markets or late market entrants, developed holding systems that did not entail intermediation and a cascade of accounts. In these 'transparent' systems, all investors were directly linked to a central ledger.[32]

The practice of intermediation involves three practical characteristics that have fundamental legal significance. First, it disrupts the evidencing system that had hitherto been fundamental in explaining transferability. Notably, in respect of bearer securities, the security certificate lost its practical function and ceased to change hands, being kept in a central depository or even abolished altogether.[33] Thus, bearer securities, in their practical handling, are assimilated to registered securities. As regards registered securities, issuers' books generally no longer reflect the investors' names but the names of the intermediaries first in the cascade, typically a nominee company or the largest banks and brokers in a given jurisdiction. In both cases, the carrier of the right was deprived of its function and thus became a thing of the past.

The second practical feature of the new holding pattern is that securities holdings are pooled, i.e. intermediaries hold their clients' securities through an account with another intermediary in fungible bulks of identical securities, in so-called omnibus accounts.[34] For instance, if three investors have a specific kind of security credited to their accounts with their direct intermediary, that intermediary will hold the aggregate of these securities with a second intermediary in a bulk credited to one account. This account is in the first intermediary' name, and the securities in it cannot be attributed to any specific investors.

The third practical trait with legal significance is that the 'same' securities are mirrored in different accounts with different intermediaries throughout the cascade of accounts. This means that an investor holds its securities in an account with her direct intermediary, which holds its and other clients' securities in a pooled account with a second intermediary, which holds all its clients' securities in a pooled account with a third intermediary, etc., until the chain reaches an intermediary that has an account with the central securities depository or the issuer register.[35] The length of such a 'holding chain' depends on the specific circumstances but may vary from just one intermediary to several. As a consequence, every individual security is mirrored in different pooled accounts maintained by the different intermediaries involved. The system-wide aggregate number of credit entries of a specific kind of security is therefore a multiple of the number of securities of that kind originally issued. A further complication is that securities accounts between investors and their intermediaries are structurally identical to the securities accounts that intermediaries set up between themselves. Therefore, the electronic credit entries in the accounts of investors are identical to

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[31] See Article 3.1 Regulation 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU and Regulation (EU) No 236/2012 ('CSDR').

[32] Unidroit, Transparent Systems, Study 78 Doc 44, available at http://www.unidroit.org/english/documents/2006/study78/s-78-044-e.pdf, last accessed 18.4.2016.

[33] France was the first financial centre to dematerialise securities in 1984. See also Article 3.1 CSDR, (n 31).

[34] L Gullifer, 'Ownership of Securities' in L Gullifer and J Payne (eds), *Intermediated Securities*, Hart Publishing Oxford and Portland (2010), 12-15; Rogers, (n 8), 485.

[35] Clearing and Settlement Legal Certainty Goup, (n 3) 30.

the electronic credit entries in the accounts of intermediaries. This obviously creates confusion as to whether these entries have a different content depending on whether they are made in favour of an investor or of an intermediary.

2. *The weakened position of the securities holder*

These three practical characteristics of intermediation (loss of carrier, pooling and mirroring) have significant consequences in legal terms, affecting the allocation of rights between investors and intermediaries.[36]

Notably, the specificity and identifiability of individual assets have disappeared. The fact that the securities are only identified in kind leads to the loss of an important feature of traditional property or ownership rights and of security interests on which so many holding systems were based. As exchange-listed securities are typically fungible, they are subject to rules on commingling when they are pooled. As a consequence, the quality of the right may change, for instance from a property right to proportionate ownership in the pool, or it may even become a mere claim against the intermediary.[37] The position of clients is weakened accordingly, especially in the event of the intermediary's insolvency.[38]

Further, this development placed under some strain the earlier achievement of easy and safe transferability, achieved through negotiability or good faith acquisition and the concept of the issuer register. These concepts had emerged earlier to facilitate transfer; however, with the advent of intermediation they have actually become fundamental as acquirers in this anonymous environment *de facto* have no possibility of checking who the disposer is and therefore whether it has the right to dispose of the securities. However, how could this system possibly work in an environment where both certificates and issuer registers have lost their functions, and where there are electronic account entries that all look alike but have different contents?

In other words, with the advent of intermediation, the factual elements that earlier paved the legal grounds for safe and easy acquisition were wiped out for the sake of the operational benefits of intermediation. This crack in the edifice considerably endangered what is today referred to as 'client asset protection' and, to be realistic, has not been entirely papered over so far.

3. *National idiosyncrasies*

In attempting to solve this problem, countries have relied on idiosyncratic approaches, thereby abandoning the homogeneity that had existed between them as long as the market was organised on the basis of paper certificates and issuer registers.

Some countries took bold steps and adapted the law to the practice (in particular the US,[39] with Canada[40] following its model), while others adapted the

[36] See Mooney (n 14), 225-28.
[37] Rogers (n 8), 485. New legislation aims at reducing commingling and the use of omnibus accounts, see CSDR (n 33), Article 38.
[38] L Gullifer (n 34), 4.
[39] See JS Rogers, 'Policy Perspectives on Revised U.C.C. Art. 8' (1995-96) 43 UCLA L. Rev., 1449-59.
[40] See Uniform Law Conference of Canada, Securities Transfer Act, accessible http://www.ulcc.ca/en/home/530-josetta-1-en-gb/uniform-actsa/securities-transfer-act/1124-securities-transfer-act?showall=&limitstart=, last accessed 20.05.2016.

practice to the law (in particular the Nordic countries[41] and China[42]). Some continued somehow to hover, confusingly, between these two approaches (France,[43] Germany[44]), while England[45] changed nothing at all in legal terms. What can be observed in various countries is a paradigmatic path-dependent development, where legal tradition coupled with existing market infrastructures and the vested interests of incumbent financial service providers shape not only the further development of the practice but also that of the law, regardless of efficiency, legal certainty and international compatibility. Thus, law and practice have become inextricably intertwined *per country,* where the law aligned with the operations of national central securities depositories, settlement architectures and customer account agreements.[46]

As a consequence, whereas the legal rights vested in the investor and, respectively, in a security or collateral taker, had remained comparable after the first market movements towards transferability, they now diverged significantly between jurisdictions even though the same practice was used. The legal position of investors has since become characterised as anything between a bundle of insolvency-proof claims against the intermediary ('security entitlement', US and Canada), an equitable interest either in securities or in an equitable interest in securities (England), full and unshared property in electronic bearer securities (France), full and unshared property in direct rights (Nordic countries, China), or shared or common property in a pool of chattels (Germany).[47]

The fact that national laws had become so idiosyncratic, complex and sometimes inconsistent in themselves had no significant consequences while securities markets remained mainly domestic. However, the third move towards more liquidity, notably the abolition of capital controls in many countries and the introduction of the EU single market, rendered the financial market truly international—and from that moment on, the discrepancies between the various approaches became relevant.

C. *Cross-border use of securities, universal fungibility and PRIMA*

Jurisdictions had barely digested, from the legal viewpoint, the emergence of intermediation when the third development began to gather pace. Since the disappearance of the Bretton Woods System in 1971, globalisation and the abolition of capital controls made available a huge asset reservoir. Markets began to use assets globally, for investment purposes, and, more importantly in the present context, to collateralise payment obligations, notably in derivative and

[41] See L Afrell and K Wallin-Norman, 'Direct or Indirect Holdings – A Nordic Perspective' (2005) 10(NS) Uniform Law Review, 277-284.
[42] See W Liang, 'The Geneva Securities Convention and its Relevance for China' (2012) Law and Financial Markets Review, 287-289.
[43] See Nizard (n 7), 245-52.
[44] Einsele (n 27), 64-160.
[45] See Benjamin, (n 11), 3-59; Financial Markets Law Committee, 'Property Interests in Investment Securities' (July 2004), available http://www.fmlc.org/uploads/2/6/5/8/26584807/3e.pdf, last accessed 20.05.2016. Overview of relevant recent case law: Mr Justice Briggs, 'Has English Law Coped with the Lehman Collapse?' (2013) Butterworth Journal of International Banking and Financial Law, 131-132.
[46] See E Micheler, 'Custody chains and asset values: why crypto-securities are worth contemplating?' Cambridge Law Journal (2015), 509-513.
[47] See references in n 39-45.

securities financing contracts. Cross-border investment and collateralisation had, of course, always existed. However, now the share of transactions with a cross-jurisdictional element rose to 40% or more.[48]

While market practice changed towards the international use of securities, parties were unable consistently to overcome the legal obstacles associated with this practice, in particular requirements under mandatory property and insolvency laws and consequences stemming from the relevant rules of private international law. As a consequence, the market either transacted under legally uncertain conditions (thereby driving up transaction cost) or had to abstain from certain transactions altogether (provoking opportunity cost)—an argument that has now been taken up again by the Commission in the context of the Capital Markets Union.[49]

1. *Lex rei sitae, lex societatis and PRIMA*

Guynn[50] was the first to conceptualise the relevant shortcomings of the private international law. He argued that the place of the securities certificate (*lex rei sitae*) and the place of the incorporation of the securities issuer (*lex societatis*) as connecting factors for bearer and registered securities, respectively,[51] were unsuitable to yield a consistent result in the intermediated set-up of securities markets, let alone in the cross-jurisdictional context. Central banks, which regularly take foreign securities as collateral in exchange for liquidity they provide to commercial banks, developed a strong interest in this argument. As a consequence, legislators in Europe as well as at the Hague Conference on Private International Law rushed to address this concern by introducing a new type of conflict-of-laws rule, based on a novel connecting factor called 'place of the relevant intermediary approach' or PRIMA. It was designed to facilitate the cross-jurisdictional use of securities, thereby lowering transaction and opportunity cost.[52]

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[48] Data shows that between 5 per cent and 95 per cent of investments in the different European financial centres are allocated to cross-border securities; typically, in large financial centres like London, Frankfurt and Paris, between 30 per cent and 70 per cent are allocated to cross-border holdings. The share of cross-border *holdings* is mirrored by a correspondent percentage of cross-border *trading* activity. (Data extracted from Oxera, 'Monitoring prices, cost and volumes of trading and post-trading services', Report prepared for the European Commission, London and Brussels (2011), 73. Though the data itself relates to equity investments, the authors note, *ibid*., that they have found a positive correlation between equity and debt securities in respect of cross-border holdings.) No data is available indicating the percentage of securities *collateral* provided across borders but, going by the aforementioned figures, a significant percentage may be assumed. It is probably justified, therefore, for ease of reference, to collapse these three elements into the figure of 40 per cent of all holding, trading and collateral operations by EU market participants in one way or another imply a cross-jurisdictional element.

[49] See n 4 and n 6.

[50] RD Guynn, 'Modernizing Securities Ownership' in Transfer and Pledging Laws, International Bar Association (ed) 1996, 5-12; see also Ooi, 'The Choice of a Choice of Law Rule', in Louise Gullifer and Jennifer Payne (eds.), *Intermediated Securities. Legal Problems and Practical Issues* (Oxford and Portland: Hart Publishing, 2010) 219–244.

[51] See Dicey, Morris & Collins, *The Conflict of Laws*, 15th ed. (2012) Vol. 2, 22-40 and 22-44.

[52] See Benjamin, (n 11), 158-159; C Bernasconi, 'The law applicable to dispositions of securities held through indirect holding systems', Hague Conference on Private international Law, Collateral Securities Prel. Doc. 1 (November 2000). In Europe, the new rule was introduces through three sectoral Directives: Article 9(1) Directive 2002/47/EC of the European Parliament and of the Council of 6 June 2002 on financial collateral arrangements, Article 9(2) Directive 98/26/EC of the European Parliament and of the Council of 19 May 1998 on settlement finality in payment and securities settlement systems; Article 24

2. The factual and contractual variations of PRIMA

PRIMA departs from the traditional connecting factors referring to location or incorporation. Instead, it refers to the law of the securities account to which the relevant securities are credited.[53] This law governs all securities credited to this account, whether foreign or domestic. The new approach subsumes two different sub-species: in relation to what might be termed the *Factual* PRIMA, the law of the account is the law of the place where the account is factually maintained. This subcategory is, roughly, the approach taken by the relevant EU legislation.[54] In relation to what might be termed the *Contractual* PRIMA, the law of the account is the law agreed upon to this effect by the parties. This is the approach underlying the Hague Securities Convention[55], which is also the law in Switzerland.[56]

The merits of both approaches have been hotly debated.[57] On the one hand, the Factual PRIMA may cause uncertainty because it is not always clear where an account is located where a multinational intermediary it is involved. On the other hand, the Contractual PRIMA was perceived as politically unacceptable because it would allow parties to provide collateral under English or New York law regardless of where they were located themselves, thus circumventing national mandatory property and insolvency laws. Both arguments have their merits, but what matters more in the present context is that both follow the same basic logic: the law applicable to securities disposition and acquisition is determined on an *inter partes* basis, i.e. the two-party relationship between account holder and intermediary, whereas before, *lex rei sitae* and *lex societatis* had been absolute, inflexible connecting factors.

3. Financial collateral and universal fungibility

This change of approach from an absolute to a relational connecting factor helped in accommodating two important market practices: the collateralisation of entire accounts and the inclusion of the value of the collateral assets in contractual insolvency set-off, often also called close-out netting. Both are extremely beneficial from an efficiency perspective and securities financing and derivatives transactions rely heavily on these techniques.

The principal efficiency gain flows from the fact that PRIMA allows entire accounts to be used as collateral, even if they contain securities from various jurisdictions. Otherwise, for instance, a portfolio comprising French, Japanese and

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Directive 2001/24/EC of the European Parliament and the Council of 4 April 2001 on the reorganisation and winding up of credit institutions.

[53] Ooi, (n 50), 221.

[54] See the Directives cited in n 52.

[55] Hague Securities Convention (n 2), Articles 2(1) and 4(1). The choice is restricted on the basis of a requirement that the intermediary has a qualifying establishment in the country the law of which has been chosen.

[56] Federal Intermediated Securities Act (Switzerland), Article 108c. See H Kuhn, B Graham-Siegenthaler, L Thévenoz, *The Federal Intermediated Securities Act and the Hague Securities Convention*, Stämpfli, Berne (2010), 1-7.

[57] P Bloch and H de Vauplane, '*Loi applicable et critères de localisation des titres multi-intermédiés dans la Convention de La Haye*', (2005) Journal du droit international – Clunet, 3–40 ; D Einsele, '*Das Haager Übereinkommen über das auf bestimmte Rechte im Zusammenhang mit zwischenverwahrten Wertpapieren anzuwendende Recht*' (2003) WM – Zeitschrift für Wirtschafts- und Bankrecht, 2349–2356 ; Ooi, n 50; Sigman, Harry C. and Bernasconi, Christophe, 'Myths about the Hague Convention debunked' (2005) International Finance Law Review, 31–35.

Delaware securities could never be collateralised as a whole unless the collateral was made enforceable under the three jurisdictions, which is cumbersome and not always possible.[58] Further, PRIMA is particularly important because parties rely on the possibility to change the collateral portfolio during the course of the transaction, either to adjust its value to the changing value of the underlying obligation by adding or subtracting securities ('margining') or to exchange, during the course of the arrangement, one kind of security for another, in accordance with their business needs ('substitution').[59] This happens often on a daily basis. It would be cumbersome and legally uncertain to accommodate a change in the applicable law whenever a new kind of security is added, say, in the above example, when German securities are substituted for French ones. With PRIMA, the law applicable to the securities remains unchanged because it applies to the entire account and its—changing—content.

Secondly, parties seek to align the law governing their financial collateral with the law governing their contractual relationships, say, a derivative or securities financing transaction, which are typically concluded under English law.[60] The relevant standard documentation by default contains clauses allowing for insolvency set-off or close-out netting.[61] It is considerably easier to arrange for the value of the collateral portfolio to be included in this calculation if the applicable law can be clearly identified and—ideally—can be chosen by the parties. This is why the difference between factual and contractual PRIMA is so relevant.

Thus, the introduction of PRIMA made it possible to apply the techniques of margining, substitution and insolvency set-off, thereby contributing significantly to improved enforceability of such arrangements, allowing for quasi-universal fungibility covering securities of any kind. Their only relevant feature was, from now on, their value.

III. Absolute and Relational Rights and the Role of Intermediaries

The preceding part has shown how three major developments in the practice of holding and transferring securities have supported the increase of liquidity in securities markets, notably transferability, intermediation and cross-jurisdictional use of securities. Every move towards a new practice was subsequently sanctioned by legislators and the courts. However, idiosyncratic national legal approaches resulted in an uncoordinated and heterogeneous legal framework, while PRIMA introduced an *inter partes* perspective into an area of the law where, in most jurisdictions, rights are absolute, at least in principle.

Recent attempts to harmonise national laws in this regard, i.e. the Geneva Securities Convention and the EU Clearing and Settlement Legal Certainty Project, have failed.[62] At first glance, this is surprising, since the drafters

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[58] R Goode, *et al*, *Explanatory Report to the Hague Securities Convention*, Martinus Nijhoff Publishers (2005), 18.

[59] See P Paech, 'The Value of Insolvency Safe Harbours', forthcoming in the Oxford Journal of Legal Studies (2016), Section 2, online version doi:10.1093/ojls/gqv041.

[60] See Global Master Repurchase Agreement, Article 17; ISDA Master Agreement, Schedule Part 4 (h).

[61] See Global Master Repurchase Agreement, Article 10; ISDA Master Agreement, Article 6.

[62] See n 2, 3.

concentrated on achieving a high degree of functionality and conceptual neutrality so that not only could national laws continue to apply but indeed could largely remain unchanged.[63] However, the resulting rules became so neutral in conceptual terms that they seem to suggest that any type of right, including absolute rights such as direct property, might be held in the intermediated system.[64] That, however, appears to be contrary to certain practical features of indirect holding systems which suggest that only relational rights can exist in them. Not surprisingly, as a consequence, the fundamental uncertainty whether the idea of an *erga omnes* right is at all compatible with intermediated securities holding remained and will continue to inhibit progress in terms of harmonisation.

Two types of legal framework mark clear positions in this discussion.[65] First, there is the framework epitomised by U.C.C. Article 8, where the legal solution is modelled to fit the intermediated holding system. It is built on multi-tier relational rights between the parties to securities accounts. There are no legal relationships beyond that account relationship; in particular, there are no direct rights against the issuer or any intermediaries other than an account holder's direct intermediary. The second type of legal framework is built on the contrary understanding. It is used in the Nordic countries and elsewhere. Here, investors have an identifiable, direct legal relationship with the issuer and intermediaries take no legal positions in the securitieswhatsoever. The holding system is not built on pooled accounts and does not mirror each security several times in various accounts. Instead, there is only one central ledger maintained in the central securities depository, which can be changed by banks and brokers as agents.[66] Both approaches are clear and consistent in terms of the right that an account holder receives.

A confusing position is taken by those jurisdictions that practise the former but conceptually think in terms of the latter holding system, such as France and Germany. These jurisdictions use multi-tiered holding systems as in the US market, involving pooled accounts and mirroring each security several times throughout the system. At the same time, these jurisdictions assume the existence of an *erga omnes* right, [67] as exists under the Nordic approach. However, the indirect holding system does not provide for a set-up in which *erga omnes* positions are viable, and it is impossible for the law to impose it. Rather, the intermediated holding system is inextricably linked to a relational understanding of the rights they confer on account holders, as the following sections will show.

A. Client asset protection

Originally, paper certificates and register entries were effective carriers of the right and plausible vehicles for easy and safe acquisition and disposition.[68] However, these approaches struggled to produce consistent results as soon as the market moved on to intermediated holding. The latter boosted liquidity but came at the

[63] Geneva Securities Convention (n 2), Preamble, Recital 6; EU Clearing and Settlement Legal Certainty Group (n 3), 4.3.
[64] See Geneva Securities Convention (n 2), Article 9; Clearing and Settlement Legal Certainty Group (n 3), Recommendation 4.
[65] See n 39-45 and accompanying text.
[66] See Unidroit, Study S78 – Doc 44 (n 32).
[67] See Einsele (n 27), 13, Nizard (n 7), 294.
[68] Nizard (n 7), 224.

price of novel risks caused by intermediation, such as inadvertent or deliberate misappropriation of securities, or the creation of credit entries in client accounts that were not backed by the intermediary's own holdings. Such practices typically result in losses of client securities in the event of an intermediary's insolvency ('intermediary risk').

However, strikingly, the classification of securities as property rights has never been capable of addressing intermediary risk, even though property is generally associated with the highest possible degree of safety. The reason is that the classification as property, notably of bearer securities, was originally conceived to serve a different function, that of transferability, through vehicles such as negotiation and good faith acquisition. This transfer function was and is still needed and became even more essential in the intermediated world, as no acquirer in the anonymous environment of automated exchanges and centralised clearing and settlement would be able to verify whether the right itself or the acquisition process were free of any legal defects.[69]

However, transferability comes at the price of increased intermediary risk because it 'validates' deliberate or inadvertent misappropriation of securities and the creation of 'excess rights' by intermediaries.[70] The risk associated with this kind of non-compliance on the intermediary's side is typically borne by the original owner who would lose out if a third person acquired the right from the intermediary in good faith. This was a real risk even before modern clearing and settlement systems emerged and investors dealt with their banks or brokers on a much more personal basis: once security certificates were physically delivered into custody, the investor had no choice but to trust its custodian that it would comply with segregation requirements to keep the property identifiable, and that it would, at the same time, abstain from unauthorised dealings in the securities. If the custodian breached these obligations, the original owner was always at risk of losing the securities. Thus, with the advent of intermediation, from the perspective of account holders, negotiability and good faith acquisition have become both a boon and a bane.

In practice, it is behavioural obligations that protect securities holdings.[71] Regulatory regimes such as the famous MiFID (EU) or CASS (UK) rules[72] impose duties on intermediaries designed to make mistakes or fraud less likely. This approach is anything but new. The first German law on indirect holding of 1896 recognised the practice of pooling and multi-tier holding and addressed the investor's resulting weak position by imposing segregation duties on the bank or broker, on threat of payment of a 3000 Deutschmark fine or up to two years' imprisonment for non-compliance.[73] However, the mere classification of securities as a property right with an *erga omnes* character could not achieve the desired level of investor protection either then or today.

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[69] Nizard (n 7), 253-257.
[70] See Nizard (n 7), 225.
[71] See Mooney, (n 14), 324-29.
[72] Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on Markets in Financial Instruments [etc.]; Financial Conduct Authority, Handbook, Client Assets, Custody Rules ('CASS6').
[73] Gesetz betreffend die Pflichten der Kaufleute bei Aufbewahrung fremder Werthpapier (1896), https://de.wikisource.org/wiki/Gesetz,_betreffend_die_Pflichten_der_Kaufleute_bei_Aufbewahrung_fremder_Werthpapiere last accessed 20.05.2016. See also Mooney, (n 14), 402-3.

B. *Investor rights*

A second issue is the tension between property in a security, on the one hand, and the ability to exercise the rights flowing from that security, on the other. In practice, investors are often excluded from these rights.[74] For instance, they may find themselves in a situation where they are not invited to attend and vote in the annual general meeting because they are not recognised as shareholders in legal terms.[75] The root of the problem is that the connection between issuer and investor is interrupted as a consequence of the intermediated holding system, either because the legal bond between the two is broken by the holding pattern, or because operational hurdles inhibit the exercise of the rights, or both.[76]

Again, the idea of property as a specific and absolute right adds to the confusion rather than helping to sort it out, especially in cross-border situations. This is primarily because substantive securities law may attribute legal title to a person who is therefore considered a shareholder or bondholder but who is not the person taking the risk of the investment in economic terms. In the UK and the US, the holder of legal title is typically the topmost intermediary or its nominee. In France, Germany and many other jurisdictions the property is supposed to lie with the ultimate investor. In international settings, where different laws might apply to the various accounts of a holding chain, these laws, independently from each other, may even identify more than one legal owner of what is the same security in economic terms.[77] This sounds like a quirk of nature but in fact arises from the modern intermediated market structure supported by the introduction of PRIMA: to the extent that the question of who owns what is answered independently for each account of an intermediated holding chain there may theoretically be as many conflicting answers as there are accounts.

Even if the investor is properly identified as shareholder or bondholder, the chain of intermediaries stands between it and the issuer. As every member of the chain only knows who is next in line, communication regarding corporate rights is operationally complicated, cumbersome and costly and, therefore, often does not work.

In this set-up, again, whether or not investors are able to exercise their rights often depends on the compliance of intermediaries with behavioural obligations. This might or might not work smoothly in national systems, and it certainly does not work in the international context.[78] However, the classification of securities as a property right *per se* is of no help in this regard.

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[74] See J Payne, 'Intermediated Securities and the Right to Vote in the UK' in L Gullifer and J Payne (eds), *Intermediated Securities*, Hart, Oxford and Portland 2010, 187-218; Micheler (n 50).
[75] The problem exists in respect of all sorts of corporate rights in the context of distributions, reorganisation and general meetings. Dividend or coupon payments may be the only right flowing from a security that reliably reaches the investor. See, for instance, the relevant work of an ECB working group on Corporate Actions, https://www.ecb.europa.eu/paym/t2s/governance/ag/html/subcorpact/index.en.html.
[76] See Micheler (n 50), 509-513.
[77] See P Paech, 'Market Needs as Paradigm' in PH Conac, U Segna and L Thévenoz (eds), *Intermediated Securities*, Cambridge University Press 2013, 36-38.
[78] See Micheler (n 32); see also the industry-wide 'Market standards for corporate action processing' which lay down very basic principles on how intermediaries should handle investor rights in a cross-border context, available at www.afme.eu/WorkArea/DownloadAsset.aspx?id=9152, accessed on 20.5.2016.

Erga omnes is a term typically used to distinguish absolute from relational rights, in particular to describe the difference between property rights and obligations. The exact nature of property as an *erga omnes* right is still controversial but it generally hovers around the elements of 'right to exclude' and 'right to use'.[79] An investor in securities at present appears to have none of these; therefore, it is unlikely that securities can be classified as property.[80]

As far as the right to exclude is concerned, it refers to a duty owed by the rest of the world to the proprietor to abstain from deliberate or careless interference with the right,[81] without any special permission, in particular from converting the right, or trespassing it, or damaging it.[82] Transposing these ideas to modern securities holding, the picture seems quite straightforward at first glance: a holder of a security typically aims to exclude the whole world: the intermediaries involved in the holding from enjoying rights flowing from the securities and using them economically; the creditors of these intermediaries from accessing the securities in the event of insolvency; and other parties in general from using the securities for their own economic purposes. However, if we turn this around and ask who owes the duty not to interfere, the picture is more confusing. The focal point is the role of intermediaries alone—only they owe duties as only they have and can give access to the securities. Others can have access only through them, typically on the basis of a court or regulatory order. Therefore, it is not entirely clear whether duties are owed by 'the whole world'.

A more fundamental point is the question of who owes these duties *to whom*. In a typical holding situation, a number of intermediaries are involved in holding the same economic asset. Only the investor's direct intermediary owes the duties *to it*.[83] Any other intermediary would typically owe duties to its own account holders, and would be unable to identify the ultimate investor. In other words, in asking who owes duties to whom, there would appear to be as many identical, stacked positions as there are accounts involved in the holding chain. The investor would appear not to have an *erga omnes* right against the whole world but rather a right against its direct intermediary which, in turn, is in an identical position against its own direct intermediary, and so on.

A second trait of property is that the proprietor can do with the asset whatever it pleases: use it, abandon it, do nothing at all with it, and enjoy its fruits.[84] However, the ultimate investor's right will typically only be enforceable against its direct intermediary but not against any other intermediaries involved in holding its securities: for lack of specificity and the ability to identify the ultimate investor's assets, they would all be unable to comply with its claim.[85] Consequently, the proprietor's freedom to do whatever it felt like with the security

[79] See S Douglas and B McFarlane, 'Defining Property Rights', in J Penner and HE Smith, *Philosophical Foundations of Property Law*, Oxford University Press (2013) 219.
[80] See Mooney, (n 14), 412; Nizard (n 7), 305.
[81] Douglas and B McFarlane (n 79), 220.
[82] *Ibid,* 224.
[83] See Benjamin, Interest in Securities (n 11), 155.
[84] Douglas and McFarlane, (n 79), 226.
[85] Nizard (n 7), 412; See Article 22 of the Geneva Securities Convention, which expressly excludes access to the investor's securities at the level of any intermediary other than the direct intermediary.

is restricted to exactly one option apart from just holding it: it can instruct its intermediary to transfer it elsewhere.

D. *Conflict of laws and the broken bond between issuer and investor*

In terms of conflict of laws, a similar development may be observed from the absolute to the relational perspective, contributing further to an understanding of intermediated securities as *inter partes* rights, thereby making intermediaries' duties the focal point of the legal framework.

Traditional approaches to conflict of laws in respect of securities incorporated the idea that there exists a fixed number of rights (the securities) between the issuer and its investors. For example, an issuer has issued 1m securities, and at no point in time can there ever be more or less than 1m securities. *Lex rei sitae* (for bearer securities) ensured that only the law of the *situs* of the certificate applied to proprietary questions such as acquisition and encumbrance, but no other law. *Lex societatis* (for registered securities), inversely, resulted in a situation where the location of parties and any evidencing documentation was irrelevant and only the law of the issuer applied.[86]

Therefore, conflicts between different laws as to the enforceability of rights in securities did not arise simply because the securities existed in only one place, either as a certificate or as a register entry. Thus, it was impossible for the acquisition of a security to be valid under one law but invalid under another. Both systems were closed within themselves and therefore consistently able to settle questions as to which party stood to lose and which party would win, for instance in the scenario of good faith acquisition.[87] The concept of *erga omnes* fits snugly into that environment.

By contrast, the introduction of PRIMA led to a situation in which the law applicable to a security is determined on the basis of an *inter partes* relationship. Different laws may govern the various accounts through which a security is held. This has two consequences. First, the right of the investor might be governed by one law, whereas the right in the securities certificate or register entry might be governed by another law—hence, the two economic positions are legally unconnected. Secondly, the different laws that apply to the various accounts in a holding chain may create enforceable rights that are in unresolvable conflict. For instance, the end investor may have an unencumbered property right, whereas an intermediary at a different level has validly pledged an account to its creditor that comprises the relevant security. Both aspects clearly point to the result that different assets exist in the different accounts in a securities holding chain.

The certificate and register systems guaranteed both horizontal transferability between market participants and vertical consistency between the rights originally issued by the issuer and those in the hands of investors. With the move to

[86] The majority view is that *lex societatis* applies in case of registered shares, see M Ooi, *Shares and other Securities in the Conflict of Laws*, Oxford University Press 2003, mainly referring to the Court of Appeal decision [1996] 1 WLR 387 *Macmillan*. *Lex rei sitae* applies in case of bearer shares, where there are two scenarios: for those bearer shares in central custody that place would determine the law. For those bearer shares outside central custody, the law the jurisdiction of the location of the certificate applies.

[87] P Paech, 'Intermediated Securities and Conflict of Laws', conference paper (May 2014), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2451030, last accessed 20.05.2016.

intermediation and PRIMA, this equilibrium shifted towards the horizontal, transactional environment,[88] in which intermediaries play the pivotal role.

IV. From Intermediated Securities to Blockchain Settlement

Professor Mooney wrote in 1990 with regard to the U.C.C. that 'intermediary solvency and integrity [is] at the heart of the treatment' for improved client asset protection in intermediated systems.[89] The preceding sections show that this is still true twenty-five years on, and on a global scale. Recent insolvencies of financial intermediaries, in particular Lehman Bros., Madoff and MF Global, confirm that, while solvency and integrity requirements generally enhance investor protection and stability, they cannot protect securities holders against intermediary risk. The benefits of the current intermediated system in terms of liquidity are considerable but the system still appears flawed in terms of legal certainty and overall consistency.

However, it is not written in stone that liquidity and legal consistency are mutually exclusive. As an alternative new solution, models of un-intermediated holding, acquisition and disposition of securities have recently appeared on the agenda. Notably, the use of distributed ledger, or blockchain, technology beyond Bitcoin and other crypto-currencies is seen as a way better to consolidate the aims of liquidity and legal certainty than is currently possible in the intermediated system.[90] Details of such plans are not publicly available, although it is clear that important market players invest resources in exploring the potential benefits of that idea, notably increased speed of settlement at lower cost.[91] At the moment, nobody contemplates the immediate introduction of crypto-securities for the market as a whole. Rather, the industry seems to plan using the technology for specific parts of the market and specific functions, while crypto-securities might be issued first in niche markets and probably later occur in relation to mainstream financial instruments such as shares in real economy corporations.[92] The close conceptual kinship with Bitcoin and other crypto-currencies suggests that crypto-securities may also become available to individual, even retail, investors.

With blockchain, Professor Mooney's prediction that 'innovations in technology and settlement systems might increase direct relationships between

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[88] Paech, *ibid.*

[89] Mooney, (n 14), 413.

[90] See R Ali, J Barrdear, R Clews & J Southable, 'Innovations in Payment Technologies and the Emergence of Digital Currencies' Bank of England Quarterly Bulletin 2014 Q3, available http://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2499397, last accessed 20.05.2016; Wright and De Filippi, 'Decentralised Blockchain Technology and the Rise of *Lex Cryptographica*' (2015) Working paper, 11-12, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2580664, last accessed 20.05.2016; M Kalderon, F Snagg and C Harrop, 'Distributed ledgers: a future in financial services?', (2016) JIBLR 31-5, 243.

[91] GW Peters and E Panayi, 'Understanding Modern Banking Ledgers through Blockchain Technologies: Future of Transaction Processing and Smart Contracts on the Internet of Money, Working Paper (18.11.2015), 26-27, 30, available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2692487, last accessed 15.4.2016.

[92] See, for instance, Cade Metz, 'SEC approves plan to issue stock via Bitcoin's blockchain' (press release 15.12.2015), available at http://www.wired.com/2015/12/sec-approves-plan-to-issue-company-stock-via-the-bitcoin-blockchain/, last accessed on 20.5.2015.

market participants and issuers and permit less reliance on intermediary control'[93] now seems to be coming true. However, that long-term shift will fundamentally change the parameters on which the current legal and regulatory framework is built, notably because the intermediary function, which currently serves as a linchpin for law and regulation, will not be part of the blockchain environment.

A. Holding and transfer of crypto-securities

Blockchain, or distributed ledger technology is able to attribute an asset to a user without the need for intermediation. 'Something' is represented by a unique piece of code and stored in an electronic vault that belongs to a market participant. The value of this piece of code can be freely determined. It could be a unit of a virtual currency, like Bitcoin, or it could be a unit in a securities issue, or something entirely unrelated to finance, like entitlements to obtain healthcare.[94] For the unit to be transferred, the transferor and the transferee connect through the Internet and the system's software effects an accrual and diminution of units in their electronic vaults.

With the lack of physical tokens, such as coins, bills or bearer certificates, there would in principle be room for error and manipulation: for instance, selling the same piece of code twice. In traditional token-less systems, such as payment systems, the problem of correct allocation of rights can only be asssured by a central entity that acts as bookkeeper for all participants. Such a central entity is not needed for assets transferred using blockchain, as a public verification process which involves many or even all participants ensures that there is no double-spending or other friction. All participants have access to this information and all accounts are regularly and automatically consolidated through the Internet.

Second-generation blockchain applications have potential beyond the mere exchange and attribution of rights. Here, the piece of code contains 'smart' elements that are able automatically to trigger performance if a specified event occurs,[95] such as the payment of dividends, or the enforcement of rights, or automatic termination, realisation of collateral or netting. Multiple smart contracts can even be bound together to form a decentralised structure that operates according to their code with no human interaction.[96]

B. Does Blockchain settlement need securities law?

Blockchain technology raises a number of regulatory and legal issues. The focus has so far been on illicit practices, such as money laundering and terrorist financing through Bitcoin.[97] There are also wider questions such as whether

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[93] Mooney, (n 14), 414.

[94] See UK Government Chief Scientific Advisor, 'Distributed Ledger Technology:beyond block chain (January 2016)', available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf, last accessed 20.5.2016.

[95] Peters and Panayi (n 91), 2; Wright and De Filippi (n 90), 11.

[96] Wright and De Filippi (n 98), 15.

[97] See Financial Action Task Force, 'Virtual currencies,: key definitions and potential AML/CFT risks' (June 2014), available at http://www.fatf-gafi.org/media/fatf/documents/reports/Virtual-currency-key-definitions-and-potential-aml-cft-risks.pdf.

societies in the blockchain era will still be able to regulate commercial activity by means of the law.[98] The commercial, insolvency and securities law framework for crypto-securities and securities holding through blockchain has so far only received scant attention.[99] However, societies should consider carefully to what extent they wish to allow algorithms to replace judicial law enforcement.[100] In the transactional context, parties may be given the option to choose a conflict settlement mechanism with direct enforcement that is built into the system.[101] In the non-transactional context, the attribution of crypto-securities to market participants will need to depend on their enforceability in court. These are notably cases in which third party interests are affected, such as the interests of unsecured creditors in insolvency. And, lastly, even purportedly fail-proof mechanisms can be manipulated[102] and misused. As a consequence, a sound financial law framework for crypto-securities is indispensable.

Wright and *De Filippi* have shown that Nation States' ability to regulate decentralised global systems is in any case fragile and, once lost, can only be regained with brute regulatory force, entailing 'draconian' limitations to the freedom of the markets.[103] It is therefore crucial that a framework ensuring enforceability of blockchain securities settlement be developed at an early stage. If the law fails to provide consistent solutions to enforceability questions, markets will rely exclusively on operational structures and technical processes to make up for that gap. Users will push for self-regulation and the implementation of stateless mechanisms of adjudication which transcend the constraints of financial institutions and State regulation.[104] The situation of the current global intermediated system and its patchy legal framework is a reminder of how financial law can end up in such a conundrum of legal, economic and operational path dependency from which there is no easy way out. Therefore, a globally consistent framework is needed not only as a matter of legal certainty, but also in order to maintain Nation States' regulatory and legal grip on a market development that might become the infrastructure for the lifeblood of our economies.

C. *The intermediated and the crypto-environment*

Blockchain technology will first serve specific segments. Even though the technology has the potential to create a system entirely free of intermediation,[105] we will see a patchwork emerging with bits of the new blockchain set up side by

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[98] Wright and De Filippi (n 90), especially 51-56.

[99] See JL Schroeder, 'Bitcoin and the Uniform Commercial Code' Cardozo Law Faculty Research Paper No. 458 (August 2015), available http://papers.ssrn.com/sol3/Papers.cfm?abstract_id=2649441, accessed 20.05.2016; D Quest, 'Taking security over bitcoins and other virtual currency', Corporate Rescue and Insolvency (2015), 261; P Ortonlani, 'Self-enforcing Online Dispute Resolution' (2015) Oxford Journal of Legal Studies, 1-35, doi: 10.1093/ojls/gqv036; Kalderon *et al.* (n 90), 246.

[100] See Wright and De Filippi (n 90), 51-56.

[101] See Ortolani (n 91), 15, in relation to Bitcoin-settled contracts for the sale of goods.

[102] UK Government Chief Scientific Advisor (n 94), 22; see, in relation to the insolvency of a Bitcoin Exchange, I Kaminska, 'Mt Gox and the mother of all short squeezes', Financial Times 20.5.2016, available at http://ftalphaville.ft.com/2016/05/20/2162507/mt-gox-and-the-mother-of-all-short-squeezes/, last accessed 20.5.2016.

[103] Wright and De Filippi (n 90), 50-56.

[104] See Ortolani (n 91), 20, in relation to Bitcoin.

[105] See Wright and De Filippi (n 90), 1; Schroeder (n 99), 3.

side with the older intermediated system and probably even with the traditional paper or register-based set-up. Three scenarios can be distinguished.

1. *Native crypto-securities*

In a first scenario, issuers decide to issue new securities directly as blockchain instruments. I call these instruments "native crypto-securities". They would exist side by side with intermediated securities issues. The relevant legal framework would fundamentally differ and pure crypto-securities and intermediated securities cannot be confounded in legal terms.[106] However, legal uncertainty may arise in the following two scenarios where the market creates intersections between these worlds.

2. *Trans-crypto-securities*

In a second scenario, the issuer moves a pre-existing securities issue fully or partly from the intermediated system to the blockchain environment. I call these products "trans-crypto-securities". The situation here is quite comparable to when securities were first moved from the paper and register-based systems into the intermediated environment. The transformation needs interfaces in both operational and legal terms. Disregarding the operational side for the purpose of this paper, the legal interface will need to consist of a rule that has two functions: first to make the relevant transformed securities disappear entirely from the intermediated system; secondly, to bring the securities into circulation as crypto-securities.[107]

Both disappearance and reappearance need to be legally enforceable, including in insolvency. The possibility for rights in transformed securities to continue to be enforced in the intermediated system must be excluded. During the transformational process from paper to intermediated securities, many jurisdictions struggled in this regard, keeping the former carrier of the right alive while depriving it of its function, for example by uselessly storing security certificates in a central depository, a strategy that has considerable potential to confuse legal analysis.[108] As a consequence, there has always been a residual danger that unsecured creditors try to attach securities at the place of storage of the certificates or at the level of the issuer register, typically by means of court orders.[109]

3. *Intermediated crypto-securities*

In a third scenario, consortia of market players build 'crypto-enclaves' in an environment that is generally still intermediated. For instance, a group of banks may set up a settlement mechanism amongst them, using blockchain technology.[110] However, the securities settled in this enclave are issued as

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[106] We have seen an analogous split between the register- and certificate-based market on the one hand, and the intermediated set-up, on the other hand, since the late 19th century, see above.
[107] Switzerland has recently introduced a rule catering to the disappearance of bearer securities and their re-appearance as pure book-entry securities, see Kuhn, Graham-Siegenthaler and Thévenoz (n 56), 191-211.
[108] See n 39-46 and accompanying text.
[109] See Geneva Securities Convention (n 2), Article 22.
[110] See Peters and Panayi (n 91), 27-28.

intermediated securities and have not undergone the transformation initiated by the issuer, as described before. Rather, participants in the settlement mechanism create 'their own' crypto-securities, which represent securities they themselves hold in the intermediated system. Here, the danger of mismatch or conflict is considerable, because the intermediated securities are what economically underpin the crypto securities. The parallel with the single most problematic trait of the current intermediated system is striking: different legal positions ultimately link to the same underlying asset, and the avoidance of conflict depends wholly on the compliance of the intermediary. If it fails to comply and becomes insolvent, the acquirers of its crypto-securities would be unprotected.

D. *The point of entry for the law*

Under the current intermediated approach, the PRIMA rule determines how the question of enforceability of a right in securities is connected to the law of a specific State. However, PRIMA presupposes the existence of accounts and therefore of intermediaries, which will not exist as such in the blockchain set-up. Consequently, the point of entry for the law into the world of crypto-securities is still unclear.[111]

1. *The nature of the right and the applicable law*

At first glance, the nature of the right, i.e. whether crypto-securities are claims or some kind of property, seems to be at the core of the issue of enforceability. Considering the criteria applied in the context of intermediated securities,[112] the most important communality is that both intermediated and crypto-securities represent a legal relationship between an investor and an issuer (in that, crypto-securities differ markedly from bitcoins and other virtual currencies which do not represent a claim against an issuer). The most relevant difference between intermediated and crypto-securities is that the latter are not pooled or mirrored in the system. Each crypto-security remains unique and identifiable. Further, crypto-securities directly embody the right, whereas intermediated securities in the investor's account merely relate to some root entry or certificate that is located at the top of the holding system. Lastly, the electronic vault is the single point of access to a crypto-security, and the owner of the vault is the sole key-holder. In that respect, crypto-securities come extremely close to the traditional concept of bearer securities, with the difference that the content is not set out in writing on paper but in electronic code. Therefore, it would, in principle, make sense to classify them as some kind of property and determine the applicable law on the basis of territorial considerations: the nature of the right as well as the conditions for enforceable acquisition and disposition would be determined by the law of the place of the electronic vault, or by the place of the key-holder.

However, it is doubtful whether this approach will be any help, similar to what has been described in relation to intermediated securities. The reason is that any such conceptual thinking is confined to a purely domestic legal view. The financial market is global, as is the Internet, and crypto-securities can be transferred globally

[111] See Kalderon *et al.* (n 90), 247.
[112] See above, n 79-85 and accompanying text.

across jurisdictional confines and without the need for physical infrastructures other than the Internet. However, that also means that rights in crypto-securities need to be enforceable in insolvency proceedings in basically any jurisdiction. The idiosyncratic classification of the right as property or any other type of right will not be able to provide for a legal position that will yield the desired result—enforceability—in so many jurisdictions. Therefore, other avenues will need to be explored.

A second alternative is the application of the law of the issuer, *lex societatis*, to crypto-securities. The classification of the nature of the right is irrelevant in this case, and the identification of the applicable law would be very easy in relation to each securities issue. However, this approach leads to a situation where the holding of international portfolios in a user's electronic vault requires the application of different laws to questions of acquisition, disposition and enforceability. In the intermediated environment just such a situation led to considerable legal uncertainty before PRIMA was introduced.[113] In the blockchain environment, the application of different laws to a user's portfolio would create the same uncertainty and ultimately undo much of the benefit of the new technology.

A better connecting factor for the law governing enforceability of rights is the software platform that holders of crypto-securities use. One might call that law '*lex systematis*'. It could be determined either on the basis of a uniform choice of the users of the relevant platform or, alternatively, it could be the law of the jurisdiction of the relevant supervisor. Blockchain platforms used for securities settlement need to be regulated and supervised for systemic stability and investor protection purposes. Regulation could, in principle, allow a choice of law for the platform and its users as a whole, or, alternatively, impose the applicable law. In order to guarantee enforceability of rights in crypto-securities, it is crucial that insolvency laws around the world recognise acquisitions and dispositions effected under this law.

2. *The mechanics between law and IT-based acquisition processes*

As there will be different blockchain systems that operate slightly differently, it will be difficult to design a legal framework that can penetrate the technology down to the smallest detail. Rules that provide for enforceability of rights in insolvency need to be stable and cannot be adapted to frequent technological changes. Therefore, the solution may consist in creating a mechanism under which the law *refers* to the platform rules on acquisition and disposition. If the requirements of these platform rules are met, acquisitions and dispositions are enforceable. This approach is already applied to another 'black box' in the financial market, i.e. the clearinghouses.[114] As in the case of clearinghouses, enforceable acquisition and disposition of crypto-securities under the platform rules would require recognition of that specific blockchain securities platform by a public authority, notably the financial supervisor, which should also scrutinise the platform rules.[115]

[113] See above, n 51-65 and accompanying text.
[114] See EU Settlement Finality Directive (n 50).
[115] See EU Settlement Finality Directive (n 50), Article 10.

However, it would need to be made clear that despite the referral to the rules of the system, compliance with these rules would still be subject to judicial review. Even though blockchain is regarded as extremely resistant to operational error or fraud, and even though some versions of blockchain systems are built in such a way as to render transactions technically irreversible,[116] the law should not be reduced to rubberstamping the outcome of an IT process. The law must retain ultimate authority over the enforceability of rights, in particular when it comes to insolvency law and other areas of mandatory law which affect third parties, as even in a near fail-safe system errors or fraud can never be entirely excluded. A strong 'good faith' rule will probably be part of the legal framework, not necessarily protecting the immediate acquirer but certainly any onwards acquirer.

In order to underline that the acquisition of crypto-securities is subject to judicial review, these rules would also need to include mechanisms allowing for the reversal of transactions.[117] Otherwise, effective judicial review could generally be countered with the argument that an erroneous or fraudulent transaction may indeed be traceable, while attempts to unwind that transaction would inevitably lead to a disruption of all transactions that have occurred subsequently on the assumption that the erroneous transaction was valid. Experience with the current intermediated system shows that the inability to reverse may be used as an argument to preclude attempts to subject to review acquisition processes that have occurred in the system. However, for systemic reasons, reversal must be limited to crypto-securities still held by the immediate acquirer—it cannot extend to an onwards acquirer as this would disrupt the confidence of the entire market in the enforceability of acquisition.

V. Conclusion

In the wake of the markets' constant search for higher liquidity, the legal framework for securities holding, acquisition and disposition has shifted incrementally but fundamentally over time. Originally, when securities were still transferred in certificated or registered form, securities law used to be the overarching determinant defining the rights of holders and acquirers as well as their creditors. With the advent of intermediation, the legal framework became increasingly patchy and dysfunctional, and the conduct of intermediaries gained importance in respect of client asset protection. When, later on, cross-jurisdictional transactions became mainstream, the results provided by the aggregate application of different idiosyncratic laws, on the basis of the PRIMA rule, became positively confusing, and trust in international securities transactions is now mainly built on tight regulation of intermediaries and on their solvency.

The reason for this retreat of the law is that the international, IT-oriented market practice provides an ideal environment for liquidity but is fundamentally disrupted as a legal environment. This disruption stems mainly from the fact that much of the legal thinking is based on the image of specific, identifiable *erga omnes* rights, whereas the market practice is in reality hostile to that type of asset. Reform efforts have so far been unable to remove that friction because current law and

[116] Peters and Panayi (n 91), 28.
[117] See Peters and Panayi (n 91), 29.

practice have become heavily path-dependent and intimately linked with each other.

Now, blockchain technology is about to be introduced into the world of securities settlement, the relevant parameters will be reshuffled once again. First of all, intermediaries are in principle obsolete and are therefore not a suitable point of entry for the relevant laws and regulations. Secondly, the importance, complexity and convergence of the relevant IT-based processes will increase significantly. Thus, the function of software platforms will become the focal point of the blockchain securities environment. Thirdly, securities will again become specific, identifiable rights, very much comparable to the bearer instruments of the past.

Blockchain technology is based on an extremely fail-proof, complex technical set-up and the role of commercial law is still entirely undefined. Some might even be tempted by the idea to leave the resolution of conflicts between the different users of a software platform to the rules of that platform itself, as the intervention of State-made law might render the whole set-up less efficient from a market practice point of view. Still, a commercial law framework is indispensable. The significance of acquisitions and dispositions of securities using blockchain technology goes beyond the mere interests of acquirer and disposer as platform users. Unsecured creditors will have a crucial interest in the question of 'who owns what' in the event that either the acquirer or the disposer becomes insolvent. The answer must be given by the rules of commercial and insolvency law. Acquisitions and dispositions effected on securities settlement platforms based on blockchain technology therefore need to be subjected to the laws of States.

Legislators would be well advised to take an interest in the law and regulation underlying blockchain securities settlement at an early stage. The picture of the current global intermediated holding system is a reminder of how disintegrated market practice and law can become. Therefore, instead of being reactive (as they have been in the past), national legislators and international bodies should now take a proactive stance and contribute to the creation of an efficient and legally safe securities settlement environment. Early and determined regulatory and legislative involvement is also important, since only a legally safe environment will appeal to the mainstream parts of the financial industry. Regulated banks, investment firms and pension funds cannot afford to move significant securities holdings into an environment that may be technically sound but which is not safe from the legal and regulatory perspective.

Considering the life-cycle of the current intermediated holding system, which first appeared in the late 19th century, the introduction of blockchain in clearing and settlement appears a once-in-several-generations chance to develop the technical environment of securities settlement in harmony with the law. In that sense, it will be the common effort of legislators, regulators and the financial industry that will be able to unlock the full efficiency and liquidity gains of blockchain technology in securities settlement.