Feature

KEY POINTS

- Two bonds were issued through the Financial Conduct Authority's second regulatory sandbox, a Control Bond and an Experimental Bond. The Control Bond provides a model for the tokenisation of fiat money whereas the Experimental Bond represents the first ever cryptocurrency bond fully settled on an open public blockchain using smart contracts.
- Nivaura's Legal Markup Language (LML) enables a legal contract to be broken down into four layers to allow for its automated construction.
- While cryptocurrency may not be rooted in the legal system in the sense that it represents a claim against a central bank, it is an effective *means of payment* as opposed to being a commodity as defined in English law.

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Automation and blockchain in securities issuances

At the end of 2017 Allen & Overy (A&O) assisted Nivaura with the issue of the world's first cryptocurrency denominated, blockchain settled bond for Luxdeco, an online retailer of luxury furniture. In this article, we will explain the structure of the two bonds that were issued, through the Financial Conduct Authority's (FCA) second regulatory sandbox and analyse some of the legal issues presented. We will examine the end to end automation of a securities issue, with a particular focus on Nivaura's Legal Markup Language (LML) and will then turn to the question of whether cryptocurrency is money or not.

BONDS ON BLOCKCHAIN

Nivaura is the only company that has participated in the first three FCA regulatory sandboxes in the UK. In the second sandbox Nivaura worked with LuxDeco as the issuer and A&O, J.P. Morgan, Moody's and Link Asset Services as partners to issue two bonds, governed by English law, using blockchain.

While the transactions were true financings for the issuer, they were also experiments to see what can be achieved using blockchain. In this experimental scenario, a control bond and an experimental bond were issued. The control bond was a regular registered sterling bond, structured in the normal way. The experimental bond was the world's first cryptocurrency denominated bond, fully registered, cleared and settled on an open public blockchain.

The Control Bond

The Control Bond was structured just like a privately placed registered Eurobond that clears through the clearing systems.

For those less familiar with such a structure see Diagram 1.

DIAGRAM 1
Structure

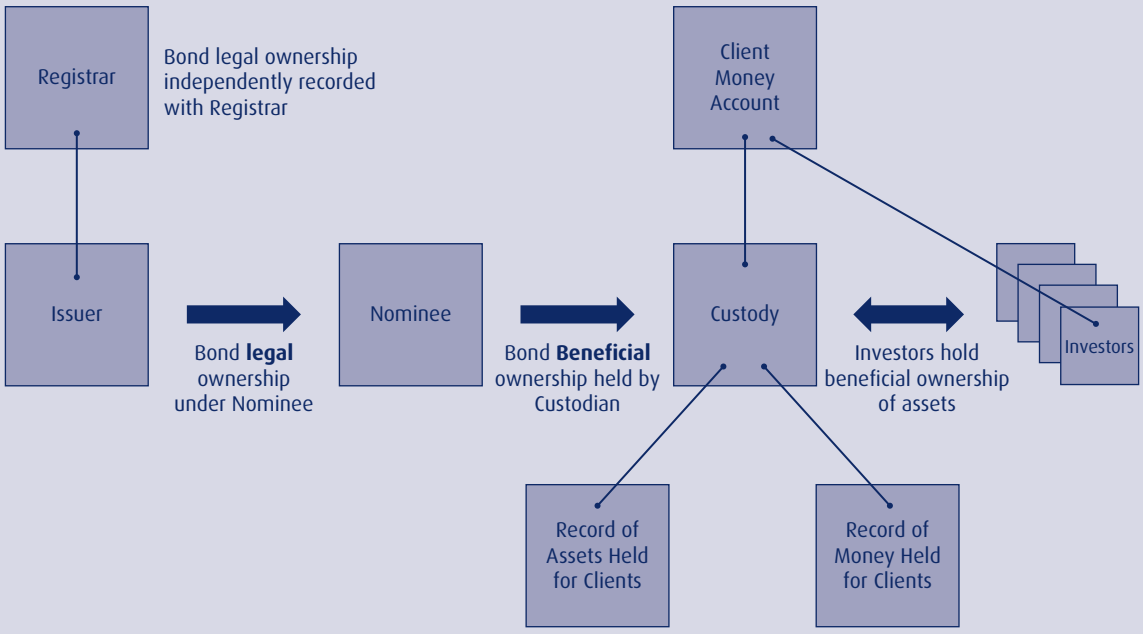


Diagram 1 shows legal and beneficial title split. Legal title rests with a nominee, whose name is entered into a register maintained by a registrar. The nominee holds the bond for the clearing systems, and account holders in the clearing systems hold beneficial title to the bond. Often beneficial holders will hold via a chain of custody whereby the ultimate beneficial holder holds their bonds through a custodian who is the accountholder in the clearing systems.

Payments of principal and interest under the bonds are made by the issuer via a paying agent, typically a large international bank. When it is time to pay bondholders, the issuer pays the paying agent who makes onward payment through the clearing systems, where it trickles down to the ultimate beneficial owner. Accordingly, payments will need to go from the issuer to the paying agent to the clearing systems and then possibly to one or more custodians before it *eventually* arrives at the person entitled to it. Some market participants also opt to have a trustee represent the bondholders and protect their interests.

The Control Bond structure was very similar to the one above, except that the clearing systems were substituted for Nivaura's platform (a platform which in this case was connected to a public blockchain) and Nivaura acted as paying agent. Link Asset Services was the registrar and also the trustee.

Nivaura is authorised and regulated by the FCA and has the appropriate CASS permissions, which are restricted for the purposes of the sandbox, to hold both client money and assets. As part of this test all the money invested by investors in LuxDeco was paid into Nivaura's client account. The GBP denominated transaction was therefore documented and structured in a conventional way, but Nivaura also recorded this on a blockchain to demonstrate how a blockchain based bond would work. The result is shown in Diagram 2.

Here investors paid the cash they wished to invest to Nivaura by way of a bank transfer into Nivaura's client account. Upon receipt, the investors' cash accounts on Nivaura's Platform were credited with the relevant amount. On settlement, the bonds were issued into Luxdeco's securities account and then transferred to investors on a delivery versus payment basis. The securities passed from Luxdeco's securities account to the relevant investors' securities accounts, as cash passed from the investors' cash accounts to Luxdeco's cash account. The transfer of the securities from the issuer to the investors was recorded on the blockchain which functioned as the register. This allowed legal and beneficial title to be united with the actual end investors.

The approach used here also provides a model for the tokenisation of fiat currency. Sterling was paid by investors into Nivaura's client account for LuxDeco. The cash was immobilised in the client account and then tokenised on the blockchain, ie on receiving cash in a real-world bank account Nivaura credited LuxDeco's blockchain wallet with that cash, in the form of a token. In a world where there is widespread blockchain based commerce, LuxDeco would be able to spend that tokenised cash on things it needs for its business and then make sales which generate more tokenised cash for payments of interest and, ultimately, principal. When it comes time to repay the bond, LuxDeco will pay cash from its blockchain wallet to investors' wallets. The real-world cash remains in the Nivaura client account, and at this point investors could keep their blockchain representation of it (in the form of tokens) and buy other things or redeem from Nivaura's client account into their real-world bank accounts.

DIAGRAM 2
The result

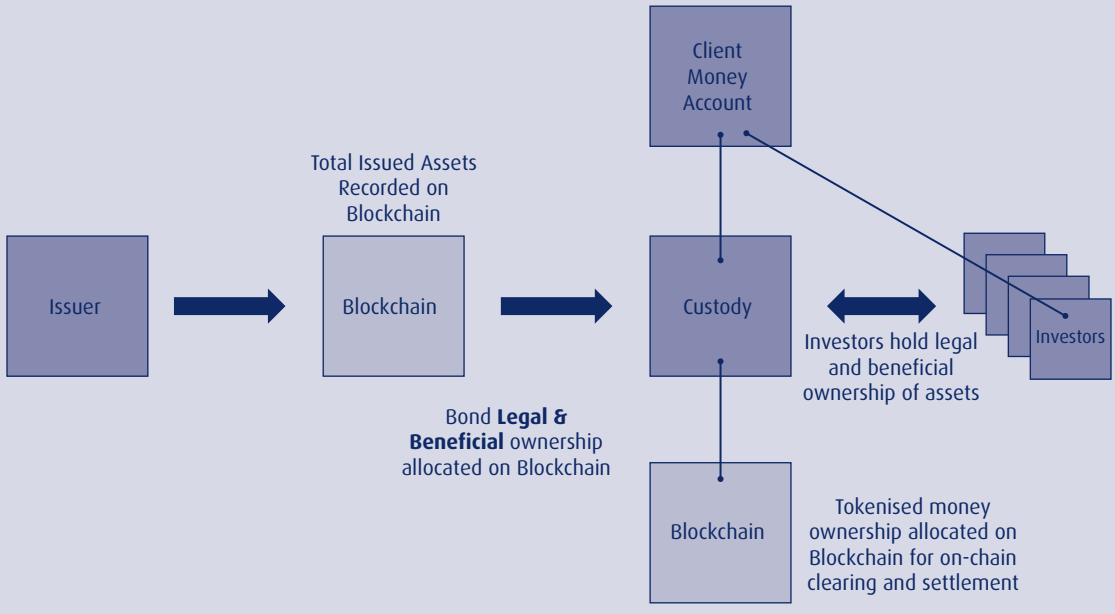
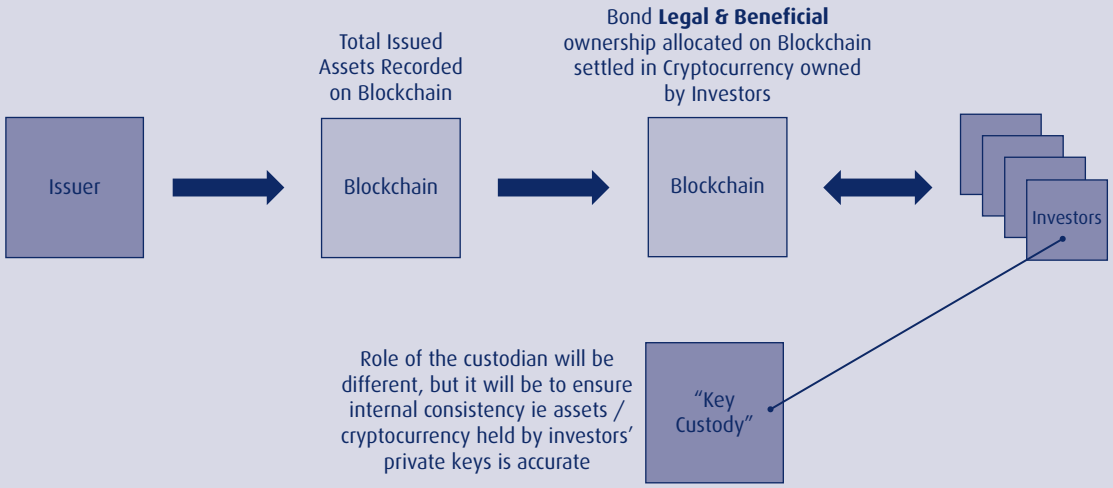


DIAGRAM 3
Structure



There is a lot of talk about cryptocurrency at the moment and it may well be part of the future, but currently the tokenisation of fiat currency looks like a more mainstream use case. In the context of the sandbox test this was very small scale, but it is worth pointing out that the model would work for central or commercial banks as a means to tokenise fiat currency on an open public blockchain and thereby enable more blockchain-based commerce, be that in the capital markets or elsewhere in the economy. An example of this is the Utility Settlement Coin, where some of the world's largest banks are working together on a project to create a new form of digital cash that can be leveraged for clearing and settlement of financial transactions over a blockchain infrastructure – in a similar manner as was executed for this LuxDeco issuance.

The Experimental Bond

The Experimental Bond was also issued by LuxDeco through Nivaura's platform, but was denominated in ether, the native cryptocurrency of the public Ethereum Blockchain. As such, this was the first ever cryptocurrency bond fully settled on an open public blockchain using smart contracts. While cryptocurrency bonds have been issued under test conditions, and there have been some bonds issued where payment has been made in cryptocurrency, this was the first time a bond has actually been denominated in cryptocurrency, fully settled on a blockchain and issued on a commercial basis by a trading company in a legally compliant way within the regulatory framework. This cryptocurrency denominated bond is significant because, for the first time, it was possible to issue and pay for a legally enforceable financial instrument without using any of the traditional existing financial infrastructure.

The issuance of the Experimental Bond worked in a very simple way. The investors transferred ether from their existing blockchain wallets, such as a Coinbase account, to their Nivaura cryptocurrency wallets. On settlement, ether transferred from investors' cryptocurrency wallet addresses to LuxDeco's address, and the bonds transferred from LuxDeco's securities wallet address to the investors' addresses. All of this is recorded on the Ethereum blockchain and shown through the Nivaura blockchain interface on the Nivaura platform. Accordingly, the structure of the Experimental Bond was much simpler than both the traditional issuance and the control issuance as should be clear from Diagram 3.

LEGAL OUTCOMES, IMPLICATIONS AND OPPORTUNITIES

Documenting a traditional bond issue is relatively complex. The split between legal and beneficial title to the bonds is achieved by entering the name of a nominee into the register, evidenced by the issue of a global certificate, which represents the entire issuance. This is then held by the nominee for the clearing systems. The terms of the global certificate make clear that while the nominee holds legal title, the accountholders in the clearing systems hold beneficial title. The documents also make full provision for the issue of definitive certificates which would be issued to individual investors in certain circumstances, including if the clearing systems ceased to function. This would need to involve each accountholder being entered into the register. The relationship between the issuer and the registrar, and the issuer and the paying agent, also needs to be agreed and documented. For capital markets practitioners this is standard, but for an issuer that has never issued a bond before and wants to understand what it is signing up to, it can be a time consuming and costly process.

So how did the Control Bond and Experimental Bond change things? The recording of the Control Bond on a permissionless blockchain infrastructure satisfied the FCA that from a regulatory perspective the blockchain constituted an independent third party, which fulfilled the requirement for third party reconciliation of the register. This is because Nivaura has no

direct control over the allocation of assets and money held on that register. This was developed in the Control and Experimental Bonds with blockchain serving as the register and thereby denoting legal and beneficial ownership. Because the FCA recognised the blockchain as an independent third party, there was no need for a registrar to keep a register of holders, the register *was* the blockchain.

The approach used in the Control and Experimental Bonds simplifies securities issuance and reduces cost in a number of ways. First, it means legal fees and complexity are both lessened because the documents and structure are simpler. As described above, blockchain allowed for legal and beneficial title to be united. This meant that the global/definitive note structure that underpins most securities issuance was dispensed with, removing a lot of the complexity that first time issuers can struggle with. Second, the absence of a registrar meant that the normal contractual relationships that need to be created between issuer and registrar could be dispensed with, and the issuer does not need to pay a registrar to perform the function. Third, payments could be made on a peer to peer basis with smart contracts being used to augment the formal legal contracts and automate the delivery of the bonds and the payment of interest and principal.

In the case of the Experimental Bond, which extended the Control issuance by eliminating the need for a GBP client money account, there was also no need to have a paying agent, which again reduced the complexity of the documentation and also meant that the issuer did not need to pay a large bank to fulfil the role. Finally, on the investor side, the ease with which someone can access a blockchain wallet means that there was less need for a long chain of custody, which again lessens cost. In the case of the Control Bond, where a client money account was used to manage and immobilise client funds that could be redeemed by users, such an intermediary can be considered as a modified version of a traditional paying agent, so strictly speaking in the case of tokenised fiat currency it may not be completely viable to eliminate the need for a paying agent.

Blockchain therefore offers the opportunity to simplify the structure, reduce the number of parties and quantity of documentation and automate many of the processes; saving complexity, time and cost. It is not a panacea though. Issues remain and there are limitations on its privacy, scalability and performance. In addition, it is easy to introduce significant (and potentially irreversible and highly detrimental) vulnerabilities in smart contracts that attempt to implement too much complexity and execution logic. This was seen in the decentralised autonomous organisation (DAO) attack in 2016, that resulted in US$60m of Ether being stolen at the time; and the case of the freezing contract incident in 2017 where US$150m of Ether was stuck in a multi-signature smart contract due to a bug. The purpose of the sandbox test was to minimise complexity in the securities issuance structure, mitigate some of the risks highlighted above, and demonstrate the possibilities of using a public blockchain in the future to ease and simplify the flow of capital.

From a compliance perspective, this is also significant. Much has been written about the compliance concerns that arise from blockchain, stemming chiefly from its pseudoanonymity. While the open public blockchain can act as an independent register and enable complete on-chain clearing and delivery versus payment settlement, transactions must be facilitated in line with key regulatory requirements. In a commercial context, anyone using blockchain to do large scale transactions will likely need to use a platform or application layer for deal formation and interface for managing on-going performance and enforcement activity. The processes of managing the lifecycle of a security are highly complex and nuanced, and at least in the short to medium term it is unlikely that smart contract technology could evolve and scale to facilitate such complexity in a commercially viable manner.

Where such end-point applications or platforms are used for securities lifecycle management, just like in traditional banking processes, users would need to go through proper appropriateness assessments, KYC/AML checks, and compliant safeguarding of client money and assets; which is what LuxDeco and its investors had to do for this issuance. This means that although the blockchain itself is pseudoanonymous, the applications that leverage the blockchain infrastructure should be able to track exactly who owns what and in a clearer and easier way than is currently possible through the clearing systems. In the issuances described here, such aspects were managed through Nivaura's digital custody service that enables compliant on-boarding and wallet management. Nivaura's regulatory responsibilities were performed through the provision of its Key Custody Service. The need to safeguard assets was achieved through the safeguarding of Keys, and all internal platform movements of money and assets could be reconciled with the external and independent records of the open public blockchain. In this way, the Key custody role can be seen as a critical function related to the safeguarding of client assets, where the value being managed can be tracked by the public addresses for each Key held and the value of cryptocurrency and securities at those addresses.

AUTOMATION OF SECURITIES AND LIFECYCLE MANAGEMENT AND THE LML

Nivaura has built a modular platform (the Platform) which facilitates the automation of the entire lifecycle of a financial instrument. Nivaura's Platform is intended to be deployed by financial services firms so that issuers can easily access the financial markets and can connect into existing technology platforms such as the clearing systems or into blockchain infrastructures, be they permissioned or permissionless. In building their platform and designing the workflow solution for the issuance and administration of the lifecycle of a financial instrument, Nivaura has focussed on the atomic nature of a financial instrument, which is in fact a legal contract, and there are three key elements to a legal contract; formation, performance and

enforcement. The Nivaura Platform seeks to automate each of these elements:

Formation

Through the Nivaura Platform an issuer is able to set the commercial parameters of a transaction it wishes to complete. It can then share this with its investor base and through a dynamic pricing tool, which is supported by Moody's Analytics, make use of optimisation techniques so that it can reach agreement with its investors on the commercial terms and pricing of the financial instrument. Once agreed, this information is then used to automatically populate and draft the documents needed for the transaction. These are signed by means of electronic signature and the instrument is automatically issued.

Performance

The Platform will then automatically manage the instrument throughout its life, including payments of interest and ultimately repayment of principal. Provided it has the correct regulatory permissions and regulatory capital, anyone deploying the platform could also use it to facilitate trading in the instrument throughout its life. Communication tools are built-in and can be enabled to facilitate investor communication and discussion if appropriate.

Enforcement

The Nivaura Platform seeks to achieve frictionless management of events and triggers that require independent dispute management, asset trustees and calculation agent services. Communication with trustees is conducted through the platform and, if it comes to it, the contractual obligations set out in the documents can be enforced through the courts or arbitration proceedings in the ordinary course.

Key to this automation process is the LML and the automated drafting of documents which Nivaura has designed with the assistance of A&O. The core activities of drafting, collaboration, review and sign-off of legal contracts have barely been impacted by technology since the advent of fax, email and word processors over twenty years ago. Lawyers globally know the pain of days, months and years spent drafting and re-drafting contracts repeatedly, only to update certain sections here and there to reflect different, but fairly standard, deal requirements. The real value-add work is in the client advice and negotiation of additional terms, conditions and covenants that impact the performance and enforcement of the financial instrument. Technologies, such as document collaboration tools, have been introduced over the past few years to improve the coordination of contract creation, however they still require a lot of manual work to generate documents for new deals.

In recent times, a push for automation in the legal sector has encouraged some lawyers to learn coding in order to programme computers to automate some of the logic involved in contract creation. Whilst this may be viewed as a step in the right direction by some, it is also akin to suggesting that in order to run faster, a runner should make their own running shoes. The reality is that the manufacture of specialised footwear has become a fine art over the years, which makes it easy for runners to get fitted with optimal running shoes so they need only focus on running faster.

Similarly, it is Nivaura's view that lawyers should not be expected to code legal logic into computers to automate contract creation, but instead they should be asked to standardise and mark existing legal contracts that they know and understand well so the contracts can be read and understood by computers.

Existing open standards for legal document structuring, such as LegalXML, introduce additional complexity as such frameworks are designed for legal and technical experts to work together to structure contract templates that can be machine readable. Such setups add to operational risks and inefficiencies as the process of translating legal complexities into machine readable technical structures, and may be prone to errors when key legal subtleties are lost in translation between the legal and technical experts. Ongoing maintenance of such documents and machine readable legal structures then requires management by two sets of experts. Such complexities can result in these tools being abandoned as lawyers revert to maintaining their own word documents, which they manually update for each execution.

Nivaura's LML is a simple human readable set of symbols and rules (syntax) that lawyers can use to mark key parameters, paragraphs and schedules in legal contracts, enabling the contracts to be broken down by Nivaura's system, their components extracted into a database and then reassembled again to create contracts for new deals and facilitate automated performance of transactions as defined by the contractual agreement.

Thus, rather than teaching lawyers how to code or teaching coders how to read and interpret law and legal contracts, LML allows lawyers to automate documents with virtually no programming knowledge. The legal logic embedded in the contract by the lawyer and marked using LML can be effectively extracted and transformed into computational logic by Nivaura's system, which enables the efficient automated execution of transactions and also reconstruction of legal contracts for new deals without the traditional drafting and redrafting required.

When an issuer using the Nivaura Platform wishes to issue a financial instrument, say for example a bond (like in the Control and Experimental Bonds described earlier), they create a new issuance, of which the workflow is automatically generated from a base bond document drafted by A&O and marked with LML. Once the issuer completes the workflow, a new bond document is then automatically constructed using the elements of the database created from automatically analysing the base bond document template. The LML framework breaks the instrument down into four layers to allow for its construction. The first is the product structure, which involves identifying the type of product being issued, for example a vanilla standalone bond, a structured note, a loan or some other financial instrument. This allows the product to be connected to the system logic and a skeleton document to be created. The second layer is the schedule structure which divides into separate schedules all the key content normally included in the various

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transaction documents required for the issue of a financial instrument. In the case of the vanilla bond for Luxdeco this included, among other things, the terms and conditions of the bonds, the agency agreement, the trust deed and the provisions for noteholder meetings. The third layer consists of a library of covenants and conditions that can be plugged into the appropriate schedules, for example whether a negative pledge or other covenants should be included or whether there should be a cross default or cross acceleration clause. The fourth and final layer consists of the document parameters, ie the standard variables such as whether it is a fixed or floating rate bond or whether there is a guarantor or not, which require different forms of standard language to be included. All of these are parameterised in a machine-readable format. AI is built in so that over time the system learns and gets better at including appropriate document elements and clauses for particular issuers, products and markets. In this way, the documents produced should meet the "market standard", the definition of which is often a key discussion point between lawyers on transactions.

LML is intended to become an open standard for legal document structuring, which would minimise operational risks and facilitate efficiencies within a single organisation and across organisations when structuring and executing transactions. With the LML framework as an open standard the individual competitive advantage for law firms and those involved in structuring deals will be in their capabilities in training their systems with a vast amount of historical data to facilitate correct and efficient structuring of new contracts with minimal human intervention. However, in this process legal experts would still provide the support to maintain libraries of the base data and ensure final documents are signed off for execution as the key value add of law firms is managing legal liabilities.

CRYPTOCURRENCY: MONEY, COMMODITY OR SOMETHING ELSE?

One key question that arose when documenting the Experimental Bond was the question of whether cryptocurrency constitutes money or something else. This is important because if a cryptocurrency is not money, an instrument denominated in it might not be properly defined as a bond. If cryptocurrency is not money then a financial instrument denominated in it could be seen as a contract for barter (see *Simpson v Connolly* [1953] 1 WLR 911,915 and *Robshar v Mayer* [1957] 1 Ch 125). Here we had two bonds, one denominated in sterling which was clearly a bond and one denominated in ether which did exactly the same things as the bond denominated in sterling except that payments were to be made in ether. To therefore define it as something other than a negotiable instrument would have been perverse. The question has implications for how the instrument should be regulated.

Generally, everyone knows what money is, but it can be hard to define especially from a legal perspective. There are various theories that have evolved and developed over time. These theories are discussed below together with an assessment of whether cryptocurrency meets the stated criteria.

Different regulatory approaches are being taken. For example the US regulates cryptocurrency as a commodity. In its decision in the matter of *Coinflip, Inc., d/b/a Derivabit and Francisco Riordan* the Commodity Futures Trading Commission highlighted that s 1a(9) of the Commodity Exchange Act 1936 defines a "commodity" to include, among other things "all services, rights, and interests in which contracts for future delivery are presently or in the future dealt in" and declared that:

> "'the definition of a 'commodity' is broad. See, eg *Board of Trade of City of Chicago v SEC*, 677 F. 2d 1137, 1142 (7th Cir. 1982). Bitcoin and other virtual currencies are encompassed in the definition and properly defined as commodities."

It is worth noting here that Art 1 of the US Constitution (s 8, para 5) reserves to the Federal Government the exclusive right to issue money, which limits the ability of the US to regard cryptocurrency as money, pushing it into the commodity bracket. Under English law, the Financial Services and Markets Act 2000 (Excluded Activities and Prohibitions) Order 2014/2080 defines a commodity as:

> "any goods of a fungible nature that are capable of being delivered including metals and their ores and alloys, agricultural products, and energy such as electricity."

In the authors' views cryptocurrency does not fall within this definition.

The European Court of Justice has reflected this in Case C-264/14 *Skatteverket v David Hedqvist* which concerned the question of whether VAT was payable in relation to purchases of cryptocurrency. The court made clear that cryptocurrency, though not legal tender, was a valid form of payment functioning in a similar way to money.

So what is the position under English law? The functional or economists' approach defines money by its functions as follows:

- as a medium of exchange;
- as a store of value or wealth; and
- as a unit of account.

The decision in *Moss v Hancock* [1889] 2 QB 11, 116 seems to adopt this functional approach defining money as "that which passes freely from hand to hand throughout the community in final discharge of debts and full payment for commodities".

Cryptocurrency seems to satisfy the parameters of the functional definition. It is a medium of exchange, as shown in the *Hedqvist* case and can be used as a standard for contractual obligations, as we did in the Luxdeco issuance. While volatility of cryptocurrency may make it a poor store of value, it is nevertheless a store of value and also a unit of account.

To date the legal definitions of money have focused on the link with the state and that money must have the formal backing of the sovereign state in which it circulates. The state theory of money proposed by Dr Mann in *Mann on the Legal Aspect of Money* stated:

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> "the quality of money is to be attributed to all chatels that are issued under the authority of the law in force within the State of Issue … and under the terms of that law, to serve as the universal means of exchange in the State of issue."[1]

This theory therefore inextricably links money with the power of a sovereign state which would therefore not cover cryptocurrency. While this may be an appropriate definition of legal tender, money in its modern form is broader than that and so a wider ranging definition is arguably now appropriate. The institutional theory of money defines money as:

> "no more than credit against an obligor, whose acceptance as a store of value and as a means of payment … is dependent on a comprehensive legal framework that ensures stable purchasing power."[2]

This theory reflects the fact that it is possible for commercial banks to create money and is supported by the creation of the euro which was not established with any intrinsic value and was, at its inception, defined in terms of equivalence with a series of participating currencies, in turn defined by reference to their market values. The reducing role of cash in the modern era also supports this wider theory. The theory still hinges though on a claim against a central bank and in that way retains the link to the state. Accordingly, while it is easier to fit cryptocurrency into this definition than the state theory the fact that cryptocurrency exists without any reference to the central bank means that it does not fall properly within it.

As argued in Mann on the *Legal Aspect of Money*, while the state continues to retain a significant role in the creation of the monetary system as only it can define and replace the unit of account and define what is or is not legal tender, it is no longer true to say that the State has a monopoly over the creation of money. Monetary laws define the monetary system and unit of account in a particular state but cannot limit the definition of "money". Whether something is money as a *means of payment* should be determined on a case-by-case basis and may depend on market practice and technology. As highlighted in Mann:

> "New forms of money may emerge as a means of payment as they gain a sufficient level of acceptance within the business world or the community generally."

This approach was the one effectively adopted in *Skatteverket v David Hedqvist*, while cryptocurrency may not be rooted in the legal system in the sense that it represents a claim against a central bank it is an effective *means of payment* as opposed to being a commodity as defined in English law.

Cryptocurrency may, for the time being, be defined on a case-by-case basis but in the case of financial instruments and in particular ICOs, cryptocurrency is an effective means of payment and so, in these cases, is effectively money and the transactions should be documented as such. The use of cryptcurrency does not turn such contracts into contracts for barter or change the fundamental nature of the financial instruments they denominate, which should continue to be regulated in the normal way. ■

1 See Mann *On The Legal Aspect Of Money*, Seventh Edition (Oxford University Press, 2012). The points relating to theories of money discussed in this section are largely derived from that text.

2 See Sáinz de Vicuna, *An Institutional Theory of Money*, in Giovanoli and Devos, *International Monetary and Financial Law*: The Global Crisis (Oxford University Press, 2010).

Further Reading:

- Blockchain and the syndicated loan market – a closer look (2017) 11 JIBFL 711.
- The legal aspect of virtual currencies (2016) 10 JIBFL 569.
- LexisNexis Loan Ranger blog: The keepers of the keys: remedies and legal obligations following misappropriations of cryptocurrency.