

Crypto derivatives
are becoming a major
digital asset class



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01 Introduction

INTRODUCTION

Blockchain technologies have created new ways of conducting business and the digital asset industry is consistently innovating in ways that could disrupt traditional finance or provide it with paradigm-changing technologies. Spot digital asset products, such as cryptocurrencies and stablecoins, are digital representations of value that can be stored and transmitted electronically. While these spot assets have led the market innovation so far, the digital asset-based derivatives market has experienced rapid growth in recent years.

Derivatives are contracts that derive value based on the performance of an underlying asset or reference variable, such as commodities, currencies, bonds and stocks – all of which have or may in the future have digital asset equivalents. Derivatives products are critical to financial markets for a variety of purposes, including risk management or hedging, leverage exposure and market access for industry participants – and have proliferated over the past 50 years to meet the needs of

end users and investors. Digital asset-based derivatives are simply a parallel to traditional derivatives products, referencing underlying digital assets or variables such as cryptocurrencies.

Commonly found digital asset-based derivative products on the market today include bitcoin and ether-based futures and options, such as those offered by Binance, FTX and Chicago Mercantile Exchange Group Inc. (CME). Overall, digital asset-based derivatives have experienced fast-paced growth that far exceeds the underlying cryptocurrency spot market, with global estimates of over \$32 trillion in trading volume for just bitcoin and ether-based futures in 2021.¹ This corner of the industry can be expected to continue to gain traction as institutional investors seek to hedge positions, gain synthetic exposure to price movements or create structured/leveraged exposures while limiting principal risk.

That said, the digital asset-based derivative market faces many challenges over the next few years. The traditional financial services ecosystem has been shaped over time by a series of laws and regulations enacted around the world to provide greater oversight over financial institutions. In the US specifically, the Dodd-Frank Act established minimum standards for capital adequacy, consumer protection and resiliency, with Title VII providing for increased regulation and oversight of over-the-counter derivatives markets. As of this paper’s drafting, the

regulatory environment regarding digital asset-based derivatives is still nascent, which leaves certain industry participants questioning when and how to engage in this space.

Notwithstanding this uncertainty, we anticipate that the financial ecosystem will continue to produce product innovation (e.g., decentralized finance (DeFi) derivatives) and that the market will grow in line with investor needs and as regulatory clarity emerges.

A comparison of traditional derivative users and use cases and potential application to digital assets:

Derivatives user base and use cases	
Traditional market	Example application to digital asset market
Farmers/energy	Miners
<p>Users: farmers (e.g., corn, wheat) or energy companies (e.g., oil, gas) selling or purchasing commodities</p> <p>Example use case: hedge against price movements by entering into forward contracts to lock in commodity prices</p>	<p>Users: miners receiving new coins created with each new block and transaction fees from all the transactions included in a block</p> <p>Example use case: hedging against expected market risk of mining rewards</p>
Debt issuers	Staking validators
<p>Users: corporations; governmental bodies; trusts issuing stocks, bonds, notes, bills, etc.</p> <p>Example use case: hedge against interest rate movements for floating rate notes by entering into interest rate swaps, caps, etc.</p>	<p>Users: companies that operate proof of stake validators/nodes, companies that provide staking-as-a-service and individuals/funds staking their own tokens</p> <p>Example use case: derivatives to (i) swap future staking rewards or commissions from tokens to fiat (ii) hedge price risk on staked tokens</p>
Dealers/market makers	Market makers and liquidity providers
<p>Users: financial institutions facilitating client trading across various asset clients</p> <p>Example use case: macro dealer hedging spread, basis and reset risk associated with interest rate swap dealing</p>	<p>Users: participants with significant exposure to digital assets via fulfilling a market maker role on centralized exchanges or providing liquidity to decentralized exchanges</p> <p>Example use case: hedging against market risk of underlying assets</p>
Corporate treasuries	Centralized exchanges and DeFi treasuries
<p>Users: corporate treasuries with exposure to market risk of the institution's assets and liabilities, managing to multiple risk metrics as determined by the firm</p> <p>Example use case: based on market outlook, enter into economic hedges to manage the risk of the entire balance sheet to appropriate risk/reward appetite</p>	<p>Users: exchanges or DeFi protocols that have exposure to market risk of tokens in their treasury</p> <p>Example use case: hedge against market risk associated with tokens held in the treasury</p>
Institutional and retail exposure	Institutional and retail exposure
<p>Users: hedge funds, family offices, venture capital, individual investors</p> <p>Example use case: gain exposure to assets in line with investment theses</p>	<p>Users: hedge funds, family offices, venture capital, individual investors</p> <p>Example use case: gain exposure to assets in line with investment theses</p>



02 Derivative product overview

Why are derivatives needed?

Derivatives are entered into by counterparties for a variety of use cases.

Risk management/hedging

Counterparties may enter into a derivatives contract to mitigate exposure to price movements of a related investment. As an example, derivatives are fundamental to hedging foreign exchange (FX) exposure on foreign-denominated instruments and, therefore, a key part of economic growth in the financial services industry.

Leverage exposure

Counterparties may conversely seek to profit from volatility in the price of an underlying variable without significant capital investment.

Market access

Counterparties may also seek to gain exposure to a spot market without directly holding the asset. Products such as non-deliverable forwards (NDFs) and contracts for differences (CFDs) exist for this purpose in both the traditional and digital asset ecosystems.

Underlying assets

Derivatives are generally based on five groups of underliers: rates, credit, FX, commodities and equities. Digital asset derivative products today most closely resemble a commodity or equity derivative.

Type	Description
Rates derivatives	Financial instrument that allows parties to increase or minimize exposure to interest rate risk (e.g., interest rate swaps, options)
Credit derivatives	Financial instrument that allows parties to increase or minimize exposure to credit risk; consist of negotiable contracts traded over the counter between two parties in a creditor/debtor relationship (e.g., credit default swaps, total return swaps)
FX derivatives	Financial instrument whose payoff depends on the FX rates of two or more currencies (e.g., FX forwards, FX swaps)
Commodities derivatives	Financial instruments whose value is based on underlying commodities, such as oil, gas, metals, agricultural products and minerals (e.g., oil futures)
Equities derivatives	Financial instrument whose value is based on movements of an underlying equity security (e.g., a stock option's value is based on the price movements of the underlying stock)

Listed vs. bilateral

Derivatives may be either **listed** (i.e., traded on a regulated exchange) or **bilateral, also known as “over the counter” (OTC)** (i.e., negotiated bilaterally between two parties and highly customizable).

Note that certain bilateral products are also cleared through a clearinghouse, although they are not listed.

Product types and digital asset parallels

The diagram below shows high-level types of traditional derivatives with typical use cases for entering into a given contract type. We have also highlighted related digital asset products that generally mirror the traditional product structure and use case.

Derivative products	
<h3>Swaps</h3> <p>Description: contract in which a series of cash flows is exchanged</p> <p>Example traditional product: swap a fixed or floating rate vs. return on an underlying asset</p> <p>Use case: hedge inflows or outflows</p> <p>Digital asset parallel: perpetual swaps</p>	<h3>Futures and forwards</h3> <p>Description: agreement to purchase or sell an asset at a specified price at a certain future date (futures listed; forwards traded OTC)</p> <p>Example traditional product: oil futures</p> <p>Use case: lock in future prices for the asset to be sold/purchased</p> <p>Digital asset parallel: exchange-traded futures, perpetual futures, NDFs</p>
<h3>Options</h3> <p>Description: contract whereby the option holder can choose to buy or sell – depending on the contract – the underlying asset at a specified price</p> <p>Example traditional product: stock options</p> <p>Use case: hedge or speculate on price movements of the underlying asset</p> <p>Digital asset parallel: exchange-traded options</p>	<h3>Structured products and exotics</h3> <p>Description: option contracts with a complex/non-vanilla payoff profile or structured products with a return linked to an underlying asset</p> <p>Example traditional product: total return swap, equity synthetic</p> <p>Use case: hedge or support a specific investment need tailored for customers or market conditions</p> <p>Digital asset parallel: market in development</p>

It is important to note that many digital asset derivatives products are **non-deliverable** (i.e., cash is exchanged based on movement of the underlying price of the referenced asset rather than assets themselves being exchanged). Certain companies, such as Bakkt and Bitnomial, support **deliverable digital asset derivative products** (i.e., the underlying asset is exchanged).²

Critical market functions and products like derivatives are vital to the development of a digital asset market that can conceivably compete with traditional financial markets.

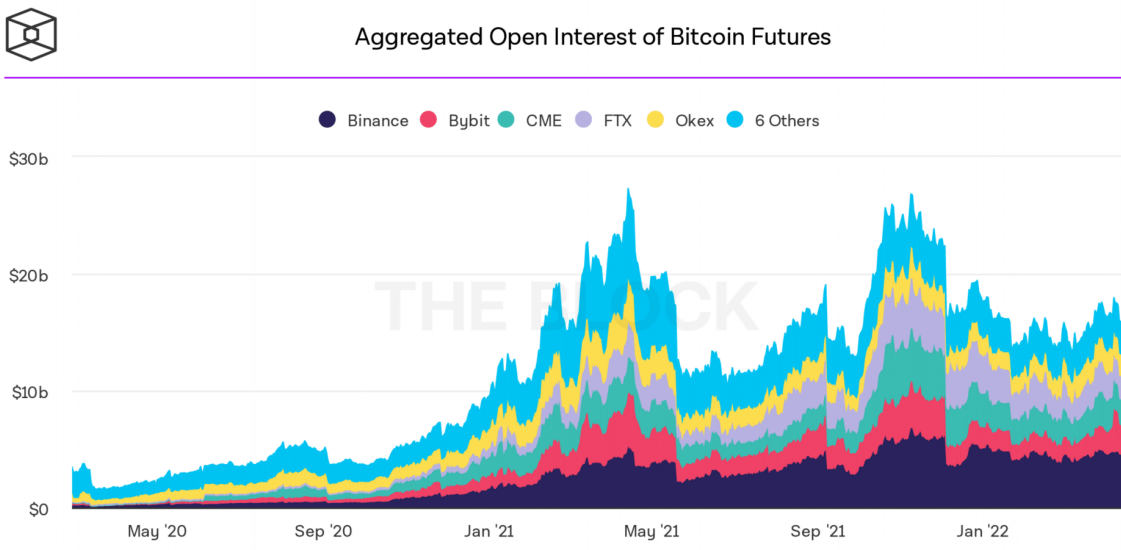


Current state of digital asset derivatives

To date, digital asset-based derivative trading has been dominated by listed futures and options on exchanges such as Binance, FTX and CME, among others, that are paving the way for adoption by traditional financial institutions. Although there are thousands of digital asset tokens in circulation, existing derivatives reference

only a subset of the population – this indicates room for growth and innovation. It is likely that additional derivative products will begin to enter the scene, including more customizable products that will mirror the growth and custom needs of the digital asset market.

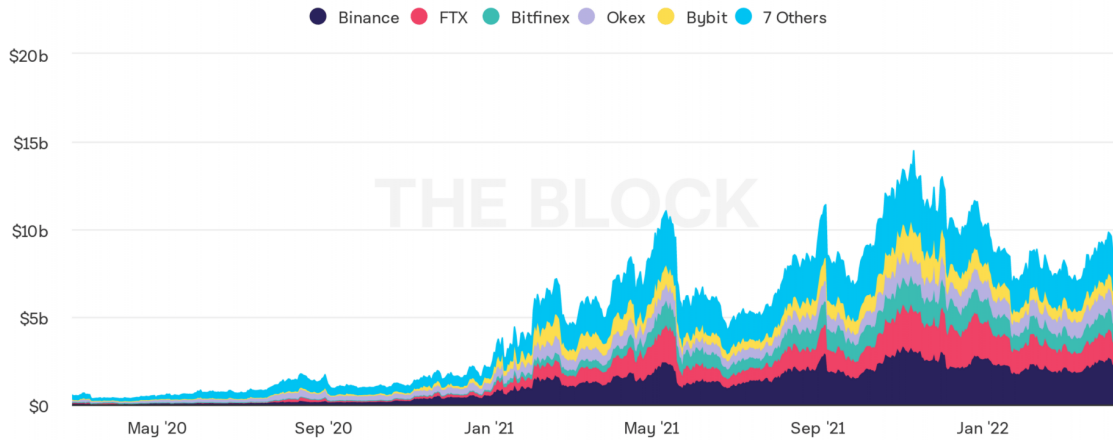
The charts below highlight open interest for bitcoin and ether futures across exchanges.³



SOURCE: COINGLASS
UPDATED: APR 14, 2022



Aggregated Open Interest of Ethereum Futures



SOURCE: COINGLASS
UPDATED: APR 14, 2022

There are three general pools of activity that have emerged in relation to digital asset derivatives: (1) US markets, (2) non-US markets and (3) DeFi markets. The US and non-US markets discussed below can be generally considered “centralized finance” and include listed and OTC activity.

It should be noted that non-US markets in particular have supported the vast majority of derivative activity and product innovation to date. Local firms, infrastructure providers and their regulators should be incentivized to work together to develop mutually beneficial global solutions such that activity is not pushed to unregulated markets.

US markets

Today, we see a growing number of US-registered trading and clearing venues for listed digital asset derivatives, with new products entering the market. Bitcoin futures trading was first supported by US-regulated exchanges when the CME and Cboe Futures Exchange launched the product in December 2017. The introduction of regulated bitcoin futures was a critical step forward to attracting institutional investment in digital assets as these products allow for synthetic exposure that does not require robust digital asset custody capabilities, as well as an effective route for hedging. Despite Cboe halting its bitcoin futures offering in 2019, the product has experienced exponential growth supported by the CME and other venues in the years that followed. CME has since recently launched its Basis Trade at Index Close product in September 2021.⁴

Market participants offering derivatives trading and clearing services in the US are generally modularized into distinct regulated functions. The table on the following page summarizes the roles that these entities take on, including the regulatory authority with which they must register to engage in the market.



Designation	Market role/function	Products	US regulatory agency
Futures commission merchant (FCM)	An individual or organization involved in the solicitation or acceptance of buy or sell orders for futures or options on futures in exchange for payment of money or other assets.	Futures, options, cleared swaps	Commodity Futures Trading Commission (CFTC)
Designated contract market (DCM)	Any board of trade (exchange) designated to trade specific futures, options or swaps products.	Listed futures and options, foreign futures, cleared swaps	CFTC ⁵
Swap Execution Facility (SEF)	An electronic platform that matches counterparties in a swap transaction. Through a mandate in the Dodd-Frank Wall Street Reform and Consumer Protection Act, SEFs changed the methods previously used to trade derivatives.	Swaps	CFTC ⁶
Derivatives Clearing Organization (DCO)	An entity that enables each party to substitute, through novation or otherwise, the credit of the DCO for the credit of the parties; arranges or provides for the settlement or netting of obligations; or otherwise provides clearing services or arrangements that mutualize or transfer credit risk.	Futures contracts, options on futures contracts, swaps	CFTC
Broker-dealers	A person or firm in the business of buying and selling securities for its own account or on behalf of its customers.	Stocks, bonds, options	Securities and Exchange Commission (SEC)
Swap dealer	A person or firm who serves as a swaps broker; makes markets in swaps; regularly enters into swaps with counterparties as an ordinary course of business for its own account; engages in activity causing itself to be commonly known in the trade as a dealer or market maker in swaps.	Swaps	SEC, CFTC
Security-based swap dealers	A person or firm represented as a dealer in security-based swaps; makes a market in security-based swaps; regularly enters into security-based swaps as an ordinary course of business.	Security-based swaps	SEC

As of late 2021, approximately 13 CFTC-registered clearing FCMs support clearing of certain listed digital asset derivatives. Comparatively, the list of “digital native” clearing FCMs and non-clearing FCMs remains short but is growing – Bakkt owns an FCM and Coinbase recently announced its intention to register as a non-clearing FCM.⁷ FTX, a leading cryptocurrency exchange, finalized its acquisition of LedgerX in October 2021 to enable derivatives trading for its US customers by leveraging

LedgerX’s licenses as a DCO, a DCM and an SEF.⁸ Note that FCMs are relevant specifically for futures, options and cleared swap products (i.e., regulated, industry-standard offerings) – there is a small but emerging bilateral derivatives market supporting customized exposure. In April 2022, FalconX became the first CFTC-registered cryptocurrency swap dealer, opening the door for US institutional investors to have greater access to trading in the bilateral derivatives market.⁹

Examples of listed products offered in the US include:

- ▶ CME's bitcoin future. Contract has a notional of 5 bitcoin and is non-deliverable, or cash settled (i.e., buyer receives difference between contract purchase price and price of underlying bitcoin at expiry). The price for these contracts is based on CME's CF Bitcoin Reference Rate (BRR), which is a daily reference rate of the US dollar price of 1 bitcoin as of 4 p.m. London time – calculated via trade flow from major bitcoin spot exchanges over a one-hour calculation window.
- ▶ Bitnomial's bitcoin USD future. Contract has a notional of 1 bitcoin and is deliverable (i.e., buyer receives 1 bitcoin at contract expiry).
- ▶ CME's bitcoin option. Contract has a notional of 1 bitcoin futures contract (which represents 5 bitcoin) and is non-deliverable (i.e., cash settled) when exercised.

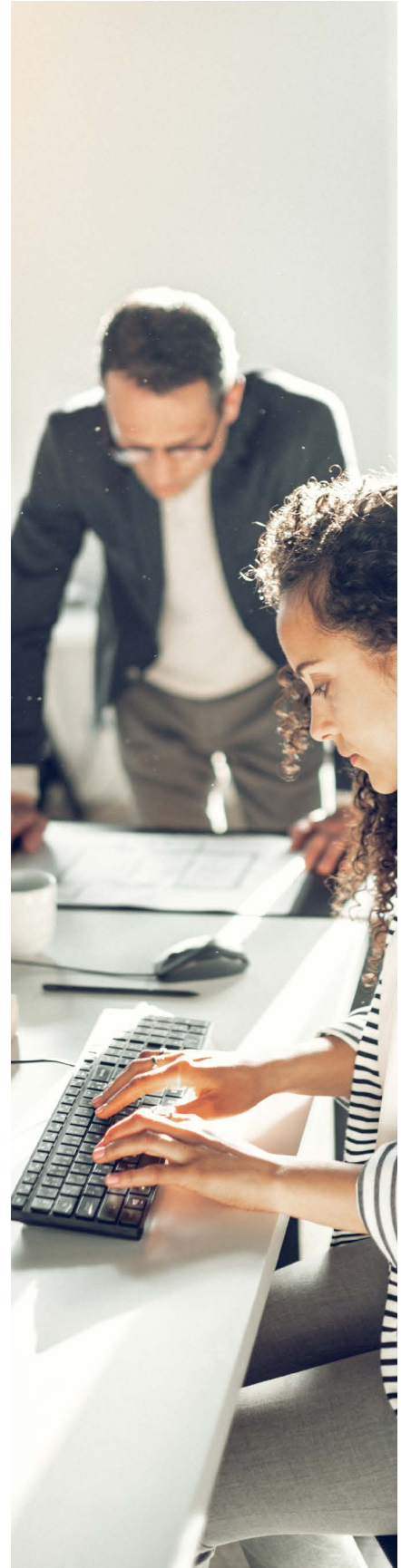
Non-US markets

Offshore exchanges such as Binance and FTX are market leaders in listed digital asset futures and options.¹⁰ These exchanges have historically been attractive to retail investors and are comparatively less regulated than their counterparts that are registered in the US. Other notable non-US exchanges are OKX and Huobi, domiciled in Asia-Pacific, as well as Deribit and Kraken. These firms are unable to offer products to US customers, although there are methods by which a US institutional firm could gain exposure to their offerings (e.g., offshore legal entities).

Outside of listed futures and options, other products offered globally include:

- ▶ Perpetual swaps (perpetuals). Perpetuals, although relatively similar to index or equity linked swaps, have become widely used for digital assets. These contracts are similar to a future, but do not settle. Rather, the price of the contract generally mirrors that of the underlying asset (e.g., bitcoin) and has no fixed maturity. Perpetuals are not currently offered by US regulated exchanges.
- ▶ NDFs. Forward contracts that are based on an underlying asset's price and are non-deliverable (i.e., are cash settled rather than exchanging the underlying asset). Goldman Sachs is reported as offering bitcoin-based NDFs and "[protecting] itself from the digital currency's famous volatility by buying and selling Bitcoin futures in block trades on CME Group Inc."¹¹
- ▶ CFDs. CFDs are cash-settled instruments that allow investors to trade on the price movement of cryptocurrencies without owning the underlying assets. These products are the European equivalent to synthetic equities or NDFs in the US and may be offered in European markets today.

Of note, perpetual swaps represent a significant portion of all digital assets derivatives trading globally. Perpetual swaps are attractive to investors as they provide the buyer with synthetic long exposure to a digital asset and the seller with short exposure to that same asset. Given there is no expiration, the swap



A man in a blue shirt and glasses is standing in a server room, looking at a laptop. The room is filled with server racks, and the lighting is dim with blue and green accents from the server lights.

“

Local firms, infrastructure providers and their regulators should be incentivized to work together to develop mutually beneficial global solutions so that activity is not pushed to unregulated markets.

provides both the buyer and seller with the ability to offset their risk and exposure indefinitely, or at least until the contract is terminated. While perpetual swaps are often compared with futures, the price does not converge to the index price in the way a cash-settled future does. Thus, perpetual swaps may compare more closely to an equity linked swap in traditional equities markets. Perpetuals employ a funding rate mechanism to encourage buyers and sellers to meet market demand. For example, if the

price is higher than the underlying asset, the funding rate would be positive and long traders would pay a fee to short sellers. This would encourage short sellers to enter and engage in arbitrage activities to drive the price to its true market value. On the other hand, if the funding rate is negative and the swap is priced lower than the market rate, long traders will purchase more positions and drive up the price.

Market functions and products

Below is an illustrative list of non-US trading venues and exchanges and their related jurisdiction and product offering(s).¹²

Example trading venues/exchanges	Jurisdiction	Products/considerations
Binance	George Town, Cayman Islands	<ul style="list-style-type: none"> ▸ Futures, options, leveraged tokens ▸ Does not offer products to US customers
FTX	Bahamas	<ul style="list-style-type: none"> ▸ Futures, options, leveraged tokens ▸ With the recent acquisition of LedgerX, a CFTC-regulated exchange, FTX can offer US-regulated futures to US customers
Huobi	Hong Kong	<ul style="list-style-type: none"> ▸ Futures
OKX	Seychelles	<ul style="list-style-type: none"> ▸ Futures
BitMEX	Hong Kong	<ul style="list-style-type: none"> ▸ Swaps, futures
Deribit	Panama	<ul style="list-style-type: none"> ▸ Perpetuals, futures and “European-style” options

Recent feedback from US regulators

While these firms typically operate outside of the US, there have been numerous charges brought forth by US regulators against non-US exchanges or trading venues over the years, alleging that certain firms have allowed US persons and institutions to transact on their platforms without the proper licenses.¹³



DeFi markets

DeFi refers to a growing financial ecosystem that offers traditional financial services, such as derivatives, using public blockchain infrastructure and smart contracts to facilitate transactions. Decentralized derivative protocols (DDPs) facilitate the issuing, servicing, trading and settlement of various digital asset-based derivatives using smart contracts. Interacting with DDPs as opposed to more traditional exchanges is a trade-off of different types of risks. Users may see a reduction in third-party/counterparty risk that would ordinarily be presented when facing a single exchange (e.g., credit risk, hacks, liquidation protocols, flash crashes) – that said, due to the relative immaturity of DDP technology and associated regulatory uncertainty, these protocols are still considered the least regulated and riskiest form of derivative exchange.

It is important to note that the common DeFi term “swap” typically refers to exchanging spot assets via smart contracts, not derivative contracts to swap cash flows.

DeFi asset swaps are not included in derivatives total value locked (TVL), which is the value of assets that are currently being staked in a specific protocol.

The rise of DeFi usage has prompted a new wave of innovation and growth across the industry, including derivative protocols. Year over year, from November 2020 to November 2021, the total amount of value locked in DDPs grew by roughly 200% to an estimated \$3 billion, with a peak of over \$4 billion in May 2021.¹⁴ DDP transactions constitute only a fraction of the existing digital asset-based derivatives trading volume; however, this number is expected to continue to grow as scaling solutions and more efficient blockchains increase the speed and volume of transactions while reducing costs, and as regulatory clarity arises.

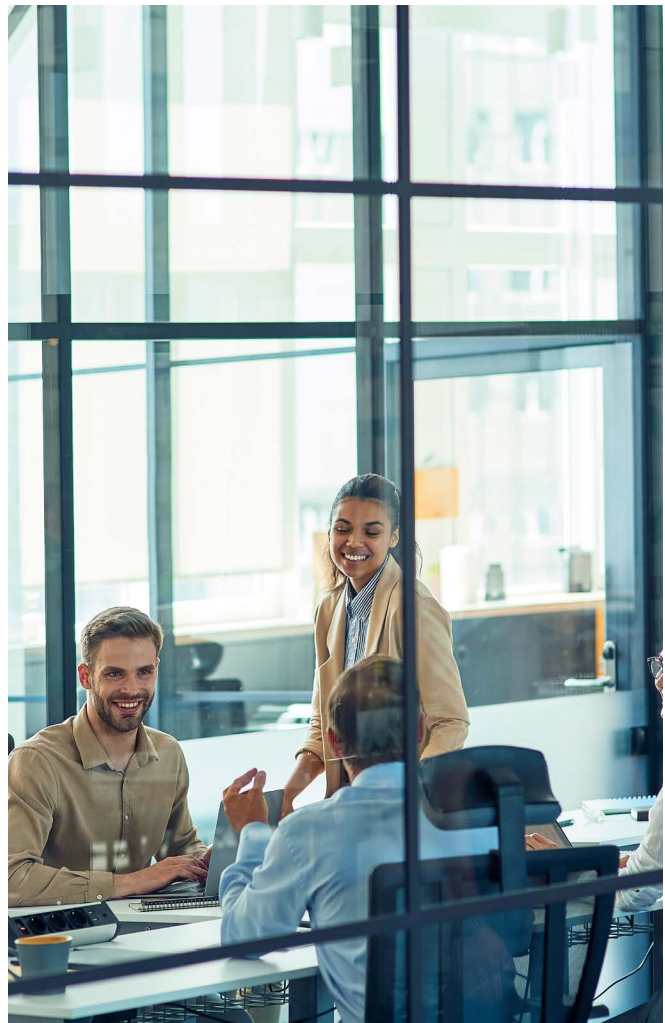
Though these new protocols offer a variety of new, unique opportunities and products, there are several risks participants must consider. The derivative products, protocol designs and governance structures of the protocols tend to differ significantly, increasing the complexity and risks associated with using a protocol.



Considerations include:

- ▶ **Collateralization requirements.** Given the inherent risk and novelty of the digital asset ecosystem, substantial overcollateralization is often required to participate on most platforms. The amount and type of collateral that protocols leverage tend to differ. Users should carefully consider the risk of spiking margin requirements given price volatility with certain digital assets; intensive capital requirements locked into collateral may make these investments prohibitive. These collateralization ratios will most likely be reduced as the protocols are increasingly adopted and a more robust reputation and credit system is built out. More broadly, systemic risks may be presented given the “built-in interconnectedness among DeFi applications can ... amplify distress, since the system’s stability hinges on the weakest links”¹⁵ – for instance, in the event of significant volatility in cryptocurrency prices, devaluation of cryptocurrency collateral may trigger impacts to the system.
- ▶ **Credit backstop.** In traditional finance, central counterparty clearinghouses (CCPs) typically act around settlement certainty, taking on the role of a credit backstop in the event of a given counterparty’s default. With DeFi, “financial intermediation ... relies exclusively on private backstops, i.e., collateral, to mitigate risk and enable transactions when participants cannot trust each other. Thus, there are no shock absorbers in DeFi that can cut in during stress periods.”¹⁶ In other words, in the absence of capital and guarantee funds that are typically pooled by CCPs to protect against counterparty default, overcollateralization is the answer in today’s DDP derivative market.
- ▶ **Liquidations.** Liquidation ratios are embedded in the smart contracts or enforced by arbitragers (bots in most cases) to ensure compliance with collateralization requirements. This liquidation process differs across protocols, with some allowing a grace period for holders to add collateral while others liquidate the position immediately. Centralized exchanges may consider prior repayment history or other forms of collateral prior to liquidating a position, but decentralized exchanges have not built out this capability to date.
- ▶ **Price oracles.** DDPs tend to leverage oracles, smart contracts that translate off-chain data into on-chain readable data to obtain asset prices. Oracles have varying levels of centralization and security, which may impact the security of the overall protocol.

- ▶ **Governance.** DeFi protocol governance is a new and burgeoning form of governance that revolves around transparent communication among a community of users, developers and investors. Decentralized autonomous organizations (DAOs) have been developed to organize these communities, but the legal and regulatory framework regarding DAOs is still very undeveloped – which creates governance risk. For example, some DAOs allow voting on changes for certain protocol mechanics, which could introduce governance risk. There is also the risk that heavily involved developers could leave a project, creating a knowledge gap.
- ▶ **Protocol and smart contract risk.** Smart contract code is immutable and generally cannot be changed once deployed, leaving opportunity for hacks and security breaches. Institutions that look to engage with a given DDP should first conduct a comprehensive protocol and smart contract review to identify any flaws or vulnerabilities.



An example of the diversity of DDPs is illustrated in the table below, which outlines a subset of key data points across some of the top DDPs.

Protocol	Native blockchain	TVL ¹⁷ (millions)	Products	Protocol design
Synthetix	Layer 1: Ethereum Layer 2: Optimism	\$354	<ul style="list-style-type: none"> ▸ Synthetic assets (synths) related to forex, crypto, indexes ▸ Inverse synths related to crypto and indexes 	<ul style="list-style-type: none"> ▸ Leverages pooled collateral, including SNX and ETH Zero slippage between synths
dYdX	Layer 1: Ethereum Layer 2: Starkware	\$1,020	<ul style="list-style-type: none"> ▸ Spot and margin trading ▸ Perpetual swaps (outside of the US) 	<ul style="list-style-type: none"> ▸ Collateralized by USDC ▸ Non-custodial on chain settlement ▸ Starkware zk-rollup
OPYN	Layer 1: Ethereum Layer 2: Arbitrum	\$76	<ul style="list-style-type: none"> ▸ Ethereum (ETH) options ▸ Bitcoin (BTC) options 	<ul style="list-style-type: none"> ▸ European options ▸ Auto exercise capabilities ▸ Cash settlement
Dopex	Layer 1: Ethereum Layer 2: Arbitrum	\$65 ¹⁸	<ul style="list-style-type: none"> ▸ ETH options ▸ BTC options 	<ul style="list-style-type: none"> ▸ Option pools ▸ European options ▸ Auto exercise capabilities
UMA	Layer 1: Ethereum Layer 2: Polygon	\$20	<ul style="list-style-type: none"> ▸ Synthetic assets related to real-world assets, crypto, indexes 	<ul style="list-style-type: none"> ▸ Relies on liquidators and offers priceless contracts ▸ Does not rely on oracles
Lyra	Layer 1: Ethereum Layer 2: Optimism	\$80 ¹⁹	<ul style="list-style-type: none"> ▸ ETH options ▸ BTC options ▸ Link options 	<ul style="list-style-type: none"> ▸ European options ▸ Auto cash settlement ▸ Leverages Synthetix protocol assets (sUSD, sETH, sBTC, sLink) for collateral pools
Friktion	Layer 1: Solana	\$88 ²⁰	<ul style="list-style-type: none"> ▸ Covered call options ▸ Cash secured puts 	<ul style="list-style-type: none"> ▸ Leverages various quantitative yield strategies through the use of "Volts" ▸ Blind Dutch auction format used to determine market price for call options during open window periods

To date, little regulatory clarity exists about DeFi protocols and how they fit into existing regulatory frameworks given their unique nature.





04 Emerging themes

Regulatory landscape

UK and EU regulators have sought to protect retail investors in the digital asset-based derivative market through rigid policy. In October 2020, the UK Financial Conduct Authority (FCA) prohibited the sale of these derivatives to retail investors. Meanwhile in Europe, the European Securities and Markets Authority (ESMA) has looked into similar regulation to restrict derivative trading. In support of these policies, the FCA and ESMA have cited cryptocurrencies' high price volatility, the prevalence of price manipulation and security vulnerabilities in the spot market, and investors' lack of understanding of complex derivatives products.

In the US, regulators have continued to treat digital asset activity under the lens of the existing legal and regulatory framework, including prohibiting derivatives that do not fit this existing framework. Certain market participants believe that this limitation hampers investment opportunities for US customers and may result in a movement to foreign markets with less regulation. That said, several working groups or ongoing initiatives have been stood up between regulatory bodies to review use cases, risks and policy options – signaling acknowledgment that these activities need to be addressed.

US CFTC

The CFTC has stated that bitcoin and other digital currencies (e.g., ether), which act as an alternative to government-issued fiat currencies, are considered commodities.²¹ Derivatives on such currencies (e.g., listed futures, options, perpetual futures, swaps) fall under the CFTC's purview. Likewise, the SEC has oversight of derivatives based on digital assets considered to be securities; however, regulatory jurisdiction becomes more complicated once derivatives on indexes or baskets of digital assets are introduced.

The CFTC has observed that current US "rules largely originated before the advent of digital assets" and given "their novel features and characteristics, digital assets expose gaps and overlaps in existing regulatory frameworks."²² Market participants have interpreted commentary from current and former CFTC personnel as indicating a willingness to partner with the digital asset community to define a regulatory framework that appropriately monitors digital asset derivative activity without crippling the market.

In August 2021, the CFTC issued a \$100 million consent order against BitMEX for operating a cryptocurrency trading platform without registering with the CFTC.²³ In late September 2021, the CFTC also filed charges against 14 entities for failing to register as FCMs or else making false and misleading claims of having CFTC registration and National Futures Association membership.²⁴ The CFTC fined crypto betting service Polymarket for \$1.4 million in January 2022 for offering swap products without first registering as a DCM or an SEF – this case is of particular interest given Polymarket is a DeFi platform.²⁵ These fines and charges demonstrate how the CFTC is able to apply existing regulations to the digital asset derivatives market.

US SEC

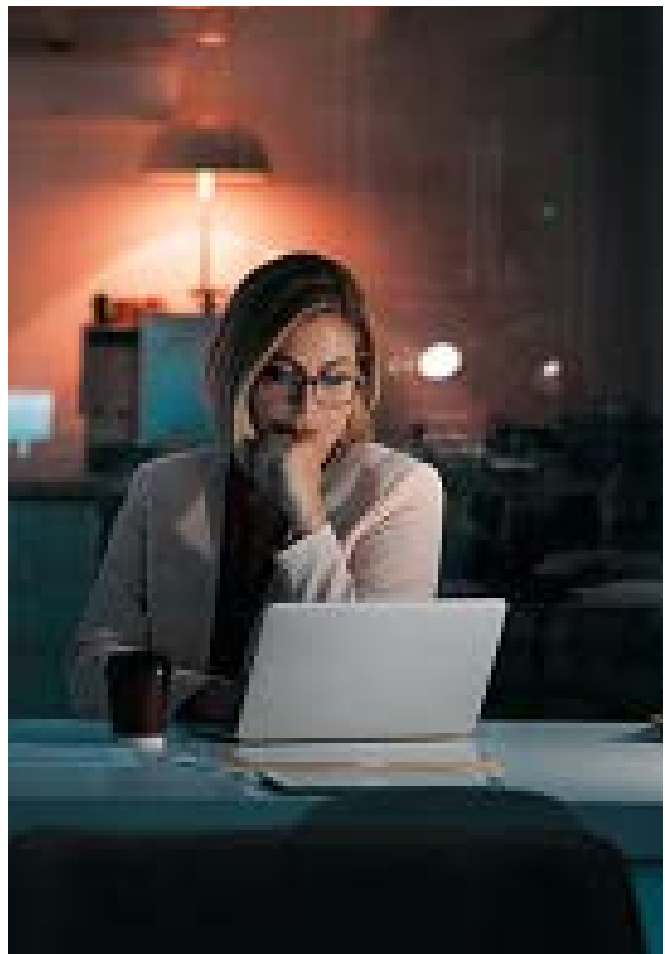
Since 2017, the SEC has taken a consistent stance that it would continue to apply the traditional test outlined in *SEC vs. W.J. Howey Co.* to determine whether certain digital assets would be considered an investment contract, and therefore subject to federal securities laws.

At a high level, the Supreme Court case and subsequent case law have outlined that an “investment contract” exists when there is the investment of money in a common enterprise with a reasonable expectation of profits to be derived from the efforts of others. The SEC has clarified that the application of the *Howey* analysis will be applied not just to the digital asset instrument itself, but also to the way it is offered, sold or resold (including secondary market sales). For example, as it relates to the creation and dissemination of new digital assets through initial token offerings, in September 2021, the SEC charged three companies more than \$500 million for illegal stock and digital-asset offerings.²⁶

Barring an overhaul to existing rulemaking, if the SEC takes the stance that most cryptocurrencies should be treated as commodities, the CFTC will effectively operate as the primary US regulatory body over digital asset derivatives. If the SEC instead classifies a significant portion of assets as securities, there are much broader implications. These assets may be treated as unregistered security offerings in spot markets and a significant portion of digital asset derivatives would shift from the CFTC to the SEC’s oversight. That is to say, the SEC is positioned to have a significant impact to the spot digital asset industry and digital asset derivatives markets based on the outcome of its stance on security classification.

Internal Revenue Service (IRS)

The IRS has not directly addressed regulation of digital asset derivatives, but the Internal Revenue Code (IRC) provides rules for reporting positions in certain futures, options and other derivatives that may also apply to similar contracts denominated in digital assets, such as bitcoin. Specifically, for contracts that fall within the rules of IRC § 1256 (Section 1256 contracts), taxpayers are required to report gains and losses arising from such positions on an annual, mark-to-market basis, as if the contracts were sold for fair market value on the last day of the year. Special gain recognition rules also apply to such contracts. Section 1256 contracts include “regulated futures contracts” and “equity options.” A regulated futures contract is a contract that depends on a mark-to-market system of accounting and is traded on a qualified board or exchange, such as the CFTC and the CME.²⁷ A nonequity option is generally any option that is listed and traded on or subject to the rules of a qualified board or exchange, and is not an equity option (e.g., tied to individual stocks).



While the IRS treats digital currency²⁸ as property and taxpayers are generally not required to recognize gain or loss on such currency until it is sold or exchanged, taxpayers may be required to deviate from this general rule for certain digital asset derivatives they hold. For example, bitcoin futures traded on the CME would likely be deemed a regulated futures contract and therefore a Section 1256 contract, subjecting the position to mark-to-market reporting. Additionally, the net gain or loss on Section 1256 contracts is treated as 60% long-term capital gain and 40% short-term capital gain. While the IRS has not formally stated whether IRC § 1256 might apply to digital asset derivatives, the departure of Section 1256 contracts from general property rules may warrant consideration for holders of digital asset derivatives.

Financial Action Task Force (FATF)

To date, little clarity exists regarding DeFi protocols and how they fit into existing regulatory frameworks. Regulators around the world are assessing how to govern and monitor these internet-based protocols that in some cases may not be incorporated in any particular jurisdiction. FATF, which is an intergovernmental body that sets international standards that aim to prevent illegal activities related to money laundering and terrorist financing, recently published updates to its guidance that hint at increased scrutiny related to the degree of centralization and control by certain individuals involved in governing a DeFi protocol. These individuals may be considered virtual asset service providers (VASPs) and therefore subject to the same relevant FATF measures that apply to financial institutions.²⁹



Financial Stability Board (FSB)

In February 2022, the FSB, an international body tasked with the mandate to promote financial stability, released an assessment of risks posed by digital assets in general. The paper cites that “much of the trading activity in crypto-assets, as well as in futures and other derivatives referencing them, takes place on platforms that may be operating outside the regulatory perimeter (or, in some cases, may be failing to comply with applicable laws and regulations) and without regulatory oversight that would provide transparency on the nature and extent of these exposures.”³⁰ The FSB will continue to monitor this space and explore potential regulatory and supervisory implications of digital assets.



Development of bilateral derivatives

Bilateral derivatives play a critical role in the market as they allow counterparties to agree on custom derivatives terms. As digital asset investment expands, institutions will likely require these custom contracts in addition to more standardized listed contracts. However, while other asset classes have well-defined contractual standards and definitions that can be used for bilateral products, there is currently no standardized legal documentation or conventions for digital asset derivatives. Without industry-standard conventions, transparency and liquidity in the bilateral derivative market will suffer (e.g., due to the burden of contractual negotiations).

There are several market participants and industry associations, including the International Swaps and Derivatives Association (ISDA), which are analyzing how digital assets might interact with existing standard legal documentation. ISDA in particular is working to develop common legal standards and definitions for digital asset derivatives so that these products can be integrated into the current ecosystem. The association has published a paper outlining unique considerations that need to be addressed to adequately cover the asset class from legal and documentation perspectives.³¹

Notable conventions to resolve include:

Treatment/processing of “forks” in the blockchain

A fork event is a modification to a blockchain that can either result in the existence of two disparate chains (a “hard” fork) or the persistence of the original chain with an alteration (a “soft” fork). A fork can result in the creation of two distinct digital assets, as was the case in the split of bitcoin cash from bitcoin due to an upgrade in block size for bitcoin cash. Digital asset derivative users will need to understand how to process fork events as these may alter a product’s structure and valuation.

Timing of valuation

The digital asset market operates 24 hours a day, in contrast to traditional financial markets. Timing of valuation will need to be determined and executed consistently across counterparties to avoid reconciliation breaks. Further, given liquidity drives valuation across the various exchanges, standard reference data sources

and methodologies will also need to be defined (e.g., referencing the most liquid exchange vs. an average across exchanges) to account for potential variation in prices reported on the same day at different exchanges, particularly in periods of high volatility where observed prices can vary significantly. Until a clear set of market standard terms is established, counterparties may seek to include provisions that specify how valuation will be determined with reference to traditional pricing sources. Alternatively, price oracles can act as a digital agent by providing the pricing information needed. This reference data, if standardized, may be used to operationalize critical processes, such as pricing or execution of a smart contract command. For example, smart contract code and distributed ledger technology present the opportunity to develop a formulaic, automated approach to determine payment and collateral obligations (e.g., daily exposure calculations, transfer of payments and collateral assets) that limit the need for human intervention.

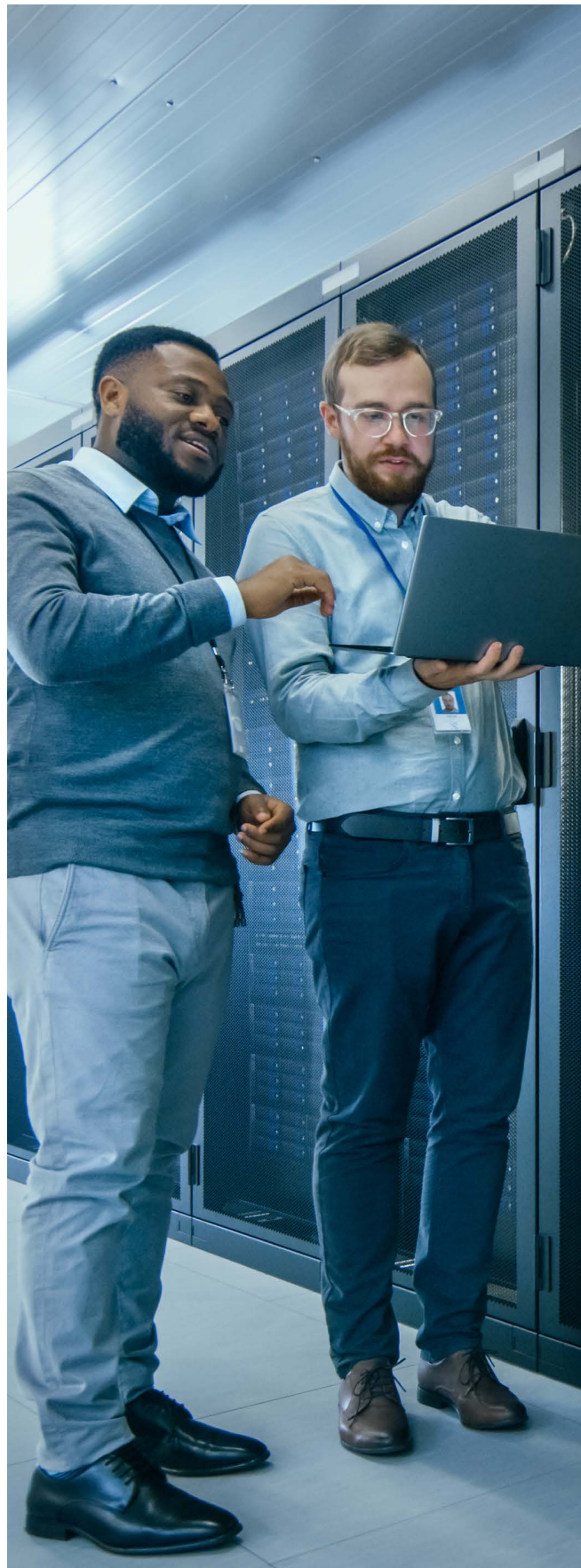
Impact of transaction fees

Fees to process a transaction vary by exchange and can range from -0.025% to 0.075% for derivatives depending on whether the participant is a “maker” or “taker” to the transaction.³² These fees can create challenges in defining hedging strategies as transaction costs could nullify the benefit of the hedge and negatively impact returns. During times of high demand and transaction volumes, fees charged by the network to process a transaction (colloquially termed “gas fees”) can rise significantly and impact the amount of collateral required (e.g., a user’s position may be liquidated based on the valuation of collateral). It should be noted that there may be additional exchange or custodian fees on top of any gas fee, which can exacerbate this impact.

Implications for settlement

Market participants have the choice between non-deliverable or deliverable products (i.e., settlement in fiat currency vs. exchanging the underlying asset) – however, the industry has not yet established standards in relation to either method.

When opting for non-deliverable products, parties must agree on a spot price at the time of settlement and must establish a settlement time considering the 24-hour nature of digital asset markets. Like financial derivatives (e.g., swaptions settling against the ICE Swap Rate), settlement may be based on a standardized reference rate such as BRR. Alternatively, market participants may



instead opt for deliverable settlement, which would require a standardized spot price in addition to considerations associated with exchange of the underlying digital asset (e.g., designating the custodian, providing addresses, paying network transaction or gas fees).

Today, the majority of markets in traditional finance opt for non-deliverable cash settlement. In the medium term, it is possible that traditional finance institutions and digital native firms will opt for different settlement methods since both have unique impacts on the infrastructure when considering security, scalability, interoperability and smart contract code.

Implications for margin requirements

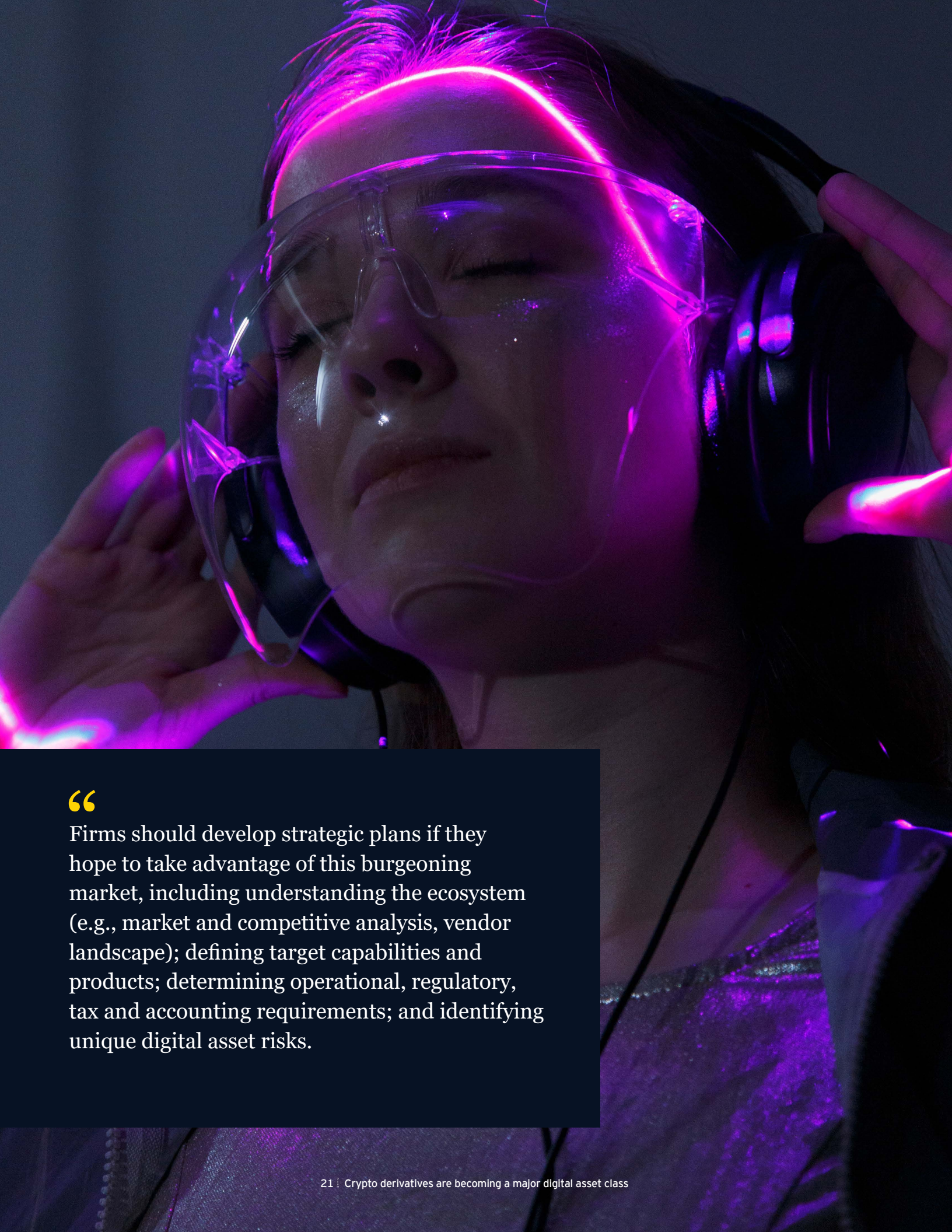
Industry standards will need to be developed regarding margin requirements to reduce exposure and address market and credit risk concerns associated with digital assets. Initial margin and daily variation margin will be required, in line with the existing framework for financial derivatives traded today, but additional conservative measures (e.g., intraday monitoring of margin) may be required to offset volatility and liquidity concerns and provide greater transparency into the firm's exposures. Under existing margin requirements, most digital assets

are unlikely to be accepted as eligible collateral. However, if legislation is passed that characterizes central bank digital currencies (CBDCs) as cash, then it becomes very likely CBDCs will constitute eligible collateral.

Implications for capital requirements

Industry standards are in the process of being developed for the capital treatment of digital assets. The Basel Committee for Banking Supervision (BCBS) recently published a paper proposing a risk weight of 1,250% to be applied to a bank's holding of bitcoin, ethereum and other cryptocurrencies, while stablecoins and tokens tied to real-world assets may require lower capital requirements.³³ Due to the observed price volatility of certain digital assets, a conservative approach such as proposed by the BCBS would create a backstop, or reserve, to absorb a loss in the event of a default and provide protection to all depositors and creditors of the firm. Given the risk-weighting and resulting capital required, additional focus on effective hedging programs, risk management and balance sheet optimization would be necessary. Risk profiles will also need to be defined for digital assets to support the development of a capital framework that is tied to the risk of the specific asset rather than one that is consistently applied across all digital assets equally.





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Firms should develop strategic plans if they hope to take advantage of this burgeoning market, including understanding the ecosystem (e.g., market and competitive analysis, vendor landscape); defining target capabilities and products; determining operational, regulatory, tax and accounting requirements; and identifying unique digital asset risks.

Implications for netting

Under the current proposal provided by the BCBS, exposures would need to be aggregated and therefore netting may not be applicable.³⁴ Traditional financial institutions may find it more difficult to engage in market making activities if they are unable to net exposures and recognize the benefits of hedging. As capital requirements are further defined, additional guidance on netting may become clearer to allow banking entities to participate in the market. Additionally, digital native firms can utilize DeFi protocols and smart contract code to self-execute payments when certain conditions are met.

Next steps regarding legal standards and documentation

In late September 2021, ISDA announced that it has established a digital asset legal and documentation working group to explore these issues, with the goal of developing “market-standard documentation that is critical for legal certainty, as well as ensuring robust processes are in place to deal with market disruptions or defaults.”³⁵

Market structure

Regulatory fragmentation

As outlined under “Regulatory landscape” above, we expect to see additional regulatory clarity emerge as industry working groups tackle issues within the digital asset market more broadly. In the US, there are two deciding factors that will influence the state of play for digital asset derivatives: (1) the treatment of various protocols and tokens as securities or not (whether based on the SEC’s interpretation or court rulings) and (2) whether incremental legislation is enacted by Congress to specifically govern these products and related technology.

If the derivatives regulatory reform coming out of the 2008 financial crisis was any indicator, it is likely that there will be a fragmented regulatory environment, which will introduce layers of complexity to a market that has operated largely homogeneously outside of the US and other regulated spaces. In other words, there may be a patchwork of regulatory frameworks (e.g., by digital asset type and by jurisdiction) that financial institutions will need to understand and navigate as they assess potential product offerings and customer segments.

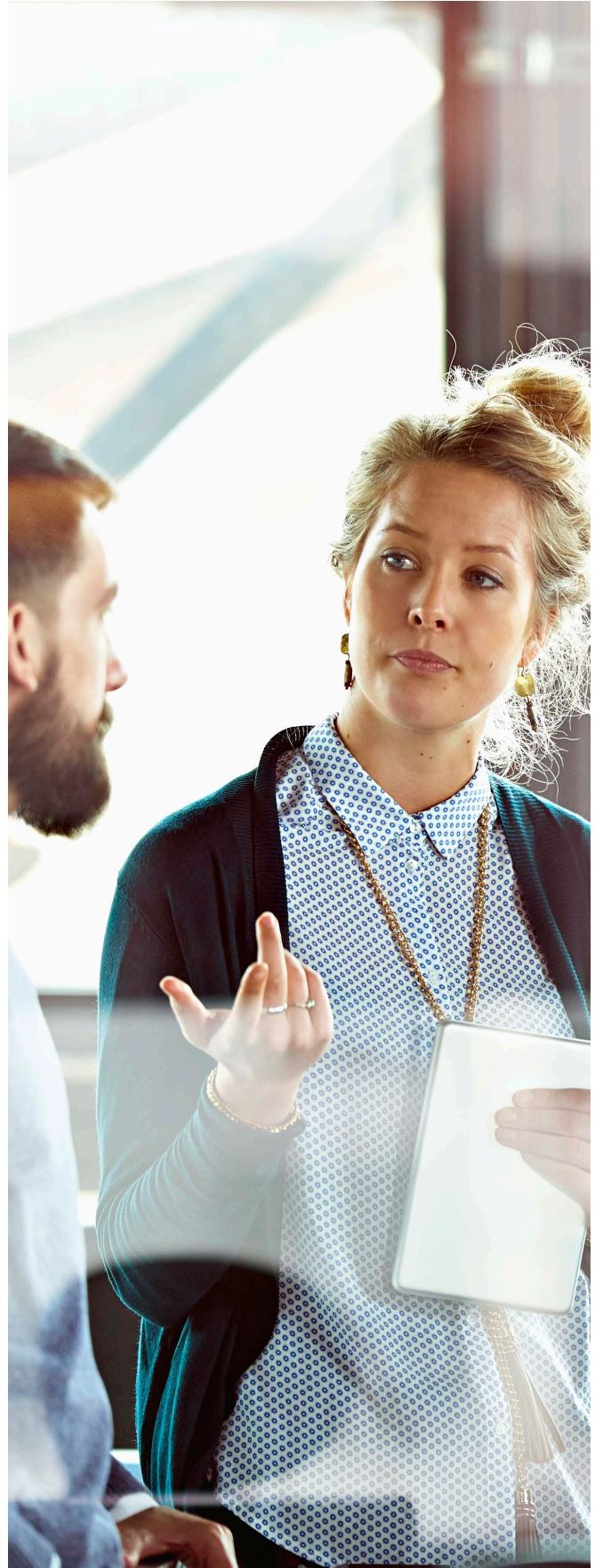


Liquidity

A large concentration of today's digital asset-based derivative activity sits with certain centralized exchanges, such as Binance, FTX and CME. Over the next few years, it is possible that this liquidity concentration will persist as these exchanges are able to meet regulatory and operational infrastructure requirements for institutional investors. Liquidity may become more fragmented across exchanges based on product availability (i.e., products restricted to certain protocols supported by certain venues) and fee compression as markets mature and become less volatile. Regulation will lead to ring-fenced areas that are required to conform to local requirements (e.g., permissioned protocols) vs. unregulated (or lightly regulated) larger pools of liquidity in the DeFi space.

In the longer term, there may be a migration away from centralized exchanges and toward DeFi. The development of scaling solutions, which seek to lower transaction costs and increase transaction execution speed, should further growth in this space. DDPs by their nature can also reach a broader set of end users than those who have access to centralized venues today. This migration to decentralized derivatives is dependent on a set of success criteria, including addressing interoperability between protocols, alleviating some degree of regulatory concern related to permissionless protocols and having the ability to offer an economically viable product (i.e., capital efficiency).

We have also seen an early indication of potentially shifting market structure via a request from FTX in March 2022. As background, in 2021, FTX acquired LedgerX, which is a digital currency futures and options exchange and clearinghouse, and rebranded as FTX US Derivatives. Currently, FTX US Derivatives is registered with the CFTC as a DCM, a DCO and an SEF. In early March 2022, FTX US Derivatives submitted an application requesting that the CFTC amend its Amended Order of Registration as a DCO, thereby allowing FTX to offer margin directly to customers. Though in the early stages, this could have long-lasting impacts to the cleared derivatives market globally if approved, especially if the model is expanded to asset classes outside of cryptocurrency.



Product innovation and DeFi

The digital asset derivative market structure is expected to evolve as institutional users demand more exposure to digital assets and more complex product offerings. The digital asset derivative product suite will mirror traditional financial instruments to start, facilitated by smart contracts that increase efficiency, reliability and auditability. Similar to the rise of the digital asset perpetuals, we may see an increase in options activity as established players stand up options infrastructure in the centralized market and as viable decentralized protocols are built on faster chains or scaling solutions that reduce

costs, increase speed and reduce collateralization requirements.³⁶ As a real-world illustration of this point, Goldman Sachs recently traded a bitcoin-linked non-deliverable option with a crypto merchant bank, Galaxy Digital.³⁷ In addition, CME began offering Micro Bitcoin and Micro Ether futures in March 2022, which will provide new opportunities and allow for greater accuracy in cryptocurrency trading strategies. Derivative product innovation will progress beyond traditional financial instruments – as we already see with offerings such as DeFi Options Vaults and “Everlasting Options” (the latter modeled after perpetuals).

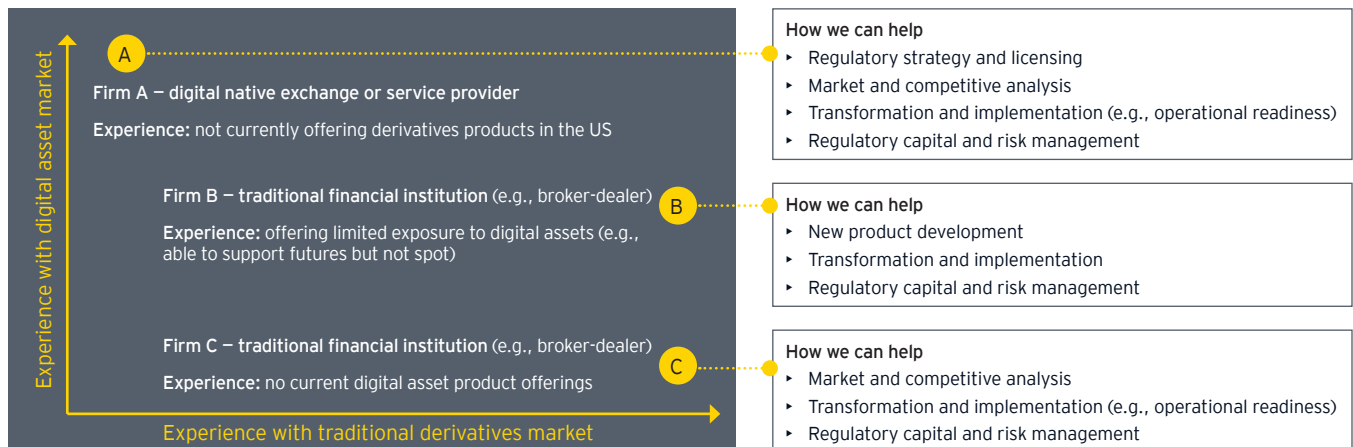


How Ernst & Young LLP (EY US) can help

We already see digital asset derivative products deployed at digital-native and traditional financial institutions to manage risk and create new business opportunities. Firms should develop strategic plans if they hope to take advantage of this burgeoning market, including understanding the ecosystem (e.g., market and competitive analysis, vendor landscape); defining target capabilities and products; determining operational, regulatory, tax and accounting requirements; and identifying unique digital asset risks.

Our team has extensive experience supporting traditional financial institutions as well as digital native firms as they define their product offerings and execute operational readiness activities to enable regulatory registration and licensing (e.g., broker-dealers, FCMs, SEFs). We have a proven track record of helping clients transform and mobilize programs with effective governance that meets regulatory expectations and aligns with the appropriate operating model from a people, process and technology perspective.

How EY US can help firms mobilize regarding asset derivatives



Regulatory strategy

Our banking and capital markets teams have collaborated with leading financial institutions to stand up regulatory horizon scanning capabilities and navigate new and evolving requirements, including identifying upcoming regulatory changes and assessing applicability, conducting traceability assessments for compliance with regulation components (e.g., rules inventory and gap analysis), and developing monitoring and control frameworks to demonstrate compliance (e.g., testing for operational effectiveness).

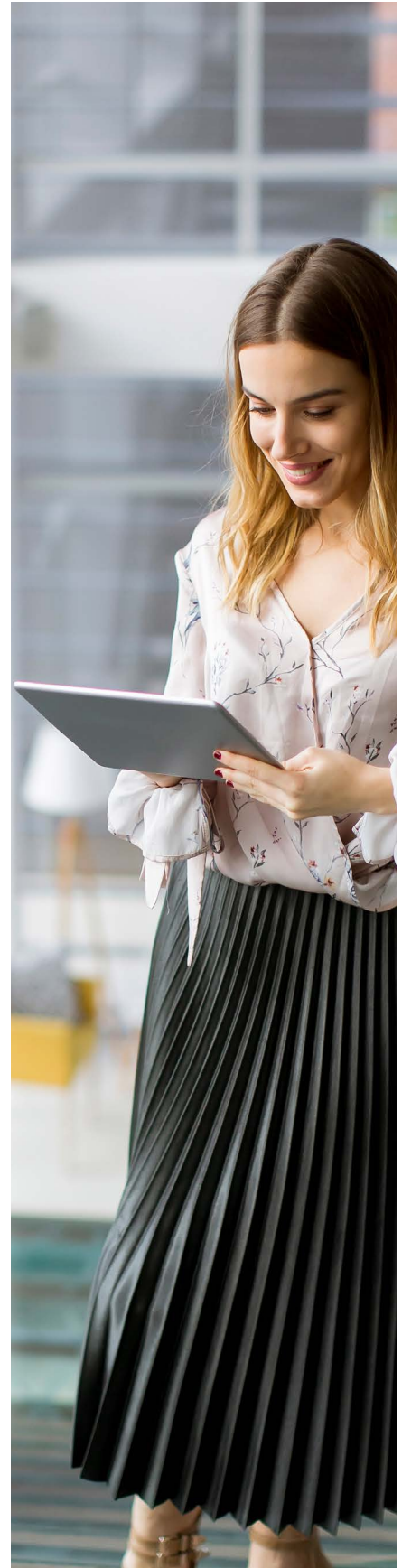
Regulatory landscape – transformation and implementation

We have supported both traditional financial institutions and digital-native firms with the development and implementation of target state operating models, including readiness activities to register with the CFTC and SEC (e.g., development of policies and procedures, requirements, system builds and testing). We have experience with developing and

delivering against implementation roadmaps to simplify clearing and settlement infrastructure and optimize collateral management.

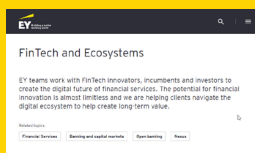
Regulatory capital and risk management

We have been trusted by financial institutions to support regulatory capital compliance in accordance with prudential requirements, as well as initiatives related to market and counterparty credit risk identification, scenario design, measurement, stress testing and reporting. We have advised our clients with rule interpretations and methodology decisions that may drive capital and risk-weighted asset variability, as well as strategic and operational changes affecting front-, middle- and back-office functions (e.g., efficiency of margin and collateral management processes). We have also helped organizations transform their existing model risk management functions to be more efficient and effective, as well as performed independent validation of models and supported the development of process and procedure documentation.

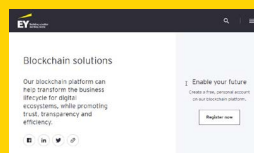


Our teams bridge experience in banking and capital markets with digital transformation and blockchain subject-matter advisors to drive value for our clients.

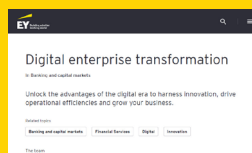
FINTECH AND ECOSYSTEMS



BLOCKCHAIN SOLUTIONS



DIGITAL ENTERPRISE TRANSFORMATION





Glossary

Term	Definition
Future and forward	Agreement to purchase or sell an asset at a specified price at a certain future date. Futures are listed on an exchange; forwards are traded over the counter and can include non-deliverable forwards, which are cash settled.
Option	Contract whereby the option holder can choose to buy or sell – depending on the contract – the underlying asset at a specified price.
Swap	Contract in that one stream of cash flows is exchanged for another. Note that certain regulators (e.g., CFTC) have defined the term “swap” to encompass a wide variety of derivatives products.
Cap	Contract that places an interest rate limit on a variable interest rate (i.e., to place a limit on the highest possible rate a creditor would be required to pay).
Contract for differences (CFD)	Contract in which the investor receives the difference in the settlement price between the open and closing trades.
Perpetual swap	These contracts are similar to a future, but do not settle. Rather, the price of the contract mirrors that of the underlying asset (e.g., bitcoin) and has no fixed maturity.
Synth	Similar to synthetic assets in traditional finance, synths take the form of ERC-20 smart contracts that track and provide returns of another asset without requiring the counterparty to hold or own the underlying asset.
Centralized Finance (CeFi)	Refers to financial institutions (e.g., crypto exchanges, digital asset custodians) that offer access to digital asset products in a similar manner and with a similar level of security as exists for traditional financial products.
Decentralized Finance (DeFi)	Decentralized Finance, DeFi for short, is the term given to decentralized applications (DApps) built on public blockchain infrastructure that facilitate financial transactions.
Fork event	A modification to a blockchain that can either result in the existence of two disparate chains (a hard fork) or the persistence of the original chain with the alteration (a soft fork).



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Endnotes

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