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Crypto Derivatives: Overview

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A Practice Note providing an introduction to digital asset derivatives, which are derivatives with digital assets, including cryptocurrencies, as their underlying asset. This Note includes an overview of the different types of digital asset and crypto asset derivatives, as well as an explanation of the ISDA Digital Asset Derivatives Definitions, which are standardized contract terms that may be used by market participants to document digital asset derivatives transactions.

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Overview of Digital Asset Derivatives

Subject to the discussion below regarding specific contractual standards for digital asset derivatives, digital asset derivatives largely parallel traditional derivatives products but reference digital assets instead of the typical underlyings of rates, currencies, commodities, and equities. The most common forms of digital asset derivatives are:

- **Forwards and futures:** A digital asset forward contract or futures contract is an agreement to purchase a digital asset at a specified date in the future for an agreed price. Forwards are private bilateral contracts between two counterparties and futures are contracts which are exchange traded. Digital asset forwards or futures might be used by, for example, miners to hedge against the market risk of mined cryptocurrencies.
- **Options:** A digital asset option is a derivative which gives one party to the contract the right, but not the obligation, to sell or purchase a specific digital asset at a certain price, either on a certain date (a European option) or during a specified period (an American option) in return for a premium paid by the purchaser of the option. Options can be private, bilateral contracts or exchange traded. Digital asset options might be used by, for example, institutional or retail investors to gain leveraged exposure to digital assets.

Digital asset derivatives can also take the form of swaps, although these are much less common, as the cash flows from digital assets are not usually suitable for traditional fixed-for-floating swap contracts.

The cash markets for digital assets include a multitude of crypto exchanges (such as Coinbase and Binance) on which market participants can purchase digital assets such as Bitcoin for cash or other digital assets. In recent years, the corresponding crypto derivatives markets have been developing at a rapid pace, and, according to a December 2021 whitepaper published by the International Swaps and Derivatives Association, Inc. (ISDA®), trading volumes in digital asset derivatives are regularly greater than in cash digital asset markets.

Digital asset derivatives may either be traded over the counter (OTC), using an ISDA Master Agreement (ISDA Master) or similar documentation, or they may be exchange traded on standard exchange terms by or through persons with exchange access. Digital asset derivatives can be exchange traded at native crypto exchanges such as Coinbase or Binance, or on traditional exchanges such as CME. Certain exchange-traded digital asset derivatives (those traded on CME) are also cleared through a clearinghouse.

To date, most digital asset derivatives trading has been in listed (exchange-traded) futures and options. There are smaller markets outside the US in listed perpetual swaps and contracts for difference (CFDs). Although smaller, the OTC market is growing and is attractive to some market participants, as it allows derivative terms to be customized. Listed derivatives are usually traded on standard terms without the ability to amend them.

Whether OTC or exchange traded, digital asset derivatives are typically cash-settled as opposed to physically settled. The contract is settled by paying a price based on the movement of the underlying price of the reference asset, rather than that by delivery of the reference asset.

Digital asset derivatives play a number of crucial roles in the digital asset markets, including:

- Facilitating short selling and price discovery.
- Increasing liquidity by allowing the entry of participants who cannot trade the physical asset (certain market participants may not be permitted or may not wish to establish the infrastructure needed for physical custody of cryptocurrencies; most digital asset derivatives trades are financially settled and do not involve exchange of the underlying asset).
- Enhancing risk management by allowing market participants to hedge the market risk of the physical asset.

ISDA noted the growth in the OTC digital asset derivatives market and the corresponding need for market-wide contractual standards to promote the growth of safe, efficient, and liquid digital asset derivatives markets. The publication of the ISDA Digital Asset Derivatives Definitions (DADDs) is ISDA's attempt to provide these standards.

The DADDs, published on January 26, 2023, are designed to allow market participants to trade the most common and liquid digital asset derivatives: non-deliverable forwards and options referencing Bitcoin or Ether. ISDA also simultaneously released suggested forms of transaction confirmations and a Settlement Price Source Matrix. This Note provides an overview of the DADDs and how they can be used to document OTC digital asset derivatives.

Documenting Transactions Using the DADDs

Consistent with ISDA's ongoing goal of moving away from paper-based transaction documentation to digital documentation, the DADDs have been developed to be natively digital at inception. Contracts can be negotiated using digital negotiation technology, including ISDA Create. In addition to comprising natively digital documentation, ISDA has prepared the DADDs to prioritize accessibility and usability to allow straightforward negotiation and simple contracts, as the DADDs are more logically organized and shorter than some other ISDA definitional booklets.

The preamble to the DADDs provides that any or all of the provisions set out therein may be incorporated into a relevant confirmation by including wording indicating that the document is subject to the DADDs. Section 1.1.3 of the DADDs provides that, unless otherwise agreed between the parties, the latest version of the DADDs available on the trade date of a transaction will apply to the transaction, and the terms of that transaction will not be affected by updates in a newer version of the DADDs.

The DADDs are comprised of:

- Section 1, Architecture.
- Section 2, Product Types and Settlement Terms.
- Section 3, Valuation. Note that this section is reserved with no content in the DADDs. The definitions provide for only one price source and observation date/time, so no additional valuation mechanics are required. However, such details may be required in the future, as the DADDs expand in scope, so ISDA has left this placeholder.
- Section 4, Disruption Events and Fallbacks.
- Section 5, Additional Termination Event Terms.
- Section 6, Business Day Convention.
- Section 7, Notices.
- Section 8, General Definitions.

The confirmation templates that accompany the DADDs set out placeholders for the economic terms of a specific transaction and other elections parties may wish to make under the DADDs. ISDA's drafting goals of accessibility and usability are achieved by structuring the confirmation templates in a modular way, to facility future product expansion, and clearly distinguishing between product terms (such as forwards and options) and underlier terms relevant to the asset type (for example, Disruption Events for BTC/ETH). Natural language drafting is combined with consistent conditional logic parameters (IF, AND, OR ELSE structures) to allow algorithmic determination of the results.

The Settlement Price Source Matrix contains standardized information relating to certain Bitcoin and Ether price sources that have been identified by members of the ISDA digital assets working group, which allows them to be easily referenced within a confirmation.

ISDA has stated its intention to expand the DADDs to other frequently traded digital assets (other than Bitcoin and Ether) and other derivatives products (other than non-deliverable forwards and options).

Valuation

Certain features of the cryptocurrency markets render the valuation mechanics in standard ISDA documentation a poor fit for digital asset derivatives. For instance, there is no single dominant price source in cryptocurrency markets, with liquidity split across many exchanges. Compare this to equity markets, where there are leading price sources such as regulated exchanges in key jurisdictions. Crypto pricing data may also vary significantly between price sources (cryptocurrency exchanges) as a result of liquidity or methodology. There are also difficulties in specifying the price source, as digital asset markets do not currently have the pricing conventions of traditional asset markets, such as close of business pricing for equities (digital asset markets are generally open for trading at all times). In addition, crypto prices and markets can be extremely volatile.

Valuation of derivatives transactions is key and depends on the valuation methodology agreed by the parties and the valuation sources that feed into that methodology. Valuation methodologies vary based on asset type and counterparty preference but are often mechanistic, pulling prices from a specified source, or involve a calculation agent determining the value in a discretionary fashion. Traditional valuation sources include screen rates, trading venue data, published index prices, and internal modeling. Valuation is key for digital asset derivatives, as all transactions under the DADDs are cash settled.

The approach in the DADDs (Section 2.3.26) is to select and use a single price source (preliminary working groups discussed multi-source structures to mitigate price source risk and other common methodologies like hedge execution but decided it was unnecessarily complex). As discussed above, to facilitate use of a variety of commonly used price sources, a centrally maintained list has been prepared in the form of the Settlement Price Source Matrix, which is annexed to the DADDs and which parties can refer to in a trade confirmation. Settlement Price Sources within the Settlement Price Source Matrix are distinguished from each other by reference to the name of the Settlement Price Source (for example, CME CF Bitcoin Reference Rate) and Settlement Price Source Location (for example, CME Group). The Settlement Price Source Matrix allows new Settlement Price Sources to be added periodically. Determining the price source will be a key commercial decision for a transaction, and parties will need to diligence their agreed price source.

For details on price source Disruption Events under the DADDs, see Price Source Disruption Events.

Disruption Events

Similar to traditional markets, digital assets may be subject to events that could disrupt the functioning of a digital asset derivatives transaction – its valuation, settlement, or legality. These could be events which also affect traditional derivatives such as a change of law or regulation. Users of the 2002 ISDA Equity Derivative Definitions (Equity Definitions) may be familiar with the Material Change in Methodology Disruption Event in the DADDs (see Section 11.1 of the Equity Definitions – Adjustment to Indices) and the Hedging Disruption Events in the DADDs (see Section 12.9(a) of the Equity Definitions – Additional Disruption Events). Alternatively, these could be events that are specific to digital asset markets, such as changes to the underlying technology of a digital asset, which fundamentally affect or alter the nature of that asset, such as a cyberattack or a fork.

Price Source Disruption Events

Various price source Disruption Events have been included in the DADDs to mitigate the risk of disruption, discontinuance, or significant shifts in liquidity, including:

- Price Source Unavailability: This event occurs when the Settlement Price is not published prior to the Valuation Observation Deadline in respect of the Settlement Price Source. The Valuation Observation Deadline provides a time buffer for observation of the relevant price, which parties specify in the confirmation based on the nature of the price source and commercial appetite. This event applies automatically under the template confirmation and occurs automatically, if triggered, due to the objective nature of the events.
- Price Source Discontinuance: This event occurs when there has been a public statement or announcement by or on behalf of the Settlement Price Source Provider unambiguously communicating that it has ceased or will cease to provide the Settlement Price Source permanently or indefinitely (with no unambiguous

public communication of a successor Settlement Price Source Provider). This event applies automatically in the template confirmation and occurs automatically, if triggered, due to the objective nature of the events.

- Material Change in Methodology: This event occurs when there has been a material change to the method of calculating the Settlement Price or a public announcement by a Settlement Price Source Provider of a material modification to the calculation or determination of the Settlement Price. This event does not apply automatically and is determined by the Material Change Determining Party (which can be either party, unless elected otherwise by the parties).

Other Disruption Events

In addition to the price source Disruption Events (Price Source Unavailability, Price Source Discontinuance, and Material Change in Methodology), other Disruption Events under the DADDs include:

- Hedging Disruption: the inability of a party to effectively hedge the price risk of a transaction or the inability to recover or realize the proceeds from one or more hedge transactions.
- Increased Cost of Hedging: an increase in the cost to hold or otherwise deal in any assets a party deems necessary to hedge the price risk of entering into and performing obligations under a transaction.
- Fork Disruption Event: a fork in the underlying blockchain that creates two or more digital assets that are available for trading simultaneously on one or more exchanges where the Price Source Provider does not make a clear determination regarding which is the appropriate replacement asset. If the Price Source Provider does make this determination, the Calculation Agent may adjust the transaction accordingly.
- Change in Law Disruption Event: a change in law or regulation such that it becomes illegal for a party to:
  - perform its obligations under a transaction; or
  - hold or otherwise deal in any assets it deems necessary to hedge the price risk of entering into and performing obligations under the transaction.

Note that the DADDs distinguish between:

- Disruption events that are objectively determined (Price Source Unavailability and Price Source Discontinuance), which are automatically triggered on the date the event occurs with no requirement for delivery of a notice; and
- Disruption events that require observation by one party (Hedging Disruption, Increased Cost of Hedging and Change in Law – Hedging Illegality) or both parties (Material Change in Methodology, Fork Event and Change in Law - Performance Illegality), which are triggered only by delivery of notice from the relevant party or parties.

Disruption Event Fallbacks

If a Disruption Event affects a transaction, the consequences typically depend on the nature of the event and the type of the transaction. In general, the transaction may be amended to reflect any new economics that result from the event, including, if applicable, postponement of pricing dates and/or changes in the method by which the price of a digital asset is determined. In the alternative, the transaction may be terminated by the affected party if the required changes would be so fundamental as to represent a new or unviable transaction.

If a Disruption Event occurs, certain remedial actions, referred to as fallbacks, apply. For price source Disruption Events, the following fallbacks apply in the following order (referred to as the Price Source Disruption Fallback Order), unless any are omitted by the parties from the relevant confirmation:

- Fallback Settlement Price: First, if this fallback is included in the confirmation, the parties look to use a replacement settlement price source. Choice of the relevant fallback price source is a commercial decision, as, for example, the valuation times for different price sources may vary.
- Price Source Termination Event: Next, if this fallback is included in the confirmation, the transaction is terminated in accordance with Section 5 of the DADDs.
- Calculation Agent Determination: Finally, if this fallback is included in the confirmation and the transaction has not been terminated, the calculation agent, acting in good faith and using commercially reasonable procedures, makes such adjustments to the transaction as it deems necessary (including specifying an alternative price source).

Given the nascent nature of many digital assets and their related price sources, a settlement price source may announce corrections to a previously published digital asset reference price. Section 2.2.5 of the DADDs provides that if a correction is published by the Settlement Price Source Provider in respect of the Settlement Price for the valuation time on the valuation date (and either party has notified the other party and, if necessary, the calculation agent), then the calculation agent, acting in good faith and using commercially reasonable procedures, determines the amount that is payable as a result of that

correction and, to the extent necessary, may adjust the terms of the transaction to account for such correction.

The fallbacks for the other Disruption Events are as follows:

- Hedging Disruption Event: If such an event occurs, the relevant affected transaction shall be terminated in accordance with Section 5 of the DADDs.
- Increased Cost of Hedging: If such an event occurs, the hedging party may give an Increased Cost Notice to the other party, who may elect (within two business days) by returning a Price Adjustment Election Notice whether to:
  - make amendments to the terms of the transaction specified in the Increased Cost Notice;
  - pay an upfront amount specified in the Increased Cost Notice; or
  - terminate the relevant transaction by specifying an Early Termination Date.

  Under this fallback, if the non-hedging party fails to deliver a Price Adjustment Election Notice within the relevant timeframe, the hedging party may give notice to terminate the transaction.
- Fork Disruption Event: If such an event occurs:
  - where Calculation Agent Fork Adjustment is specified in the relevant confirmation, if the Calculation Agent determines that it is commercially reasonable to continue the transaction on adjusted terms, it may amend the relevant transaction (including to clarify the relevant Reference Asset and Settlement Price Source) in a commercially reasonable manner to allow it to continue, taking into account factors such as the number, nature, and types of exchanges and other price source providers that have listed each successor asset and the relative trading volume in each successor asset. If the Calculation Agent determines that it is not commercially reasonable to continue the transaction on adjusted terms, either party may terminate the transaction; or
  - where Calculation Agent Fork Adjustment is not specified in the relevant confirmation, either party may give notice to terminate the affected transaction in accordance with Section 5 of the DADDs.
- Change in Law Disruption Event: If such an event occurs, an affected party may give notice to terminate the affected transaction in accordance with Section 5 of the DADDs.

Note that the application of Disruption Events and their fallbacks can result in:

- Different settlement-price sources than initially specified.
- Different prices being used for determining valuations than initially specified.
- The determination of relevant prices being deferred until the relevant Disruption Event is no longer continuing (at which time a different price may be used from that prevailing on the original pricing date).
- Payment of a termination amount calculated in accordance with the valuation provisions that may afford considerable discretion to the determining party.

Moreover, the determinations or negotiations called for by a disruption fallback are likely to occur under uncertain market conditions.

Additional Termination Event Terms

Certain of the Disruption Event fallbacks result in a transaction being terminated. This occurs when the relevant Affected Party delivers a termination notice to its counterparty following the relevant event, in which it designates a date not more than 20 days after the date the notice becomes effective as an Early Termination Date. The relevant transaction is deemed to have been terminated as a result of an Additional Termination Event (ATE) on the Early Termination Date. Section 5.1.1 of the DADDs defines the termination of a transaction as a result of an ATE on an Early Termination Date designated on the date specified in the related termination notice as Transaction Early Termination (this ATE is separate from the standard Termination Events under the ISDA Master of Illegality, Force Majeure, etc.).

It is worth noting that while it is usually the case that parties negotiate and specify ATEs in the schedule to an ISDA Master, nothing in the ISDA documentation architecture prevents a definitions booklet from specifying that an ATE occurs following certain events (Part 5(b)(vi) of the 2002 ISDA Master, for instance, states that ATEs can be specified in a confirmation, which includes incorporated definitions).

Under Section 5.1.2, the parties specify a Termination Valuation Election in relation to a Disruption Event in the relevant transaction confirmation. The Termination Valuation Election determines who calculates the early termination amount following the early termination of a

transaction: Either one party determines the close-out amount or both parties calculate and an average is taken. The Termination Valuation Elections and related affected parties are as follows:

Termination Valuation Election	Affected Party/Parties
Mid-Market Termination Value	Both parties
Buyer Termination Value	Seller
Seller Termination Value	Buyer
Non-Disrupted Party Termination Value	Disrupted Party
Disrupted Party Termination Value	Non-Disrupted Party

Further Issues: Close-out Netting and Collateral

Close-out netting and collateral significantly reduce the credit exposure of a party to a defaulting party and provide wider market benefits by insulating defaults to single entities. Parties want comfort that both forms of protection continue to apply to derivatives transactions with digital assets as reference assets – a concern that is heightened by recent high-profile failures of crypto exchanges and firms.

Close-out Netting

ISDA has stated that, based on its analysis, netting arrangements relating to digital asset derivatives are likely to be enforceable in major jurisdictions (including New York and England and Wales). The analysis is made more straight-forward in the case of transactions under the DADDs, which are all cash-settled.

However, the enforceability of netting in an insolvency scenario in any particular jurisdiction will depend on the defaulting party's local insolvency law. ISDA has begun work to update netting opinions in relevant jurisdictions to include digital assets. This is especially important for regulated institutions looking for capital relief on the basis of a net derivatives exposure, which relies on securing a reasoned netting opinion to confirm the effectiveness of the netting arrangement.

Collateral Arrangements

There is a distinction between the direct provision of digital assets as collateral by an on-chain transfer and the indirect provision of collateral by transferring a book interest in digital assets held with an intermediary. In either case, ISDA has stated that it is likely that most (if not all) developed jurisdictions would recognize digital assets as property that is capable of being posting as collateral. However, there are still many technical questions around the use of digital assets as collateral, such as whether it is possible to create effective security over digital assets, perfect that security interest, and enforce it following a default. The answers to these questions vary based on the applicable jurisdiction and are in various stages of formation given the nascent nature of the assets.