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Smart Contracts in the Derivatives Space: An Overview of the Key Issues for Buy-side Market Participants

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There is no universally accepted definition for 'smart contracts', but this term is commonly used to refer to legal contracts (or elements of legal contracts) being represented and executed by software. The term 'smart' refers to the fact that some elements of a smart contract are automatic and self-executing pursuant to pre-defined conditions.

The market is evolving to differentiate a 'smart legal contract' from a smart contract code. A smart legal contract is a legally enforceable contract in which some or all of the contractual obligations are performed automatically by a computer program. A smart contract code, on the other hand, would not necessarily form part of a smart legal contract, but would constitute a piece of code (or programming language) designed to provide for the execution of certain tasks by a machine.

There has been increased interest from key industry bodies, such as the International Swaps and Derivatives Association (**ISDA**) in the development of technology-enabled solutions (including the use of smart contracts), which will allow a fundamental reshaping of the derivatives infrastructure. ISDA's view is that these solutions should improve operating efficiency, reduce operating costs and risk, and increase both the quality and transparency of data.

Latest Developments in the Derivatives Market

There is still a long way to go, but some of the key developments involving ISDA's work to facilitate the use of smart contracts across the derivatives industry include:

(i)   In 2017, ISDA issued the first version of the Common Domain Model (**CDM**), known as ISDA CDM 1.0, followed by its second version, ISDA CDM 2.0, which was published in 2019. The CDM is a standardised solution aimed at providing market participants with a common digital representation throughout the lifecycle of a derivatives transaction. In its first two phases, the CDM provides for the representation of certain events in a machine-readable format with a focus on interest rate and credit derivatives, including an initial representation of equity swaps products and the ISDA Credit Support Annex for initial margin. It is expected that, in its next phases, the CDM will be further developed to incorporate models for foreign exchange (**FX**) transactions. ISDA has recently published the 2021 ISDA Interest Rate Derivatives Definitions, which are the first definitions to be published in a natively digital format. The intention is that, in time, the mechanics of the definitions will be available via open-source code and will be aligned with the CDM in order to allow them to be consistently interpreted by automated systems.

(ii)   On 6 October 2020, ISDA and Digital Asset (a blockchain start-up) launched a pilot implementation of the CDM for the clearing of interest rate derivatives (the CDM Clearing Pilot) using DAML, an open-source reference code library that is intended to facilitate the implementation of the CDM. The CDM Clearing Pilot is expected to allow a superior level of standardisation and automation of derivatives clearing processes.

(iii) Over the past few years, ISDA has published a series of papers focused on providing *Legal Guidelines for Smart Derivatives Contracts*. These papers set out ways in which derivatives contracts may be modernised and automated through the use of blockchain technology and other fintech developments, beginning with an *Introduction* to the subject in January 2019. ISDA has produced guidance on the use of smart derivatives contracts in relation to:

- **ISDA Master Agreement** (February 2019) – the paper acts as an introduction to the ISDA 2002 Master Agreement for potential fintech developers and highlights the interdependence of key mechanics within the 2002 Master Agreement, including events of default and termination events, payment and delivery obligations, close-out and netting.

- **Collateral** (September 2019) – as parties to derivatives contracts are becoming increasingly subject to margin requirements, automation of the collateral exchange process would ease the administrative burden. ISDA proposals include automating the resolution of disputes in a timely fashion, automating the valuation of collateral and streamlining the collateral enforcement process.

- **Equity Derivatives** (February 2020) – the ISDA 2011 Equity Derivatives Definitions provide potential for broader standardisation across the market, which lends itself to the use of smart derivatives contracts. The paper proposes that automation be facilitated through pre-defined options in the Relationship Supplement or a Transaction Supplement to the definitions. Fintech solutions based on the 2011 Equity Definitions framework offer a chance to build shared processes on a standard CDM representation.

- **Interest Rate Derivatives** (February 2020) – a key driver in the development of the revised ISDA Interest Rate Definitions has been to ensure that the standardised definitions are more technology-friendly. 'Light chain' systems would allow market participants to exchange information in relation to interest rate derivatives in a more automated way, while 'heavy chain' systems could potentially allow collateral to be transferred and held digitally.

■ **Credit Derivatives** (November 2020) – credit derivatives transactions often incorporate automated functions and there remain further opportunities for greater automation and more efficient straight-through post-trade processing. The paper addresses new technology solutions to facilitate the efficiency of delivery of existing services (e.g. by aiding reconciliation or the more complex processing required in index credit default swaps) and the use of distributed ledger technology (**DLT**) or similar technology to provide for more efficient settlement in the credit derivatives market.

■ **Foreign Exchange Derivatives** (November 2020) – the risks inherent in the cross-border nature of FX derivatives can be addressed through enhanced automated processes and the development of digital instruments for valuation and/or settlement. The paper sets out how the use of smart contracts and new DLT can provide scalable, cost-efficient and more accurate technology solutions within the FX market.

(iv) On 23 June 2020, ISDA launched the ISDA Clause Library, which sets out standardised drafting options for frequently negotiated provisions within the ISDA Master Agreement. The database is expected to improve the efficiency of contract negotiation and facilitate the digitisation of legal documentation. The ISDA Clause Library has since been expanded to include ISDA's collateral documentation.

(v) On 21 January 2021, ISDA made the ISDA Master Agreement and ISDA Clause Library digitally available for the first time via ISDA Create. ISDA Create allows users to produce and agree documentation online, as well as store legal data from these documents.

(vi) On 19 March 2021, ISDA published a response to the UK Treasury's Cryptoasset and Stablecoin Consultation. The response highlighted the potential for smart contracts and DLT to be used in the derivatives market, as well as noting areas where a lack of legal and regulatory certainty currently inhibits their adoption.

(vii) On 14 December 2021, ISDA published a paper on *Contractual Standards for Digital Asset Derivatives*, in which it highlighted that the use of digital assets in conjunction with smart contract code could revolutionise financial markets by improving efficiency and accuracy through automation. This follows ISDA's intention to develop legal standards to support the crypto derivatives market, which includes creating templates and definitions that support the development of on-chain smart contracts for crypto derivatives.

ISDA has acknowledged the challenges in implementing the use of smart contracts (and other technology-enabled solutions) in the derivatives space and has established a number of internal committees and industry-wide working groups to focus on technology-related topics, including the ISDA Legal Technology Working Group, the ISDA Smart Contracts/DLT Legal Working Group, the ISDA CDM Design Working Group and the ISDA Clause Library Project.

Issues and Challenges to be Considered from a Buy-side Perspective

There are a number of issues and challenges that will need to be considered by ISDA in its discussions with market participants to facilitate the transition of the derivatives market towards the use of smart contract code and smart legal contracts.

Scope of automation: Operational and non-operational clauses

The main payment and delivery obligations in respect of a derivatives transaction are dependent on conditional logic, so these would be well placed for being represented into a smart legal contract. However, not all clauses are susceptible to being automated and self-executed. Certain legal terms are subjective in nature and would produce ambiguity if represented in smart contract code.

The materials produced by ISDA relating to the use of smart contracts in the derivatives space suggest that when determining which parts of a derivatives contract are susceptible to automation, it is helpful to distinguish between operational and non-operational clauses. Operational clauses would generally contain conditional logic so would be more susceptible to automation, whereas non-operational clauses would more likely relate to the wider contractual relationship between the parties, proving to be more resistant to automation.

Issues with legal validation

For a smart legal contract to produce its intended legal effect, its automated provisions (or smart contract codes) must be legally validated by a lawyer. This might be challenging as it would require lawyers to understand the programming language. It follows that there is the need for programmers to work in collaboration with lawyers to leverage their legal insight into which parts of the ISDA documentation framework would be legally effective if converted into an automatable form. ISDA is expected to play an important role in facilitating this work.

It will be challenging for non-operational clauses that include some degree of subjective interpretation (e.g. where a party is required to act in good faith or in a commercially reasonable manner) or those that are more complex in nature (e.g. when an event of default is linked to the occurrence of a specific event outside the contractual relationship and that is not easily asserted) to be legally validated.

In addition, even if legally validated, there is a risk that the smart contract code will produce terms at the transaction confirmation level that are inconsistent with terms in the ISDA Master Agreement (or schedule). Appropriate mechanisms for resolving any consequent conflicts will need to be considered.

Issues with automation

Not all provisions, when automated, would produce the same effect as if complied with in their original form (i.e. in natural language) without automation.

By way of example, upon the occurrence of an event of default under a derivatives contract, the non-defaulting party would have the right to terminate the outstanding transactions. Under normal circumstances, under a non-automated contract, there are a range of factors that the non-defaulting party would take into account before pulling the trigger – these tend to be subjective and include commercial considerations, the relationship context at the time of the event and the nature of the default. It would be difficult to cater for these factors when translating event of default provisions into programming language. In practice, the occurrence of an event of default under a smart legal contract would be self-automated, so it would automatically trigger the termination of any outstanding transactions.

ISDA has proposed to work with its members to select provisions within the ISDA documentation framework that are best suited for automation – their goal is to select provisions that can be automated without changing their legal effect.

Interaction with third-party data and platform providers

Where a smart derivatives contract involves the use of external, third-party data sources (sometimes referred to as 'oracles'), there may be risks posed by data inaccuracies, whether caused by error or deliberate manipulation – particularly if hacking is involved.

For instance, smart derivatives contracts for FX derivatives will use an external data source to determine FX rates. In a situation where payment or delivery is automatically triggered by data from an external source (e.g. if automation involves any straight-through processing), the prospective apportionment of liability in the event of a third-party data failure should be considered.

In addition, consideration should be given to what alternate mechanism should be used where there is a breakdown in communication between the third party and the smart contract, due to, for example, a software programming bug or a coding error on the part of the third party. This could be with recourse to manual input.

Complex and bespoke derivatives contracts

Certain derivatives contracts can be heavily negotiated and customised to apply to bespoke arrangements made between the parties. The level of customisation may vary depending on counterparty type and product complexity. Examples of highly customised arrangements include total return swaps, longevity swaps and other structured finance products that will likely be made under a wide set of documents forming the overall derivatives architecture where various levels of obligations apply across different parts of the documentation. It would be challenging to translate these interlinking obligations into programming language in a straightforward manner.

The recent regulatory developments in the derivatives space (which follow a global trend post the global financial crisis) have also contributed to the complexity of certain derivatives contracts; e.g. there is an increase in the use of third-party custodians when implementing collateral arrangements to deal with certain margin requirements, and there are additional layers of complexity arising from the need for certain over-the-counter derivatives transactions to be centrally cleared.

Laws affecting contractual performance

Certain laws might have the effect of interrupting the performance of contracts – e.g. where a provision under a specific contract is rendered void, or where a contractual stay is applied to a party in financial distress under the applicable regulatory regime. How would smart legal contracts interact with these laws? This is another issue to be considered by ISDA in its discussions with market participants.

Liquidity concerns

Once the market has moved to address most of the key concerns that are set out in this chapter, it is likely that only the largest and most sophisticated market participants will be able to start using smart legal contracts. The smaller or less sophisticated players, including many buy-side entities, might find it more challenging and costly to adapt their processes to the new 'reshaped' derivatives market.

What Should a Buy-side Market Participant be Doing?

The market is still evolving and is in its early stages of developing a model that works across the derivatives industry. For the time being, buy-side entities should consider becoming involved with the initiatives put forward by ISDA, including the working group discussions and projects. It is also important for buy-side entities to discuss and compare notes with their peers, counterparty banks, legal advisers and other market participants on the changes that will need to be implemented into their systems and processes to allow for the use of smart derivatives contracts.

Jonathan Gilmour is a partner at Travers Smith and heads its Derivatives & Structured Products team. He specialises in derivatives and structured products from both a transactional and advisory standpoint. He is widely regarded by peers and clients as one of the leading specialists in his field. He counts among his clients some of the UK's largest and most sophisticated financial institutions, investment managers, private equity houses, challenger banks and occupational pension schemes. Jonathan regularly negotiates and advises on ISDA, GMRA and GMSLA documentation as well as the impact of related regulation including EMIR/UK EMIR and SFTR/UK SFTR. He also advises on the structure and documentation of bespoke transactions to hedge exposure to key market risks, including interest rate, inflation, FX and longevity, and advises on investment management, custody, clearing and collateral management arrangements, as well as pension scheme funding and risk transfer arrangements. Jonathan was recognised in the 2022 edition of *The Legal 500* as a "Leading Individual" in derivatives and structured products.

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