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SECURITIES AND EXCHANGE COMMISSION
[Release No. 34-102440; File No. SR-Phlx-2025-08]

Self-Regulatory Organizations; Nasdaq PHLX LLC; Notice of Filing of Proposed Rule Change to List and Trade Nasdaq Bitcoin Index Options

February 18, 2025.

Pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 ("Act")[1], and Rule 19b-4 thereunder,[2] notice is hereby given that on February 4, 2025, Nasdaq PHLX LLC ("Phlx" or "Exchange") filed with the Securities and Exchange Commission ("SEC" or "Commission") the proposed rule change as described in Items I and II below, which Items have been prepared by the Exchange. The Commission is publishing this notice to solicit comments on the proposed rule change from interested persons.

I. Self-Regulatory Organization's Statement of the Terms of Substance of the Proposed Rule Change

The Exchange proposes to list and trade Nasdaq Bitcoin Index Options,[3] a new index that reflects the price of bitcoin as represented by the CME CF Bitcoin Real Time Index ("BRTI").[4] Options on this new index will be cash-settled, with a European-style exercise, and will be published as BRRNY – NOS "Nasdaq Options Settlement."

The text of the proposed rule change is available on the Exchange's Website at https://listingcenter.nasdaq.com/rulebook/phlx/rules, at the principal office of the Exchange, and at the Commission's Public Reference Room.

II. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

In its filing with the Commission, the Exchange included statements concerning the purpose of and basis for the proposed rule change and discussed any comments it received on the

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1 15 U.S.C. 78s(b)(1).

2 17 CFR 240.19b-4.

3 Nasdaq Bitcoin Index Options will have the ticker symbol "XBTX".

4 The BRTI is a real time price benchmark and is regulated by the UK FCA under EU BMR.

proposed rule change. The text of these statements may be examined at the places specified in Item IV below. The Exchange has prepared summaries, set forth in sections A, B, and C below, of the most significant aspects of such statements.

A. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

1. Purpose

The Exchange proposes to introduce a new index options product, Nasdaq Bitcoin Index Options. This product would enable retail and institutional investors to obtain a precise price for bitcoin. Nasdaq Bitcoin Index Options is represented by the CME CF Bitcoin Real Time Index, a precise spot market source for bitcoin pricing and a leading price benchmark for real time valuations. The CME CF Bitcoin Real Time Index is a Registered Benchmark under EU BMR.[5]

Background

The CME CF Bitcoin Real Time Index ("BRTI") is calculated every second of every day, using the Relevant Order Books[6] of all Constituent Exchanges,[7] thereby aggregating the notional value of bitcoin trading activity across major bitcoin spot platforms. The CF Benchmarks Index is designed based on the IOSCO Principles for Financial Benchmarks.[8] The administrator of the CF Benchmarks Index is CF Benchmarks Ltd. The CF Benchmarks Index serves as a once-a-

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5 Today, the CME CF Bitcoin Reference Rate—New York Variant for the Bitcoin—U.S. Dollar trading pair (the "CF Benchmarks Index") constitutes the index for the following exchange-listed ETF products comprising $58 billion of assets as of July 18, 2024: iShares Bitcoin Trust (IBIT), Grayscale Bitcoin Trust (GBTC), Fidelity Wise Origin Bitcoin Fund (FBTC), ARK 21Shares Bitcoin ETF (ARKB), Bitwise Bitcoin ETF Trust (BUTB), VanEck Bitcoin Trust (HODL), Coinshares Valkyrie Bitcoin Fund (BRRR), Invesco Galaxy Bitcoin ETF (BTCO), Franklin Bitcoin ETF (EZBC). (See https://etfdb.com/index/cme-cf-benchmarks-bitcoin-reference-rate-new-york-variant).

6 Relevant Order Books comprise the universe of the currently unmatched limit orders to buy or sell a unit of the cryptocurrency base asset versus the quote asset on a Constituent Exchange in the Relevant Pair, aggregated by price, that is reported through its API to the Calculation Agent. To assure that the CME CF Cryptocurrency Pricing Products reflect global cryptocurrency trading activity in a representative and unbiased manner, a geographically diverse set of spot trading venues is included within the current framework. At their launch the Indices for any given Relevant Pair shall require input data from no less than two (2) Constituent Exchanges.

7 Constituent Exchanges are cryptocurrency trading venues approved by the CME CF Cryptocurrency Pricing Products Oversight Committee to serve as pricing source for the calculation of a CME CF Cryptocurrency Reference Rate or CME CF Cryptocurrency Real Time Index, collectively known as the CME CF Cryptocurrency Pricing Products. See proposed Options 4D, Section 2(a)(2).

8 See https://www.iosco.org/library/pubdocs/pdf/IOSCOPD589.pdf.

day benchmark rate of the U.S. dollar price of bitcoin (USD/BTC), calculated as of 4:00 p.m. ET. The CF Benchmarks Index aggregates the trade flow of several bitcoin platforms, during an observation window between 3:00 p.m. and 4:00 p.m. ET into the U.S. dollar price of one bitcoin at 4:00 p.m. ET. Specifically, the CF Benchmarks Index is calculated based on the Relevant Transactions of all of its constituent bitcoin platforms, which are currently Bitstamp, Coinbase, itBit, Kraken, Gemini, and LMAX (the "Constituent Platforms"), and which may change from time to time.[9]

A trading venue is eligible as a Constituent Exchange in any of the CME CF Cryptocurrency Pricing Products if it offers a market that facilitates the spot trading of the relevant cryptocurrency base asset against the corresponding quote asset, including markets where the quote asset is made fungible with Accepted Assets (the "Relevant Pair") and makes trade data and order data available through an Automatic Programming Interface ("API") with sufficient reliability, detail and timeliness. Furthermore, it must meet certain criteria.[10] Should the average daily contribution of a Constituent Exchange fall below 3% for any Reference Rate, then the continued inclusion of the venue as a Constituent Exchange to the Relevant Pair shall be assessed by the CME CF Oversight Committee.

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[9] All aspects of the Index Methodology are publicly available at the website of Index Provider, CF Benchmarks. See https://docs.cfbenchmarks.com/CME%20CF%20Real%20Time%20Indices%20Methodology.pdf.

[10] The venue's Relevant Pair spot trading volume for an index must meet the minimum thresholds for it to be admitted as a Constituent Exchange. The average daily volume the venue would have contributed during the observation window for the Reference Rate of the Relevant Pair exceeds 3% for two consecutive calendar quarters. The venue has policies to ensure fair and transparent market conditions at all times and has processes in place to identify and impede illegal, unfair or manipulative trading practices. The venue does not impose undue barriers to entry or restrictions on market participants, and utilizing the venue does not expose market participants to undue credit risk, operational risk, legal risk or other risks. The venue complies with applicable law and regulation, including, but not limited to capital markets regulations, money transmission regulations, client money custody regulations, know-your-client ("KYC") regulations and anti-money laundering regulations. Finally, the venue cooperates with inquiries and investigations of regulators and the Administrator upon request and must execute data sharing agreements with CME Group Once admitted a constituent exchange must demonstrate that it continues to meet the aforementioned criteria.

When calculated, the Relevant Order Book of each Constituent Exchange is added to a joint list of order books,[11] which are aggregated into one consolidated order book. If the size at the bid or ask order price level exceeds the order size cap, it enters the consolidated order book with a size equal to the order size cap. The cumulative bid price-volume curve, ask price-volume curve, mid price-volume curve[12] and mid spread-volume curve are calculated from the consolidated order book at a granularity equal to the spacing parameter.

Using the above notation, the ask price-volume curve is defined as $askPV$, the bid price-volume curve as $bidPV$, the mid-price volume curve as $midPV$, and the mid spread-volume curve as $midSV$, in each case as of the effective time T, as:

$\widehat{askPV}_T(v) = ap_{T,j+1} \text{ where } \sum_{i=1}^{j} \square\, as_{T,i} < v \text{ and } \sum_{i=1}^{j+1} \square\, as_{T,i} \geq v$	Eq. 1a
$\widehat{bidPV}_T(v) = bp_{T,j+1} \text{ where } \sum_{i=1}^{j} \square\, bs_{T,i} < v \text{ and } \sum_{i=1}^{j+1} \square\, bs_{T,i} \geq v$	Eq. 1b
$askPV_T(v) = \widehat{askPV}_T\left(s\left\lfloor\frac{v}{s}\right\rfloor\right)$	Eq. 1c
$bidPV_T(v) = \widehat{bidPV}_T\left(s\left\lfloor\frac{v}{s}\right\rfloor\right)$	Eq. 1d
$midPV_T(v) = \frac{askPV_T(v) + bidPV_T(v)}{2}$	Eq. 1e
$midSV_T(v) = \frac{askPV_T(v)}{midPV_T(v)} - 1$	Eq. 1f

The utilized depth is calculated as the maximum cumulative volume for which the mid spread-volume curve does not exceed a certain percentage deviation from the mid price.[13] If this

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11 An order book is a list of buy and sell orders with associated limit prices and sizes that have not yet been matched due to lack of supply or demand to trade at that price. CME CF Cryptocurrency Real Time Indices are calculated from order book data, as opposed to, for instance, trade data.

12 The mid price-volume curve represents the average of the marginal price at which a certain amount of cryptocurrency can be sold and bought. By averaging across the mid price-volume curve, CME CF Cryptocurrency Real Time Indices represent a blend of such (hypothetical) transactions at various transaction sizes. See https://docs.cfbenchmarks.com/CME%20CF%20Real%20Time%20Indices%20Methodology.pdf.

13 CME CF Cryptocurrency Real Time Indices are calculated from the section of the mid price-volume curve for which ask limit order price levels at a certain depth diverge by no more than a certain percentage from the mid-price at that depth. It therefore reflects a significant portion of the top of the consolidated order book (as opposed to, for instance, the best bid and ask prices only) but discards limit order price levels that are less likely to be matched. This makes it a meaningful representation of true liquidity and robust to local changes in order books. See https://docs.cfbenchmarks.com/CME%20CF%20Real%20Time%20Indices%20Methodology.pdf.

volume is less than the spacing parameter, the utilized depth is set to the spacing parameter. The utilized depth, v , is calculated as:

$\underline{v}_T = max(v_i \text{ where } midSV_T(v_i) \leq D \text{ and } midSV_T(v_{i+1}) > D, s)$	Eq. 2

The mid price-volume curve is weighted by the normalized probability density of the exponential distribution up to the utilized depth. The CME CF Cryptocurrency Real Time Index is then given by the sum of the weighted mid price-volume curve obtained in the previous step.[14] The CME CF Cryptocurrency Real Time Index as of the effective time T, $CCRTI$, is then given by:

$CCRTI_T = \sum_{v \in \{s, 2s, \cdots, \underline{v}_T\}} midPV_T(v) \frac{1}{NF} \lambda e^{-\lambda v}$	Eq. 3

The order size cap is calculated from the uncapped consolidated order book. Using the above notation, the dynamic order size cap is derived as follows:

$ac_T = (ap_{T,i} \leq 1.05 ap_{T,1}\}, (\lvert A_T \rvert, 50))$	Eq. 4a
$bc_T = (bp_{T,i} \geq 0.95 bp_{T,1}\}, (\lvert B_T \rvert, 50))$	Eq. 4b
$S_T = \left[bs_{T,1}, bs_{T,2}, \cdots, bs_{T,bc_T}\right] \cup \left[as_{T,1}, as_{T,2}, \cdots, as_{T,ac_T}\right] S_T = \left[s_{T,1}, s_{T,2}, \cdots, s_{T,n_T}\right] \text{ where } s_{T,1} \leq s_{T,2} \leq \cdots \leq s_{T,n_T}$	Eq. 4c
$k = \lfloor 0.01 n_T \rfloor$	Eq. 4d
$\underline{s} = \frac{1}{n_T - 2k} \sum_{i=k+1}^{n_T - k} s_{T,i}$	Eq. 4e
$s'_{T,i} = s_{T,k+1} \text{ if } i \leq k$ $s'_{T,i} = s_{T,n-k} \text{ if } i > n - k$ $s'_{T,i} = s_{T,i} \text{ otherwise}$	Eq. 4f
$\underline{s}' = \frac{1}{n_T} \sum_{i=1}^{n_T} s'_{T,i}$	Eq. 4g
$\sigma = \sqrt{\frac{1}{n_T - 1} \sum_{i=1}^{n_T} (s'_{T,i} - \underline{s}')}$	Eq. 4h

[14] See the qualitative description of the calculation methodology at https://docs.cfbenchmarks.com/CME%20CF%20Real%20Time%20Indices%20Methodology.pdf.

The order size cap as of the effective time T, C , is then given by:

$C_T = \underline{s} + 5\sigma$	Eq. 5

If the Retrieval Time of the Relevant Order Book of a Constituent Exchange is at least 30 seconds older than the Calculation Time, the Constituent Exchange is disregarded in the calculation of the CME CF Cryptocurrency Real Time Index for that Calculation Time. If the Retrieval Times of the Relevant Order Books of all Constituent Exchanges are each at least 30 seconds older than the Calculation Time, a CME CF Cryptocurrency Real Time Index calculation failure occurs for that Calculation Time. All Relevant Order Books are subject to an automated screening for erroneous data.[15]

Overview of the Bitcoin Industry

Bitcoin is a digital asset that is created and transmitted through the operations of the peer-to-peer bitcoin network, a decentralized network of computers that operates on cryptographic protocols (the "Bitcoin network"). No single entity owns or operates the Bitcoin network, the infrastructure of which is collectively maintained by its user base. The Bitcoin network allows people to exchange tokens of value, called bitcoin, which are recorded on a public transaction ledger known as the Bitcoin blockchain (the "Bitcoin blockchain"). Bitcoin can be used to pay for goods and services, or it can be converted to fiat currencies, such as the U.S. dollar, at rates determined on bitcoin platforms that enable trading in bitcoin or in individual end-user-to-end-user transactions under a barter system.

The Bitcoin network is commonly understood to be decentralized and does not require governmental authorities or financial institution intermediaries to create, transmit or determine

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[15] If the format of a Relevant Order Book: deviates from the expected format such that it cannot be parsed; contains no bid orders or no ask orders; crosses; or contains any entries with a non-numeric or non-positive limit price or size, it is flagged as erroneous. Relevant Order Books flagged as erroneous for a given Calculation Time are disregarded in the calculation of the CME CF Cryptocurrency Real Time Index for that Calculation Time. See https://docs.cfbenchmarks.com/CME%20CF%20Real%20Time%20Indices%20Methodology.pdf.

the value of bitcoin. Rather, bitcoin is created and allocated by the Bitcoin network protocol through a "mining" process. The value of bitcoin is determined by the supply of and demand for bitcoin-on-bitcoin platforms or in private end-user-to-end-user transactions.

New bitcoins are created and rewarded to the miners of a block in the Bitcoin blockchain for verifying transactions. The Bitcoin blockchain is a shared database that includes all blocks that have been solved by miners and it is updated to include new blocks as they are solved. Each bitcoin transaction is broadcast to the Bitcoin network and, when included in a block, recorded in the Bitcoin blockchain. As each new block records outstanding bitcoin transactions, and outstanding transactions are settled and validated through such recording, the Bitcoin blockchain represents a complete, transparent and unbroken history of all transactions of the Bitcoin network.

History of Bitcoin

The Bitcoin network was initially contemplated in a whitepaper that also described bitcoin and the operating software to govern the Bitcoin network. The whitepaper was purportedly authored by Satoshi Nakamoto. However, no individual with that name has been reliably identified as bitcoin's creator, and the general consensus is that the name is likely a pseudonym for the actual inventor or inventors. The first bitcoins were created in 2009 after Nakamoto released the Bitcoin network source code (the software and protocol that created and launched the Bitcoin network). The Bitcoin network has been under active development since that time by a loose group of software developers who have come to be known as core developers.

Overview of Bitcoin Network Operations

In order to own, transfer or use bitcoin directly on the Bitcoin network (as opposed to through an intermediary, such as an exchange), a person generally must have internet access to connect to the Bitcoin network. Bitcoin transactions may be made directly between end-users without the need for a third-party intermediary. To prevent the possibility of double-spending

bitcoin, a user must notify the Bitcoin network of the transaction by broadcasting the transaction data to its network peers. The Bitcoin network provides confirmation against double-spending by memorializing every transaction in the Bitcoin blockchain, which is publicly accessible and transparent. This memorialization and verification against double-spending is accomplished through the Bitcoin network mining process, which adds "blocks" of data, including recent transaction information, to the Bitcoin blockchain.

Overview of Bitcoin Transfers

Prior to engaging in bitcoin transactions directly on the Bitcoin network, a user generally must first install on its computer or mobile device a Bitcoin network software program that will allow the user to generate a private and public key pair associated with a bitcoin address commonly referred to as a "wallet." The Bitcoin network software program and the bitcoin address also enable the user to connect to the Bitcoin network and transfer bitcoin to, and receive bitcoin from, other users.

Each Bitcoin network address, or wallet, is associated with a unique "public key" and "private key" pair. To receive bitcoin, the bitcoin recipient must provide its public key to the party initiating the transfer. This activity is analogous to a recipient for a transaction in U.S. dollars providing a routing address in wire instructions to the payor so that cash may be wired to the recipient's account. The payor approves the transfer to the address provided by the recipient by "signing" a transaction that consists of the recipient's public key with the private key of the address from where the payor is transferring the bitcoin. The recipient, however, does not make public or provide to the sender its related private key.

Neither the recipient nor the sender reveals their private keys in a transaction because the private key authorizes transfer of the funds in that address to other users. Therefore, if a user loses his or her private key, the user may permanently lose access to the bitcoin contained in the associated address. Likewise, bitcoin is irretrievably lost if the private key associated with them is deleted and no backup has been made. When sending bitcoin, a user's Bitcoin network

software program must validate the transaction with the associated private key. The resulting digitally validated transaction is sent by the user's Bitcoin network software program to the Bitcoin network to allow transaction confirmation.

Some bitcoin transactions are conducted "off-blockchain" and are therefore not recorded in the Bitcoin blockchain. Some "off-blockchain transactions" involve the transfer of control over, or ownership of, a specific digital wallet holding bitcoin or the reallocation of ownership of certain bitcoin in a digital wallet containing assets owned by multiple persons, such as a digital wallet maintained by a digital assets platform. In contrast to on-blockchain transactions, which are publicly recorded on the Bitcoin blockchain, information and data regarding off-blockchain transactions are generally not publicly available. Therefore, off-blockchain transactions are not truly bitcoin transactions in that they do not involve the transfer of transaction data on the Bitcoin network and do not reflect a movement of bitcoin between addresses recorded in the Bitcoin blockchain. For these reasons, off-blockchain transactions are subject to risks as any such transfer of bitcoin ownership is not protected by the protocol behind the Bitcoin network or recorded in, and validated through, the blockchain mechanism.

Summary of a Bitcoin Transaction

In a bitcoin transaction directly on the Bitcoin network between two parties (as opposed to through an intermediary, such as a custodian), the following circumstances must initially be in place: (i) the party seeking to send bitcoin must have a Bitcoin network public key, and the Bitcoin network must recognize that public key as having sufficient bitcoin for the transaction; (ii) the receiving party must have a Bitcoin network public key; and (iii) the spending party must have internet access with which to send its spending transaction.

The receiving party must provide the spending party with its public key and allow the Bitcoin blockchain to record the sending of bitcoin to that public key. After the provision of a recipient's Bitcoin network public key, the spending party must enter the address into its Bitcoin network software program along with the number of bitcoin to be sent. The number of bitcoin to

be sent will typically be agreed upon between the two parties based on a set number of bitcoin or an agreed upon conversion of the value of fiat currency to bitcoin. Since every computation on the Bitcoin network requires the payment of bitcoin, including verification and memorialization of bitcoin transfers, there is a transaction fee involved with the transfer, which is based on computation complexity and not on the value of the transfer and is paid by the payor with a fractional number of bitcoin.

After the entry of the Bitcoin network address, the number of bitcoin to be sent and the transaction fees, if any, to be paid, will be transmitted by the spending party. The transmission of the spending transaction results in the creation of a data packet by the spending party's Bitcoin network software program, which is transmitted onto the decentralized Bitcoin network, resulting in the distribution of the information among the software programs of users across the Bitcoin network for eventual inclusion in the Bitcoin blockchain.

As discussed in greater detail below, Bitcoin network miners record transactions when they solve for and add blocks of information to the Bitcoin blockchain. When a miner solves for a block, it creates that block, which includes data relating to (i) the solution to the block, (ii) a reference to the prior block in the Bitcoin blockchain to which the new block is being added and (iii) transactions that have occurred but have not yet been added to the Bitcoin blockchain. The miner becomes aware of outstanding, unrecorded transactions through the data packet transmission and distribution discussed above.

Upon the addition of a block included in the Bitcoin blockchain, the Bitcoin network software program of both the spending party and the receiving party will show confirmation of the transaction on the Bitcoin blockchain and reflect an adjustment to the bitcoin balance in each party's Bitcoin network public key, completing the bitcoin transaction. Once a transaction is confirmed on the Bitcoin blockchain, it is irreversible.

Creation of a New Bitcoin

New bitcoins are created through the mining process. The process by which bitcoin is

"mined" results in new blocks being added to the Bitcoin blockchain and new bitcoin tokens being issued to the miners. Computers on the Bitcoin network engage in a set of prescribed complex mathematical calculations in order to add a block to the Bitcoin blockchain and thereby confirm bitcoin transactions included in that block's data. The Bitcoin network is designed in such a way that the reward for adding new blocks to the Bitcoin blockchain decreases over time. In the future, once new bitcoin tokens are no longer awarded for adding a new block, miners will only have transaction fees to incentivize them, and as a result, it is expected that miners will need to be better compensated with higher transaction fees to ensure that there is adequate incentive for them to continue mining.

Limits on Bitcoin Supply

Under the source code that governs the Bitcoin network, the supply of new bitcoin is mathematically controlled so that the number of bitcoin grows at a limited rate pursuant to a pre-set schedule. The number of bitcoin awarded for solving a new block is automatically halved after every 210,000 blocks are added to the Bitcoin blockchain, approximately every 4 years. The fixed reward for solving a new Bitcoin block is currently 3.125 BTC per block. This amount is the result of the most recent Bitcoin halving event, which occurred in April 2024. The next Bitcoin halving is anticipated in 2028 when Bitcoin will halve to 1.5625. This deliberately controlled rate of bitcoin creation means that the number of bitcoin in existence will increase at a controlled rate until the number of bitcoin in existence reaches the pre-determined 21 million bitcoin. However, the 21 million supply cap could be changed in a hard fork. A hard fork could change the source code to the Bitcoin network, including the 21 million bitcoin supply cap.

Bitcoin as an Underlying for an Index

The proposed product is a cash-settled index option that permits holders to receive U.S. dollars representing the difference between the current bitcoin spot market and the exercise price of the option and would not involve holding physical bitcoin similar to the approved Bitcoin-

Based Commodity-Based Trust Shares and Trust (collectively "Spot Bitcoin ETPs")[16] which entailed the custody of bitcoin assets.

In 2006, Phlx received approval to list and trade foreign currency index options.[17] These foreign currency options are cash-settled, European-styled options issued by The Options Clearing Corporation ("OCC") that permit holders to receive U.S. dollars representing the difference between the current foreign exchange spot price and the exercise price of the option.[18] Further, similar to this proposal, Phlx noted in SR-Phlx-2026-34, its proposal seeking approval for foreign currency options (or "U.S. dollar-settled FCOs"), that "U.S. dollar-settled FCOs would trade in the same general manner as equity index options, which are also U.S. dollar-settled products."[19] The Commission noted in the SR-Phlx-2006-34 approval order that it believed that, "….sufficient venues exist for obtaining reliable information on the Currencies so that investors in U.S. dollar-settled FCOs can monitor the underlying spot market in the Currencies. The Commission also believes that the Phlx's procedures and the competitive nature of the spot market for the [c]urrencies should help to ensure that the settlement values for U.S. dollar-settled FCO contracts will accurately reflect the spot price for foreign currencies…".[20]

Foreign currency options established precedent to list and trade index options overlying an underlying that is not a security, such as proposed herein. Like foreign currency markets, the bitcoin market is liquid and is characterized by a significant degree of volume and turnover. As a result, the Exchange believes that sufficient venues exist to provide investors with ready access

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16 See Securities Exchange Act Release No. 99306 (January 10, 2024), 89 FR 3008 (January 17, 2024) (File Nos. SR-NYSEArca-2021-90; SR-NYSEArca-2023-44; SR-NYSEArca-2023-58; SR-NASDAQ-2023-016; SR-NASDAQ-2023-019; SR-CboeBZX-2023-028; SR-CboeBZX-2023-038; SR-CboeBZX-2023-040; SR-CboeBZX-2023-042; SRCboeBZX-2023-044; and SR-CboeBZX-2023-072) (Order Granting Accelerated Approval of Proposed Rule Changes, as Modified by Amendments Thereto, to List and Trade Bitcoin-Based Commodity-Based Trust Shares and Trust Units) ("Spot Bitcoin ETPs Approval Order").

17 See Securities Exchange Act Release No. 54989 (December 21, 2006), 71 FR 78506 (December 29, 2006) (SR-Phlx-2006-34) (Notice of Filing and Order Granting Accelerated Approval to Proposed Rule Change as Modified by Amendments No. 1, 2, and 3 Thereto Relating to U.S. Dollar-Settled Foreign Currency Options) ("SR-Phlx-2026-34").

18 Id at 78506.

19 Id at 78508.

20 Id at 78510.

to reliable information on the spot market price of bitcoin for purposes of this product.[21] While bitcoin is a novel asset, the requirements of a benchmark price for bitcoin are no different from those required of a benchmark price for any asset.

Final Settlement

The final settlement value for Nasdaq Bitcoin Index Options would be the CME CF Bitcoin Reference Rate - New York Variant (BRRNY) on the expiration date (usually a Friday). BRRNY will be divided by a factor of one hundred (100) to create a new settlement value to arrive at the settlement value for Nasdaq Bitcoin Index Options, which will be published as BRRNY – NOS (Nasdaq Options Settlement). BRRNY is a once-a-day benchmark index price for bitcoin that aggregates trade data from multiple bitcoin-USD markets operated by major cryptocurrency exchanges that conform to the CME CF Constituent Exchange Criteria. It is synchronized to the traditional U.S. financial market close of 1600 New York Time and is calculated every single day of the year. The index is a Registered Benchmark under UK BMR and as such is a Third Country benchmark under the EU BMR Regime.

The BRRNY index is methodologically identical to the regulated CME CF Bitcoin Reference Rate (BRR), the most widely used benchmark price for Bitcoin, that settles the Bitcoin-USD derivatives complex listed by CME Group, and which serves as the NAV for exchange listed investment products from WisdomTree Europe, Evolve ETFs (CAN) and QR Asset Management (BRZ). The only difference between the CME CF BRRNY and the CME CF BRR, is that BRRNY references the price of bitcoin at the closing time of U.S. markets, 16:00 New York Time, rather than the price at 16:00 London Time, referenced by the BRR.

The purpose of BRRNY is to provide a replicable, manipulation-resistant and representative Bitcoin benchmark that synchronizes with the traditional U.S. market close. The CME CF Bitcoin Reference Rate – New York Variant is a regulated Benchmark under the UK

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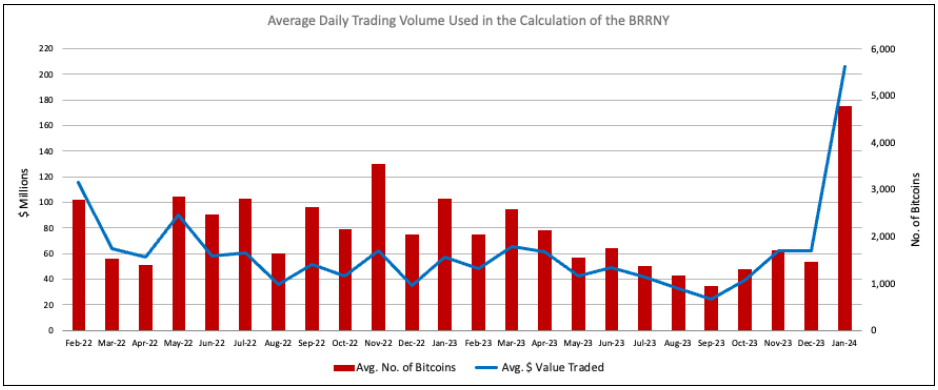
[21] Today, there are regulated bitcoin futures and options on futures derivatives contracts from CME Group and Eurex AG, approved regulated spot FTSE Bitcoin Index futures as well as a variety of other regulated exchange traded products and funds in Canada, Brazil, Hong Kong and Europe.

Benchmarks Regulation (BMR) regime. The BRRNY calculation methodology aggregates transactions of Bitcoins in U.S. dollars that are only conducted on the most liquid markets for which data is publicly available and operated by exchanges that meet the CME CF Constituent Exchange Criteria.[22]

BRRNY is a valid and robust benchmark that is calculated from input data of sufficient volume so that it is representative of the market it seeks to measure. Additionally, BRRNY has volume sufficiency which permits it be replicated by institutional market participants and product providers that need to warehouse price risk. The below table summarizes the total number of transactions and average number of transactions per day observed each month for BRRNY.[23] Between February 28, 2022, and January 31, 2024 (weekdays only), on average 2,116.73 Bitcoins, or $59M were traded during each daily observation window between 15:00 and 16:00 New York Time.[24]



This trading activity exhibits volatility that is not substantially different from that shown in traditional asset markets. The volume observed and the reliability of that volume are clearly evident to be sufficient for the calculation of a robust and reliable benchmark.

Phlx believes that Nasdaq Bitcoin Index Options will be utilized for a wide range of activities such as asset valuation, settlement of financial risk, risk management, NAV

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22 See infra note 25.

23 The data represents both trade count and bitcoin volume during the observation window.

24 BRRNY was launched on February 28, 2022. LMAX Digital was added as a Constituent Exchange from May 2022.

calculation, unit creation and unit redemption. To that end, the index design is fair and transparent. CF Benchmarks exclusively sources input data from Constituent Exchanges that meet published criteria as set out in its Constituent Exchanges Criteria and conducts a thorough review of any exchange under consideration for inclusion as a Constituent Exchange.[25] BRRNY methodology takes an observation period and divides it into equal partitions of time. The volume-weighted median of all transactions within each partition is then calculated. The benchmark index value is determined from the arithmetic mean of the volume-weighted medians, equally weighted. As a result, individual trades of large size have limited effect on the index level as they only influence the level of the volume-weighted median for that specific partition. Further, a cluster of trades in a short period of time will also only influence the volume-weighted median of the partition or partitions they were conducted in, thereby limiting impact. Use of volume-weighted medians as opposed to volume-weighted means ensures that transactions conducted at outlying prices do not have an undue effect on the value of a specific partition. By not volume weighting partitions, trades of large size or clusters of trades over a short period of time will not have an undue influence on the index level. CF Benchmarks applies equal weight to transactions observed from CME CF Constituent Exchanges. With no pre-set weights, the BRRNY index is not readily subject to manipulation. Using the arithmetic mean of partitions of equal weight further denudes the effect of trades of large size at prices that deviate from the prevailing price having undue influence on the benchmark level.[26]

BRRNY's methodology incorporates a procedure for potentially erroneous data. Although volume-weighted medians of transaction prices from individual data sources are not

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[25] The criteria are available at: https://docs.cfbenchmarks.com/CME%20CF%20Constituent%20Exchanges%20Criteria.pdf. The arrangements of all Constituent Exchanges are reviewed annually to ensure that they continue to meet all criteria specified within "Constituent Exchange Criteria." This due diligence is documented, and the information is distributed to CF Benchmarks' oversight organs to consider. The deliberations of oversight organs are conducted during regular meetings, minutes of such meetings are publicly available, being published by the administrator on its website.

[26] See also https://www.cfbenchmarks.com/blog/suitability-analysis-of-the-cme-cf-bitcoin-reference-rate-new-york-variant-as-a-basis-for-regulated-financial-products-february-2024-update.

part of the benchmark determination process, they are calculated as a means of quality control and manipulation resistance. In the event of an instance of index calculation in which a Constituent Exchange's volume-weighted median transaction price exhibits an absolute percentage deviation from the volume-weighted median price of other Constituent Exchange transactions greater than the Potentially Erroneous Data Parameter (10%), then transactions from that Constituent Exchange are deemed potentially erroneous and excluded from the index calculation. All instances of data excluded from a calculation trigger a Benchmark Surveillance Alert that is investigated. By way of example, between February 28, 2022, and January 31, 2024, the Potentially Erroneous Data Parameter of the methodology for the CME CF Bitcoin Reference Rate – New York Variant has never been triggered. Analysis of the max volume-weighted median per exchange during the observation period produced the results in the table. The results illustrate that during the observation period, no Constituent Exchange's input data needed to be excluded due to exhibiting potential manipulation and indeed no individual cryptocurrency exchange exhibits a deviation percentage above 2.41% during this period.

Max in Month	Max volume weighted median deviation per exchange (%)					
	Bitstamp	Coinbase	Gemini	itBit	Kraken	LMAX Digital
Feb-2022	0.04%	0.00%	0.10%	0.06%	0.12%	N/A
Mar-2022	0.47%	0.20%	0.21%	0.45%	0.36%	N/A
Apr-2022	0.31%	0.17%	0.28%	0.32%	0.38%	N/A
May-2022	0.70%	0.45%	0.43%	0.34%	0.55%	0.26%
Jun-2022	0.45%	0.28%	0.33%	0.37%	0.49%	0.43%
Jul-2022	0.36%	0.18%	0.62%	0.93%	0.76%	0.47%
Aug-2022	0.34%	0.25%	0.20%	0.46%	0.37%	0.21%
Sep-2022	0.49%	0.16%	0.23%	0.46%	0.33%	0.16%
Oct-2022	0.21%	0.10%	0.13%	0.15%	0.18%	0.28%
Nov-2022	1.66%	0.59%	0.54%	1.14%	1.38%	0.93%
Dec-2022	0.15%	0.07%	0.57%	0.08%	0.28%	0.09%
Jan-2023	0.21%	0.13%	0.34%	0.17%	0.23%	0.11%
Feb-2023	0.28%	0.14%	0.60%	0.46%	0.77%	0.22%
Mar-2023	0.39%	0.28%	2.41%	0.24%	0.26%	0.22%
Apr-2023	0.25%	0.49%	0.65%	0.28%	0.28%	0.56%
May-2023	0.23%	0.21%	0.29%	0.33%	0.19%	0.29%
Jun-2023	0.39%	0.13%	0.43%	0.30%	0.24%	0.18%
Jul-2023	0.18%	0.11%	0.35%	0.50%	0.20%	0.16%
Aug-2023	0.35%	0.08%	0.60%	0.61%	0.20%	0.14%
Sep-2023	0.66%	0.15%	0.10%	0.18%	0.27%	0.17%
Oct-2023	0.45%	0.12%	0.41%	0.15%	0.39%	0.16%
Nov-2023	0.16%	0.12%	0.21%	0.25%	0.26%	0.40%
Dec-2023	0.33%	0.09%	0.17%	0.16%	0.46%	0.10%
Jan-2024	0.37%	0.28%	0.43%	0.43%	0.36%	0.35%

CF Benchmarks has implemented a benchmark surveillance program for the investigation

of alerts. Instances of suspected benchmark manipulation are escalated through appropriate regulatory channels in accordance with CF Benchmarks' obligations under the UK Benchmarks Regulation (UK BMR). As a regulated Benchmark Administrator, CF Benchmarks is subject to supervision by the UK FCA.[27]

In terms of correlation, an analysis was undertaken of the pair-wise correlation of prices from Constituent Exchanges on a per-minute basis (the price difference between transactions for each minute at each exchange) during the observation period. The results are shown in the below table.

Pairwise Correlation of Constituent Exchanges to BRRNY			
Constituent Pair Platform	Mean Correlation %	Median Correlation %	Standard Deviation
Bitstamp-Coinbase	98.41%	98.98%	1.72%
Bitstamp-Gemini	96.38%	98.23%	5.78%
Bitstamp-itBit	97.62%	98.66%	2.97%
Bitstamp-Kraken	96.72%	98.20%	4.29%
Bitstamp-LMAX Digital*	96.70%	98.03%	4.36%
Coinbase-Gemini	96.25%	98.19%	5.97%
Coinbase-itBit	97.33%	98.55%	3.55%
Coinbase-Kraken	96.43%	98.13%	4.78%
Coinbase-LMAX Digital*	96.65%	98.07%	4.63%
Gemini-itBit	96.44%	98.30%	5.97%
Gemini-Kraken	95.67%	97.83%	6.13%
Gemini-LMAX Digital*	95.16%	97.49%	6.55%
itBit-Kraken	97.51%	98.65%	3.48%
itBit-LMAX Digital*	96.70%	98.17%	4.53%
Kraken-LMAX Digital*	95.85%	97.66%	5.45%

With respect to replicability, a simple replication simulation was thereby conducted of BRRNY to demonstrate the extent of slippage that implementation of the BRR would probably encounter. The methodology was as follows for weekdays only.

- Trades are executed on *n* (6) Constituent Exchanges, during a 3,600-second window.
- One trade is executed every second and the price achieved is assumed to be the last execution price observed in that second. Its associated volume is assumed to be the volume executed during that second.

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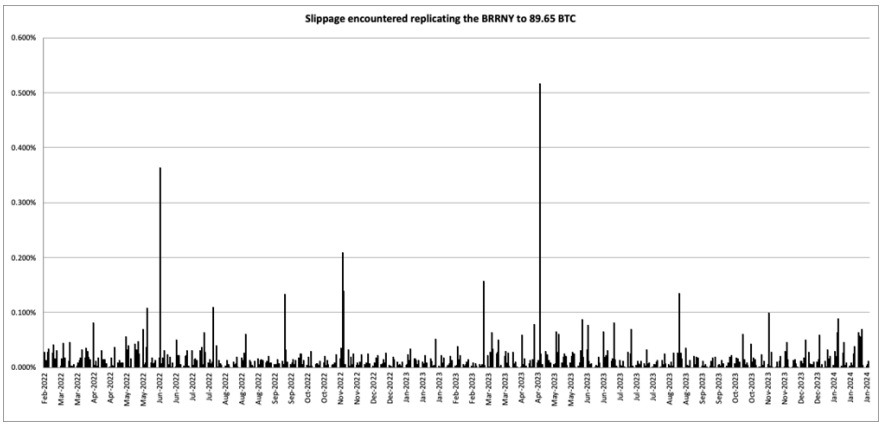
27 Furthermore, CF Benchmarks' Control Procedures with respect to compliance with the UK BMR have been audited by 'Big Four' accountancy firm Deloitte. The Independent Assurance Report on Control Procedures Noted by CF Benchmarks Regarding Compliance with the UK Benchmarks Regulation as of September 12, 2022 is available at: https://docs.cfbenchmarks.com/Deloitte_CF%20Benchmarks%20SOC1%20Audit%20Report.pdf.

▪ If no trade is completed in any single-second period, then the price achieved is assumed to be the price achieved in the previous second, but the associated volume from the previous second is not added to the volume executed in the latest second.

The results of this simulation are displayed below.

Slippage %	
MAX	0.51639%
MIN	0.00006%
MEDIAN	0.01063%
MEAN	0.01895%
STD. DEV.	0.03493%

Summary data for the above simulation is provided below.



As evidenced above, the BRRNY can be replicated with a high degree of confidence and usually with slippage of no more than 1 basis point (0.01%). On only 6.76% of days would slippage have been greater than 5 basis points (0.05%). Indeed, even on the most volatile day, slippage was approximately one half of one percent, 51.6 basis points (0.516%). Furthermore, in the 24-month period under observation slippage would have been in double-digit basis points only 10 times.

As evidenced by the foregoing data, Nasdaq Bitcoin Index Options are representative of the underlying market, resistant to manipulation, and replicable by market participants.

Amendments to Exchange Rules

The proposal is designed to ensure that Nasdaq Bitcoin Index Options are listed and traded under the same terms that apply to other index options that are currently traded on the

Exchange. The Exchange proposes to create a new Options 4D, titled "Nasdaq Bitcoin Index Options," with rules that would apply specifically to the listing and trading of Nasdaq Bitcoin Index Options.

Applicability

The proposed Options 4D Rules would be applicable to Nasdaq Bitcoin Index Options. All Options Rules shall apply to Nasdaq Bitcoin Index Options, in addition to the Options 4D Rules, however where the Options 4D Rules disagree with another Options Rule not within Options 4D a conflict shall be resolved in favor of the Options 4D Rule as it applies to Nasdaq Bitcoin Index Options.[28]

Definitions

The Exchange proposes to define certain terms for the trading of Nasdaq Bitcoin Index Options in Options 4D, Section 2, titled "Definitions." The Exchange proposes to utilize certain defined terms in Options 4A, Section 1, such as "aggregate exercise price," "current index value," "exercise price," "European-style index option," "index multiplier," and "reporting authority."

Specifically, the term "aggregate exercise price" shall be as defined within Options 4A, Section 2(a).[29] The term "current index value" shall be as defined within Options 4A, Section 2(e).[30] The term "exercise price" shall be as defined within Options 4A, Section 2(f).[31] The term "European-style index option" shall be as defined within Options 4A, Section 2(g).[32] The term "index multiplier" shall be as defined within Options 4A, Section 2(i).[33] Finally, the term "reporting authority" shall be as defined within Options 4A, Section 2(o).[34]

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[28] See proposed Options 4D, Section 1.

[29] See proposed Options 4D, Section 2(a)(1).

[30] See proposed Options 4D, Section 2(a)(2).

[31] See proposed Options 4D, Section 2(a)(3).

[32] See proposed Options 4D, Section 2(a)(4).

[33] See proposed Options 4D, Section 2(a)(5).

[34] See proposed Options 4D, Section 2(a)(6).

The Exchange proposes to adopt a new term, "Constituent Exchange," in Options 4D, Section 2(a)(2) which shall be defined as a cryptocurrency trading venue approved by the CME CF Cryptocurrency Pricing Products Oversight Committee to serve as pricing source for the calculation of a CME CF Cryptocurrency Reference Rate-New York Variant or CME CF Cryptocurrency Real Time Index, collectively known as the CME CF Cryptocurrency Pricing Products.[35] The Exchange proposes to define the term "underlying" at proposed Options 4D, Section 2(a)(7) with respect to Nasdaq Bitcoin Index Options to mean the bitcoin that is the basis for the calculation of the index. The Exchange notes that the term "unit of foreign currency" is defined at Options 4C, Section 2(b)(4) and also does not refer to a security for the listing of index options on foreign currencies.

The Exchange also proposes to note in Supplementary Material .01 to Options 4C, Section 2 that CF Benchmarks shall be the reporting authority for Nasdaq Bitcoin Index Options.

Trading Sessions

Options 4D, Section 3, titled "Trading Sessions," notes that Nasdaq Bitcoin Index Options may be effected on the Exchange between the hours of 9:30 a.m. (Eastern time) and 4:15 p.m. (Eastern time), except that on the last trading day, transactions in expiring in Nasdaq Bitcoin Index Options may be effected on the Exchange between the hours of 9:30 a.m. (Eastern time) and 4:00 p.m. (Eastern time). As is the case for all index options listed on Phlx, General 3, Rule 1030 governs the days the Exchange will be open for business.[36] These hours are consistent with trading hours for index options listed on Phlx.

Designation of an Index

Unlike other index options, Nasdaq Bitcoin Index Options need not meet the requirements of Options 4, Section 3 or Options 4A, Section 3.[37] The Exchange does not

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[35] Of note, Nasdaq Bitcoin Index Options will have an aggregated price derived from Constituent Exchanges, whereas broad-based indices have components.

[36] See proposed Options 4D, Section 3(a).

[37] See proposed Options 4D, Section 4.

propose to designate Nasdaq Bitcoin Index Options as a broad based, narrow based or sector index. Of note, index options on foreign currencies are also not designated as a broad based, narrow based or sector index.

Minimum Increments

As proposed, Nasdaq Bitcoin Index Options would have a minimum increment of $0.01 for all series.[38] Similar to the Nasdaq 100 Micro Index ("XND") that are based on 1/100th of the value of the Nasdaq-100 Index, the Exchange proposes this increment given the 1/100th relationship to the BRRNY. Nasdaq Bitcoin Index Options would be quoted and traded in U.S. dollars.[39]

Position and Exercise Limits

Generally, Options 9, Section 13 shall govern position limits for Nasdaq Bitcoin Index Options, except as modified by this Options 4D, Section 6. Position Limits for Nasdaq Bitcoin Index Options shall be equal to 250,000 contracts on the same side of the market, restricted to no more than 150,000 near-term contracts.[40] All position limit hedge exemptions applicable to broad-based index options would also apply to Nasdaq Bitcoin Index Options. Nasdaq Bitcoin Index Options contracts would not be aggregated with options contracts. Nasdaq Bitcoin Index Options positions in Short Term Option Series, Monthly Options Series, and Quarterly Options Series shall be aggregated.[41] The proposed position limits are similar to those applied to broad-based index options.

Each member or member organization that maintains a position on the same side of the market in excess of 100,000 contracts for its own account or for the account of a customer in excess of 100,000 contracts for its own account or for the account of a customer in Nasdaq

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38 See proposed Supplementary Material .06 to Options 3, Section 3.

39 Phlx Options 4A, Section 12(a)(1) titled "Meaning of Premium Bids and Offers," provides that bids and offers shall be expressed in terms of dollars and decimal equivalents of dollars per unit of the index (e.g., a bid of 85.50 would represent a bid of $85.50 per unit).

40 See proposed Options 4D, Section 6(a).

41 See proposed Options 4D, Section 6(b).

Bitcoin Index Options, would be required to file a report with the Exchange that includes, but is not limited to, data related to the option positions, whether such positions are hedged and if applicable, a description of the hedge and information concerning collateral used to carry the positions. Market Makers would be exempt from this reporting requirement.[42] Finally, exercise limits for index option contracts on Nasdaq Bitcoin Index Options shall be equivalent to the position limits described in Options 4D, Section 6.[43] Nasdaq Bitcoin Index Options are cash-settled.

Terms of Index Options Contracts

As noted herein, the Exchange proposes to provide for the listing and trading of Nasdaq Bitcoin Index Options, a new index that reflects the price of bitcoin as represented by the CME CF Bitcoin Real Time Index, a once a second benchmark index price for bitcoin that aggregates order data from Bitcoin-USD markets operated by major cryptocurrency exchanges that conform to the CME CF Constituent Exchange Criteria.

Similar to other index options at Options 4A, Section 12(a)(1), bids and offers on Nasdaq Bitcoin Index Options would be expressed in terms of dollars and cents per unit of the index.[44] The Exchange shall determine fixed-point intervals of exercise prices for call and put options.[45]

As proposed, strike price intervals of no less than $2.50 are generally permitted for Nasdaq Bitcoin Index Options, if the strike price is less than $200. This is the case today for XND, which is based on 1/100th of the value of the Nasdaq-100 Index.[46] Similar to XND, the Exchange may also determine to list strike prices at $1 or greater, subject to certain conditions. The Exchange may list series at $1 or greater strike price intervals for Nasdaq Bitcoin Index Options and will list at least two strike prices above and two strike prices below the current value

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42 See proposed Options 4D, Section 6(c).

43 See proposed Options 4D, Section 6(d).

44 See proposed Options 4D, Section 7(a)(1).

45 See proposed Options 4D, Section 7(a)(2).

46 See proposed Options 4D, Section 7(a)(3).

of the Nasdaq Bitcoin Index Options at about the time a series is opened for trading on the Exchange. The Exchange shall list strike prices for Nasdaq Bitcoin Index Options that are within 5 points from the closing value of Nasdaq Bitcoin Index Options on the preceding day.[47]

Additional series of the same class of Nasdaq Bitcoin Index Options may be opened for trading on the Exchange when the Exchange deems it necessary to maintain an orderly market, to meet customer demand or when the underlying Nasdaq Bitcoin Index Options moves substantially from the initial exercise price or prices. To the extent that any additional strike prices are listed by the Exchange, such additional strike prices shall be within thirty percent (30%) above or below the closing value of Nasdaq Bitcoin Index Options. The Exchange may also open additional strike prices that are more than 30% above or below the current Nasdaq Bitcoin Index Options value provided that demonstrated customer interest exists for such series, as expressed by institutional, corporate or individual customers or their brokers. Market-Makers trading for their own account shall not be considered when determining customer interest under this provision. In addition to the initial listed series, the Exchange may list up to sixty (60) additional series per expiration month for each series in Nasdaq Bitcoin Index Options.[48]

The Exchange shall not list LEAPS on Nasdaq Bitcoin Index Options Nasdaq Bitcoin Index Options at intervals less than $5.[49]

With respect to delisting, Nasdaq Bitcoin Index Options added pursuant Options 4D, Section 7(a)(3)(A) and (B) will be reviewed by the Exchange on a monthly basis. The Exchange will review series that are outside a range of five (5) strikes above and five (5) strikes below the current value Nasdaq Bitcoin Index Options, and delist series with no open interest in both the put and the call series having a: (i) strike higher than the highest strike price with open interest in the put and/or call series for a given expiration month; and (ii) strike lower than the lowest strike

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47 See proposed Options 4D, Section 7(a)(3)(A).

48 See proposed Options 4D, Section 7(a)(3)(B).

49 See proposed Options 4D, Section 7(a)(3)(C).

price with open interest in the put and/or call series for a given expiration month.[50] Notwithstanding this delisting policy, customer requests to add strikes and/or maintain strikes in Nasdaq Bitcoin Index Options series eligible for delisting shall be granted.[51] If the Exchange identifies series for delisting, the Exchange shall notify other options exchanges with similar delisting policies regarding eligible series for delisting, and shall work with such other exchanges to develop a uniform list of series to be delisted, so as to ensure uniform series delisting of multiply listed Nasdaq Bitcoin Index Options.[52]

Notwithstanding any other provision regarding strike prices in Options 4D, Section 6, non-Short Term Options that are on Nasdaq Bitcoin Index Options that have been selected to participate in the Short Term Option Series Program (referred to as a "Related non-Short Term Option series") shall be opened during the month prior to expiration of such Related non-Short Term Option series in the same manner as permitted in Supplementary .01 of Options 4D, Section 6 and in the same strike price intervals that are permitted in Supplementary .01 of Options 4D, Section 6.[53] The Exchange proposes to adopt the same strike price intervals for Nasdaq Bitcoin Index Options as are listed for XND options on Phlx at Supplementary Material .02 to Options 4A, Section 12.

As is the case for index options at Options 4A, Section 12(a)(4), the Exchange proposes to state that Nasdaq Bitcoin Index Options contracts may expire at three (3)-month intervals, in consecutive weeks or in consecutive months. The Exchange may list: (i) up to six (6) standard monthly expirations at any one time in a class of Nasdaq Bitcoin Index Options, but will not list Nasdaq Bitcoin Index Options that expire more than twelve (12) months out.[54]

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50 See proposed Options 4D, Section 7(a)(3)(D).

51 See proposed Options 4D, Section 7(a)(3)(D)(1).

52 See proposed Options 4D, Section 7(a)(3)(D)(2).

53 See proposed Options 4D, Section 7(a)(3)(E).

54 See proposed Options 4D, Section 7(a)(4).

Nasdaq Bitcoin Index Options would be European-style index options.[55]

Nasdaq Bitcoin Index options would be P.M.-settled and the exercise settlement value would be derived from closing prices on the expiration day. The last day of trading for P.M.-settled index options would be the business day of expiration, or, in the case of a Nasdaq Bitcoin Index Options contract expiring on a day that is not a business day, on the last business day before its expiration date. The current index value at expiration of Nasdaq Bitcoin Index Options is determined by the last reported sale price of each component. In the event that the underlying does not open for trading on the expiration date, the price of Nasdaq Bitcoin Index Options shall be the last reported sale price prior to the expiration date.[56] The Exchange believes that market participants, and in particular, retail investors, prefer P.M.-settled index options. P.M.-settlement is preferred by retail investors as it allows market participants to hedge their exposure for the full week. A.M.-settled options by contrast are based on opening prices on the day of expiration and therefore stop trading on the day prior, leaving residual risk on the day of expiration. P.M.-settlement is needed to garner retail investor support for this product.

Similar to index options at Options 4A, Section 12(b), after a particular class of Nasdaq Bitcoin Index Options has been approved for listing and trading on the Exchange, the Exchange shall from time to time open for trading series of options therein. Within each approved class of Nasdaq Bitcoin Index Options, the Exchange shall open for trading a minimum of one expiration month and series for each class of approved Nasdaq Bitcoin Index Options and may also open for trading series of options having not less than twelve and up to 60 months to expiration ("Long-Term Index Options Series").[57] Prior to the opening of trading in any series of Nasdaq Bitcoin Index Options, the Exchange shall fix the expiration month and exercise price of option contracts included in each such series.[58]

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55 See proposed Options 4D, Section 7(a)(5).

56 See proposed Options 4D, Section 7(a)(6).

57 See proposed Options 4D, Section 7(b)(2).

58 See proposed Options 4D, Section 7(b).

Also, similar to index options at Options 4A, Section 12(b)(1), additional series of Nasdaq Bitcoin Index Options of the same class may be opened for trading on the Exchange when the Exchange deems it necessary to maintain an orderly market, to meet customer demand or when the market price of the underlying index moves more than five strike prices from the initial exercise price or prices. The opening of a new series of options shall not affect the series of options of the same class previously opened. New series of Nasdaq Bitcoin Index Options may be added until the beginning of the month in which the options contract will expire. Due to unusual market conditions, the Exchange, in its discretion, may add a new series of Nasdaq Bitcoin Index Options until the fourth business day prior to the business day of expiration, or, in the case of Nasdaq Bitcoin Index Options contract expiring on a day that is not a business day, up to the fifth business day prior to expiration.[59]

The Exchange would also list Long-Term Option Series or "LEAPs." Similar to index options at Options 4A, Section 12(b)(2), the Exchange proposes that it may list LEAPs on Nasdaq Bitcoin Index Options that expire from twelve (12) to sixty (60) months from the date of issuance. There may be up to ten (10) expiration months, none further out than sixty (60) months. Strike price intervals and continuity Rules shall not apply to such options series until the time to expiration is less than twelve (12) months. Bid/ask differentials for LEAPs are specified within Options 2, Section 4(b)(4)(i)(A).[60] Also similar to index options at Options 4A, Section 12(b)(1), when new Nasdaq Bitcoin Index Options LEAPs are listed, such series would be opened for trading either when there is buying or selling interest, or forty (40) minutes prior to the close, whichever occurs first. No quotations would be posted for such options series until they are opened for trading.[61]

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59 See proposed Options 4D, Section 7(b)(1).

60 See proposed Options 4D, Section 7(b)(2)(a).

61 See proposed Options 4D, Section 7(b)(2)(a)(i).

Similar to index options at Options 4A, Section 12(d), the reported level of the underlying index that is calculated by the reporting authority for purposes of determining the current index value at the expiration of Nasdaq Bitcoin Index Options may differ from the level of the index that is separately calculated and reported by the reporting authority and that reflects trading activity subsequent to the opening of trading in the underlying.[62]

The Exchange proposes to note in Supplementary .01 to Options 4D, Section 7 that the Short Term Options Series Program listing rules at Options 4A, Section 12(b)(4) shall be applicable to Nasdaq Bitcoin Index Options. The Monthly Options Series Program at Options 4A, Section 12(b)(5) shall be applicable to Nasdaq Bitcoin Index Options. Finally, the Quarterly Options Series Program at Options 4A, Section 12(b)(3) shall be applicable to Nasdaq Bitcoin Index Options. These listing rules shall be applicable to an underlying as defined in proposed Options 4D, Section 2(a)(7).

The Exchange proposes to describe the settlement of Nasdaq Bitcoin Index Options in Options 4D, Section 9, titled "Closing Settlement Value." Nasdaq Bitcoin Index Options would be settled in U.S. dollars on the business day following expiration. Cash settlement would be equal to the difference between the final settlement value and the strike price of the contract multiplied by $100.[63]

The Nasdaq Bitcoin Index Options final settlement value would be the CME CF Bitcoin Reference Rate - New York Variant (BRRNY) on the expiration date (usually a Friday). BRRNY would be divided by a factor of one hundred (100) and published as BRRNY – NOS (Nasdaq Options Settlement). Nasdaq Bitcoin Index Options will have a multiplier of $100.[64] As noted herein, BRRNY is a once-a-day benchmark index price for bitcoin that aggregates trade data from multiple bitcoin-USD markets operated by major cryptocurrency exchanges that

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62 See proposed Options 4D, Section 7(c).

63 See proposed Options 4D, Section 8(a).

64 By way of example, if the bitcoin index if 576.97, with a $100 multiplier the notional value would be $57,697.00.

conform to the CME CF Constituent Exchange Criteria. This index price for bitcoin risk settlement is synchronized to the traditional U.S. financial market close of 1600 New York Time and is calculated every single day of the year. BRRNY is a benchmark registered under UK Benchmark Regulations and as such is a third country benchmark under the EU BMR Regime. Specifically, the BRRNY is calculated based on the Relevant Transactions. Relevant Transactions include those that trade bitcoin versus U.S. Dollars that occur from 15:00 to 16:00 New York Time on a CME CF Constituent Exchange that is reported through its API to the Calculation Agent of all CME CF Constituent Exchanges.[65]

Settlement is calculated by combining all Relevant Transactions on a joint list and recording the trade price and size for each transaction. That list is partitioned into a number of equally-sized time intervals, of 5 minutes. For each partition[66] separately, the volume-weighted median[67] trade price is calculated from the trade prices and sizes of all Relevant Transactions, i.e. across all Constituent Exchanges.[68] A volume-weighted median differs from a standard median in that a weighting factor, in this case trade size, is factored into the calculation.[69] For each partition k, the volume-weighted median trade prices WM across all Relevant Transactions is calculated as:

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65 See proposed Options 4D, Section 8(b).

66 CME CF Cryptocurrency Reference Rates are calculated as the equally-weighted average of the intermediate calculation steps for the K partitions. A single large trade or cluster of trades occurring in any one partition will therefore only have a limited effect on CME CF Cryptocurrency Reference Rates. See https://www.cfbenchmarks.com/data/indices/BRRNY.

67 Spot prices have historically varied considerably across trading venues, in particular during times of high volatility. The use of medians to calculate the weighted median trade price for each partition (as opposed to averages) greatly reduces CME CF Cryptocurrency Reference Rates' susceptibility to price extremes on one or more Constituent Exchanges. See https://www.cfbenchmarks.com/data/indices/BRRNY. Trading is driven to some extent by automated algorithms that may execute a high number of small trades. The use of volume-weighted medians to calculate the weighted median trade price for each partition (as opposed to simple medians) assures that CME CF Cryptocurrency Reference Rates appropriately reflect large trades and that whether an order is executed in parts or in full has no effect on calculation results.

68 Partitions are equally-weighted (as opposed to volume-weighted) to facilitate replication of CME CF Cryptocurrency Reference Rates through trading on Constituent Exchanges. Assuming K partitions, a trader aiming to transact Y units of the relevant cryptocurrency at the CME CF Cryptocurrency Reference Rates can do so with little tracking error by transacting Y/K units of the cryptocurrency during each partition. See https://www.cfbenchmarks.com/data/indices/BRRNY.

69 See proposed Options 4D, Section 8(b).

$$WM_k = p_{k,j} \text{ where } j \text{ satisfies } \sum_{i=1}^{j-1} s_{k,i} < \frac{1}{2}\sum_{i=1}^{I_k} s_{k,i} \text{ and } \sum_{i=j+1}^{I_k} s_{k,i} \leq \frac{1}{2}\sum_{i=1}^{I_k} s_{k,i}$$

$$\text{If } s_{k,1} \geq \frac{1}{2}\sum_{i=1}^{I_k} s_{k,i} \text{ then } WM_k = p_{k,1}$$

$$\text{If } \sum_{i=j+1}^{I_k} s_{k,i} = \frac{1}{2}\sum_{i=1}^{I_k} s_{k,i}, \text{ then } WM_k = \frac{p_{k,j} + p_{k,j+1}}{2} \qquad \text{Eq. 1}$$

The CME CF BRRNY is then given by the equally weighted average of the volume-weighted medians of all partitions.[70] The CME CF Cryptocurrency Reference Rate as of the effective time T, $CCRR$, is then given by:

$$CCRR_T = \frac{1}{K}\sum_{k=1}^{K} WM_k \qquad \text{Eq. 2}$$

Delayed data and missing data are subject to certain rules. Any Relevant Transaction for a given Calculation Day that is not available from a Constituent Exchange's API by the Retrieval Time is disregarded in the calculation of the CME CF Cryptocurrency Reference Rate for that Calculation Day. If no Relevant Transaction occurs on a Constituent Exchange on a given Calculation Day or one or more Relevant Transactions occur but for any reason cannot be retrieved by the Calculation Agent, the Constituent Exchange is disregarded in the calculation of the CME CF Cryptocurrency Reference Rate for that Calculation Day. If, for any of the K partitions of the TWAP Period, no Relevant Transaction occurs on any Constituent Exchange or one or more Relevant Transactions occur but for any reason cannot be retrieved by the Calculation Agent, the partition remains empty and will be disregarded in the calculation of the CME CF Cryptocurrency Reference Rate for that Calculation Day. The denominator in Eq. 2 above will then be decremented by the number of empty partitions. If one or more Relevant

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70 See proposed Options 4D, Section 8(b).

Transactions occur but for any reason no Relevant Transaction can be retrieved from any Constituent Exchange API by the Calculation Agent, a CME CF Cryptocurrency Reference Rate calculation failure occurs for that Calculation Day. All Relevant Transactions retrieved by the Calculation Agent for a given Calculation Day are subject to an automated screening for erroneous data.[71]

Similar to other index options,[72] neither the Exchange, nor any agent of the Exchange would have any liability for damages, claims, losses or expenses caused by any errors, omissions, or delays in calculating or disseminating the current settlement value or the closing settlement value resulting from an act, condition, or cause beyond the reasonable control of the Exchange including but not limited to, an act of God; fire; flood; extraordinary weather conditions; war; insurrection; riot; strike; accident; action of government; communications or power failure; equipment or software malfunction; any error, omission, or delay in the reports of transactions in one or more underlying currencies or any error, omission or delay in the reports of the current settlement value or the closing settlement value by the Exchange.[73] The Exchange shall post the closing settlement value BRRNY – NOS (Nasdaq Options Settlement) on its website or disseminate it through one or more major market data vendors.[74]

The Exchange proposes to adopt "Disclaimers" at Options 4D, Section 9. As noted herein, CF Benchmarks shall be the reporting authority for Nasdaq Bitcoin Index Options.[75] Other options markets provide similar disclaimers for the reporting authority.[76]

The Exchange proposes to provide at Options 4D, Section 9 that no reporting authority, and no affiliate of a reporting authority (each such reporting authority, its affiliates, and any

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71 See https://docs.cfbenchmarks.com/CME%20CF%20Reference%20Rates%20Methodology.pdf.

72 See Options 4A, Sections 20 and 21.

73 See proposed Options 4D, Section 8(c).

74 See proposed Options 4D, Section 8(d).

75 See proposed Supplementary Material to Options 4C, Section 2.

76 See Nasdaq ISE, LLC Options 4A, Section 14.

other entity identified in Options 4D, Section 9 are referred to collectively as a "Reporting Authority"), makes any warranty, express or implied, as to the results to be obtained by any person or entity from the use of an index it publishes, any opening, intra-day or closing value therefor, or any data included therein or relating thereto, in connection with the trading of any options contract based thereon or for any other purpose. The Reporting Authority shall obtain information for inclusion in, or for use in the calculation of, such index from sources it believes to be reliable, but the Reporting Authority does not guarantee the accuracy or completeness of such index, any opening, intra-day or closing value therefor, or any date included therein or related thereto. The Reporting Authority hereby disclaims all warranties of merchantability or fitness for a particular purpose or use with respect to such index, any opening, intra-day, or closing value therefor, any data included therein or relating thereto, or any options contract based thereon. The Reporting Authority shall have no liability for any damages, claims, losses (including any indirect or consequential losses), expenses, or delays, whether direct or indirect, foreseen or unforeseen, suffered by any person arising out of any circumstance or occurrence relating to the person's use of such index, any opening, intra-day or closing value therefor, any data included therein or relating thereto, or any options contract based thereon, or arising out of any errors or delays in calculating or disseminating such index.

Margin

The Exchange proposes to apply margin requirements for the purchase and sale of Nasdaq Bitcoin Index Options that are identical to those applied for its broad-based index options. Therefore, purchases of puts or calls with 9 months or less until expiration must be paid for in full. Writers of uncovered puts or calls must deposit / maintain 100% of the option proceeds plus 15% of the underlying index value less out-of-the-money amount, if any, to a minimum of option proceeds plus 10% of underlying index value for calls; 10% of the put exercise price for puts.

Regulatory Rules

The trading of Nasdaq Bitcoin Index Options would be subject to the same rules that presently govern the trading of index options on Phlx, including sales practice rules and trading rules. Options 10, Section 6, "Opening of Accounts," is designed to protect public customer trading and shall apply to trading in Nasdaq Bitcoin Index Options. Specifically, Options 10, Section 6(a) prohibits members and member organizations from accepting a customer order to purchase or write an option, including Nasdaq Bitcoin Index Options, unless such customer's account has been approved in writing by an Options Principal. Additionally, Phlx Options 10, Section 8, "Suitability of Recommendations," is designed to ensure that options, including Nasdaq Bitcoin Index Options, are only sold to customers capable of evaluating and bearing the risks associated with trading in this instrument. Further, Phlx Options 10, Section 9, "Discretionary Accounts," permits members and member organizations to exercise discretionary power with respect to trading options, including Nasdaq Bitcoin Index Options, in a customer's account only if the customer has given prior written authorization and the account has been accepted in writing by a Registered Options Principal. Phlx Options 10, Section 9 also requires a record to be made of every option transaction for an account in respect to which a member or member organization or a partner, officer or employee of a member organization is vested with any discretionary authority, such record to include the name of the customer, the designation, number of contracts and premium of the option contracts, the date and time when such transaction took place and clearly reflecting the fact that discretionary authority was exercised. Finally, Phlx Options 10, Section 7, "Supervision of Accounts," Phlx Options 10, Section 10, "Confirmations to Customers," and Phlx Options 10, Section 13, "Delivery of Options Disclosure Documents and Prospectus," will also apply to trading in Nasdaq Bitcoin Index Options.

The trading of Nasdaq Bitcoin Index Options will be subject to the trading halt procedures applicable to other index options traded on the Exchange.[77]

The Exchange believes that all Phlx and OCC members will be able to accommodate trading, clearance and settlement of Nasdaq Bitcoin Index Options without alteration.

Surveillance

In 2024, the Commission approved various rule changes to list and trade Spot Bitcoin ETPs.[78] The Commission noted in the Spot Bitcoin ETPs Approval Order that, "…one way an exchange that lists bitcoin-based exchange-traded products ("ETPs") can meet the obligation under Exchange Act Section 6(b)(5) that its rules be designed to prevent fraudulent and manipulative acts and practices is by demonstrating that the exchange has a comprehensive surveillance-sharing agreement with a regulated market of significant size related to the underlying or reference bitcoin assets. Such an agreement would assist in detecting and deterring fraud and manipulation related to that underlying asset." The Commission has recognized that the "regulated market of significant size" standard is not the only means for satisfying Section 6(b)(5) of the Act, specifically providing that a listing exchange could demonstrate that "other means to prevent fraudulent and manipulative acts and practices" are sufficient to justify dispensing with the requisite surveillance-sharing agreement.[79] For example, in approving the Spot Bitcoin ETPs, the Commission found that there were "sufficient 'other means' of preventing fraud and manipulation," including that:

> [B]ased on the record before the Commission and the improved quality of the correlation analysis in the record, including the Commission's own analysis, the Commission is able to conclude that fraud or manipulation that impacts prices in spot bitcoin markets would likely similarly impact CME bitcoin futures prices.

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77 Phlx Options 4A, Section 18(c), Trading Rotations, Halts or Reopenings.

78 See supra note 16.

79 See Securities Exchange Act Release No. 83723 (July 26, 2018), 83 FR 37579 at 37580 (August 1, 2018) (the "Winklevoss Order"). The Commission has also specifically noted that it "is not applying a 'cannot be manipulated' standard; instead, the Commission is examining whether the proposal meets the requirements of the Exchange Act and, pursuant to its Rules of Practice, places the burden on the listing exchange to demonstrate the validity of its contentions and to establish that the requirements of the Exchange Act have been met." See Winklevoss Order, 83 FR at 37582.

> And because the CME's surveillance can assist in detecting those impacts on CME bitcoin futures prices, the Exchanges' comprehensive surveillance-sharing agreement with the CME—a U.S. regulated market whose bitcoin futures market is consistently highly correlated to spot bitcoin, albeit not of "significant size" related to spot bitcoin—can be reasonably expected to assist in surveilling for fraudulent and manipulative acts and practices in the specific context of the [Spot Bitcoin ETPs].[80]

As described in the Spot Bitcoin ETPs Approval Order, there is currently a regulated U.S. market with respect to spot bitcoin, the CME bitcoin futures ("Bitcoin Futures") market.[81] In its Spot Bitcoin ETPs Approval Order, the Commission found there was a high price correlation between the underlying and the futures market.[82] The proposed Nasdaq Bitcoin Index Options and the various Spot Bitcoin ETPs reference the same underlying market for spot bitcoin that trade on spot bitcoin trading platforms.

Specifically, the Exchange has a comprehensive surveillance-sharing agreement with the CME via its common membership in ISG, which facilitates the sharing of information that is available to the CME through its surveillance of its markets, including its surveillance of the Bitcoin Futures market. Similar to the Spot Bitcoin ETPs previously approved by the SEC, Nasdaq's ability to obtain information regarding trading in the Bitcoin Futures market from other markets that are members of the ISG (specifically the CME) would assist Nasdaq in detecting and deterring misconduct.

Further, the exchanges that list Spot Bitcoin ETPs comprehensively surveil market conditions and price movements on a real time and ongoing basis in order to detect and prevent price distortions, including price distortions caused by manipulative efforts. Thus, the CME's surveillance as well as Nasdaq's surveillance and other equity markets that list Spot Bitcoin

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80 See Spot Bitcoin ETPs Approval Order 89 FR 3010 and 3011.

81 CME began offering trading in Bitcoin Futures in 2017. Each contract represents five bitcoin and is based on the CME CF Bitcoin Reference Rate. The contracts trade and settle like other cash settled commodity futures contracts.

82 A correlation analysis was conducted by the Commission in analyzing the Spot Bitcoin ETP proposals. The results of the Commission's analysis confirmed that the CME bitcoin futures market has been consistently highly correlated with the subset of the spot bitcoin market utilized in the analysis for the timeframe reviewed. See Spot Bitcoin ETPs Approval Order at 89 FR 3010.

ETPs can reasonably be relied upon to capture the effects on the Bitcoin Futures market and Spot Bitcoin ETPs, as applicable, that are caused by a person attempting to manipulate the futures ETP or Spot Bitcoin ETPs by manipulating the price of bitcoin futures contracts or Spot Bitcoin ETPs, whether that attempt is made by directly trading on the Bitcoin Futures market or Spot Bitcoin ETPs, or indirectly by trading outside of the Bitcoin Futures market or Spot Bitcoin ETPs.

The Exchange would have an adequate surveillance program in place for Nasdaq Bitcoin Index Options as it intends to apply the same program procedures that it applies to the Exchange's other index options products.[83] Index products and their respective symbols are integrated into the Exchange's existing surveillance system architecture and are thus subject to the relevant surveillance processes. This is true for both surveillance system processing and manual processes that support the Phlx's surveillance program. Additionally, the Exchange is also a member of the Intermarket Surveillance Group ("ISG") under the Intermarket Surveillance Group Agreement. ISG members work together to coordinate surveillance and investigative information sharing in the stock and options markets. Both the Exchange and CME are members of ISG.[84]

The Exchange, in its normal course of surveillance, will monitor for any potential manipulation of the Nasdaq Bitcoin Index Options settlement value according to the Exchange's current procedures. The Exchange believes that its surveillance procedures currently in place will allow it to adequately surveil for any potential manipulation in the trading of Nasdaq Bitcoin Index Options.

Capacity

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83 The surveillance program includes real-time patterns for price and volume movements and post-trade surveillance patterns (e.g., spoofing, marking the close, pinging, phishing).

84 For a list of the current members and affiliate members of ISG, see https://www.isgportal.com/.

The Exchange represents that it has the necessary system capacity to support additional quotations and messages that will result from the listing and trading Nasdaq Bitcoin Index Options. Finally, the Options Price Reporting Authority ("OPRA") has the necessary systems capacity to handle the additional traffic associated with the listing of Nasdaq Bitcoin Index Options. The proposal is limited to one new class and the additional traffic that would be generated from the introduction of Nasdaq Bitcoin Index Options would be manageable and well within any systems capacity capabilities.

2. Statutory Basis

The Exchange believes that its proposal is consistent with Section 6(b) of the Act,[85] in general, and furthers the objectives of Section 6(b)(5) of the Act,[86] in particular, in that it will permit trading in Nasdaq Bitcoin Index Options pursuant to rules designed to prevent fraudulent and manipulative acts and practices and promote just and equitable principles of trade. In particular, the Exchange believes the proposed rule change will further the Exchange's goal of introducing new and innovative products to the marketplace. The Exchange believes that listing Nasdaq Bitcoin Index Options will provide an opportunity for investors to hedge, or speculate on, the market risk associated with trading bitcoin. This proposal offers market participants with choice of product structures for bitcoin exposure and offers a flexible way to gain exposure to bitcoin through transparent, regulated index options.

In 2006, Phlx received approval to list and trade foreign currency index options.[87] These foreign currency options are cash-settled, European-styled options, issued by OCC that permit holders to receive U.S. dollars representing the difference between the current foreign exchange

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85 15 U.S.C. 78f(b).

86 15 U.S.C. 78f(b)(5).

87 See Securities Exchange Act Release No. 54989 (December 21, 2006), 71 FR 78506 (December 29, 2006) (SR-Phlx-2006-34) (Notice of Filing and Order Granting Accelerated Approval to Proposed Rule Change as Modified by Amendments No. 1, 2, and 3 Thereto Relating to U.S. Dollar-Settled Foreign Currency Options) ("SR-Phlx-2026-34").

spot price and the exercise price of the option.[88] Further, similar to this proposal, Phlx noted in its rule change seeking approval for foreign currency options (or "U.S. dollar-settled FCOs") that "U.S. dollar-settled FCOs would trade in the same general manner as equity index options, which are also U.S. dollar-settled products."[89] The Commission noted in the SR-Phlx-2006-34 approval order that it believed that, "….sufficient venues exist for obtaining reliable information on the Currencies so that investors in U.S. dollar-settled FCOs can monitor the underlying spot market in the Currencies. The Commission also believes that the Phlx's procedures and the competitive nature of the spot market for the [c]urrencies should help to ensure that the settlement values for U.S. dollar-settled FCO contracts will accurately reflect the spot price for foreign currencies…".[90]

Foreign currency options established precedent to list and trade index options overlying an underlying that is not a security, such as proposed herein. Like foreign currency markets, the bitcoin market is liquid and is characterized by a significant degree of volume and turnover. As a result, the Exchange believes that sufficient venues exist to provide investors with ready access to reliable information on the price of bitcoin for purposes of this product.[91] While bitcoin is a novel asset, the requirements of a benchmark price for bitcoin are no different from those required of a benchmark price for any asset.

The introduction of Nasdaq Bitcoin Index Options will provide investors with an additional tool to manage their portfolio, whether by hedging or through diversification and will remove impediments to and perfect the mechanism of a free and open market and a national market system and, in general, protect investors because offering this new product will provide investors with a greater opportunity to realize the benefits of utilizing index options based on

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88 Id at 78506.

89 Id at 78508.

90 Id at 78510.

91 Today, there are regulated bitcoin futures and options on futures derivatives contracts from CME Group and Eurex AG, approved regulated spot FTSE Bitcoin Index futures as well as a variety of other regulated exchange traded products and funds in Canada, Brazil, Hong Kong and Europe.

spot bitcoin, including cost efficiencies and increased hedging strategies. In particular, the Exchange believes that offering options Nasdaq Bitcoin Index Options will benefit investors by providing them with an additional, relatively lower cost risk management tool allowing them to manage, more easily, their positions and associated risks, in their portfolios in connection with exposure to spot bitcoin. Additionally, this cash-settled index that permits holders to receive U.S. dollars representing the difference between the current bitcoin spot market and the exercise price of the option eliminates risks associated with physical settlement such as volatility and movement in the underlying at expiration. Today, the CME CF Bitcoin Reference Rate—New York Variant for the Bitcoin—U.S. Dollar trading pair (the "CF Benchmarks Index") constitutes the index for the following products: iShares Bitcoin Trust ETF, Franklin Bitcoin ETF, Bitwise Bitcoin ETF, Valkyrie Bitcoin Fund and ARK 21Shares Bitcoin ETF.

For the reasons which follow, the Exchange believes that Nasdaq Bitcoin Index Options is designed to prevent fraudulent and manipulative acts and practices and promote just and equitable principles of trade. Nasdaq Bitcoin Index Options are representative of the underlying market, resistant to manipulation, and replicable by market participants, to be able to foster further institutional participation in the underlying market that is being measured. The final settlement value for Nasdaq Bitcoin Index Options would be the CME CF Bitcoin Reference Rate - New York Variant (BRRNY) on the expiration date (usually a Friday). BRRNY will be divided by a factor of one hundred (100) to create a new settlement value to arrive at the settlement value for Nasdaq Bitcoin Index Options and will be published as BRRNY – NOS (Nasdaq Options Settlement). BRRNY is a once-a-day benchmark index price for bitcoin that aggregates trade data from multiple bitcoin-USD markets operated by major cryptocurrency exchanges that conform to the CME CF Constituent Exchange Criteria. It is synchronized to the traditional U.S. financial market close of 1600 New York Time and is calculated every single day of the year. The index is a Registered Benchmark under UK BMR and as such is a Third Country benchmark under the EU BMR Regime.

The BRRNY index is methodologically identical to the regulated CME CF Bitcoin Reference Rate (BRR), the most widely used benchmark price for Bitcoin, that settles the Bitcoin-USD derivatives complex listed by CME Group, and which serves as the NAV for exchange listed investment products from WisdomTree Europe, Evolve ETFs (CAN) and QR Asset Management (BRZ). The only difference between the CME CF BRRNY and the CME CF BRR, is that BRRNY references the price of bitcoin at the closing time of U.S. markets, 16:00 New York Time, rather than the price at 16:00 London Time, referenced by the BRR.

The purpose of BRRNY is to provide a replicable, manipulation-resistant and representative bitcoin benchmark that synchronizes with the traditional U.S. market close. The CME CF Bitcoin Reference Rate – New York Variant is a regulated Benchmark under the UK Benchmarks Regulation (BMR) regime. The BRRNY calculation methodology aggregates transactions of Bitcoins in U.S. dollars that are only conducted on the most liquid markets for which data is publicly available and operated by exchanges that meet the CME CF Constituent Exchange Criteria.[92]

BRRNY is a valid and robust benchmark that is calculated from input data of sufficient volume so that it is representative of the market it seeks to measure. Additionally, BRRNY has volume sufficiency which permits it be replicated by institutional market participants and product providers that need to warehouse price risk. The below table summarizes the total number of transactions and average number of transactions per day observed each month for BRRNY.[93] Between February 28, 2022, and January 31, 2024 (weekdays only), on average 2,116.73 Bitcoins, or $59M were traded during each daily observation window between 15:00 and 16:00 New York Time.[94]

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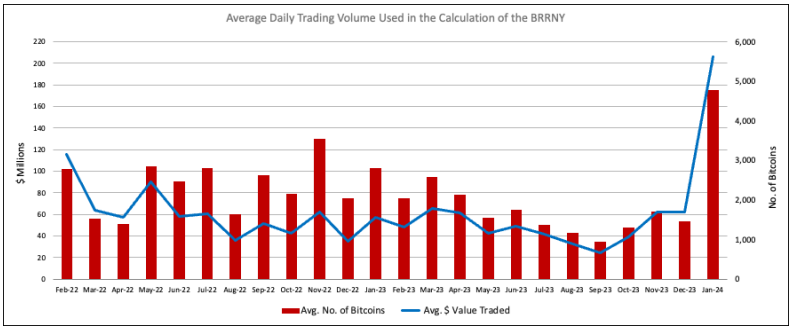
92 See supra note 25.

93 The data represents both trade count and bitcoin volume during the observation window.

94 BRRNY was launched on February 28, 2022. LMAX Digital was added as a Constituent Exchange from May 2022.



This trading activity exhibits volatility that is not substantially different from that shown in traditional asset markets. The volume observed and the reliability of that volume are clearly evident to be sufficient for the calculation of a robust and reliable benchmark.

Phlx believes that Nasdaq Bitcoin Index Options will be utilized for a wide range of activities such as asset valuation, settlement of financial risk, risk management, NAV calculation, unit creation and unit redemption. To that end, the index design is fair and transparent. CF Benchmarks exclusively sources input data from Constituent Exchanges that meet published criteria as set out in its Constituent Exchanges Criteria and conducts a thorough review of any exchange under consideration for inclusion as a Constituent Exchange.[95] BRRNY methodology takes an observation period and divides it into equal partitions of time. The volume-weighted median of all transactions within each partition is then calculated. The benchmark index value is determined from the arithmetic mean of the volume-weighted medians, equally weighted. As a result, individual trades of large size have limited effect on the index level as they only influence the level of the volume-weighted median for that specific partition. Further, a cluster of trades in a short period of time will also only influence the volume-weighted median of the partition or partitions they were conducted in, thereby limiting impact. Use of volume-weighted medians as opposed to volume-weighted means ensures that

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95 The criteria are available at: https://docs.cfbenchmarks.com/CME%20CF%20Constituent%20Exchanges%20Criteria.pdf. The arrangements of all Constituent Exchanges are reviewed annually to ensure that they continue to meet all criteria specified within "Constituent Exchange Criteria." This due diligence is documented, and the information is distributed to CF Benchmarks' oversight organs to consider. The deliberations of oversight organs are conducted during regular meetings, minutes of such meetings are publicly available, being published by the Administrator on its website.

transactions conducted at outlying prices do not have an undue effect on the value of a specific partition. By not volume weighting partitions, trades of large size or clusters of trades over a short period of time will not have an undue influence on the index level. CF Benchmarks applies equal weight to transactions observed from CME CF Constituent Exchanges. With no pre-set weights, the BRRNY index is not readily subject to manipulation. Using the arithmetic mean of partitions of equal weight further denudes the effect of trades of large size at prices that deviate from the prevailing price having undue influence on the benchmark level.[96]

BRRNY's methodology incorporates a procedure for potentially erroneous data. Although volume-weighted medians of transaction prices from individual data sources are not part of the benchmark determination process, they are calculated as a means of quality control and manipulation resistance. In the event of an instance of index calculation in which a Constituent Exchange's volume-weighted median transaction price exhibits an absolute percentage deviation from the volume-weighted median price of other Constituent Exchange transactions greater than the Potentially Erroneous Data Parameter (10%), then transactions from that Constituent Exchange are deemed potentially erroneous and excluded from the index calculation. All instances of data excluded from a calculation trigger a Benchmark Surveillance Alert that is investigated. By way of example, between February 28, 2022, and January 31, 2024, the Potentially Erroneous Data Parameter of the methodology for the CME CF Bitcoin Reference Rate – New York Variant has never been triggered. Analysis of the max volume-weighted median per exchange during the observation period produced the results in the table. The results illustrate that during the observation period, no Constituent Exchange's input data needed to be excluded due to exhibiting potential manipulation and indeed no individual cryptocurrency exchange exhibits a deviation percentage above 2.41% during this period.

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[96] See also https://www.cfbenchmarks.com/blog/suitability-analysis-of-the-cme-cf-bitcoin-reference-rate-new-york-variant-as-a-basis-for-regulated-financial-products-february-2024-update.

Max in Month	Max volume weighted median deviation per exchange (%)					
	Bitstamp	Coinbase	Gemini	itBit	Kraken	LMAX Digital
Feb-2022	0.04%	0.00%	0.10%	0.06%	0.12%	N/A
Mar-2022	0.47%	0.20%	0.21%	0.45%	0.36%	N/A
Apr-2022	0.31%	0.17%	0.28%	0.32%	0.38%	N/A
May-2022	0.70%	0.45%	0.43%	0.34%	0.55%	0.26%
Jun-2022	0.45%	0.28%	0.33%	0.37%	0.49%	0.43%
Jul-2022	0.36%	0.18%	0.62%	0.93%	0.76%	0.47%
Aug-2022	0.34%	0.25%	0.20%	0.46%	0.37%	0.21%
Sep-2022	0.49%	0.16%	0.23%	0.46%	0.33%	0.16%
Oct-2022	0.21%	0.10%	0.13%	0.15%	0.18%	0.28%
Nov-2022	1.66%	0.59%	0.54%	1.14%	1.38%	0.93%
Dec-2022	0.15%	0.07%	0.57%	0.08%	0.28%	0.09%
Jan-2023	0.21%	0.13%	0.34%	0.17%	0.23%	0.11%
Feb-2023	0.28%	0.14%	0.60%	0.46%	0.77%	0.22%
Mar-2023	0.39%	0.28%	2.41%	0.24%	0.26%	0.22%
Apr-2023	0.25%	0.49%	0.65%	0.28%	0.28%	0.56%
May-2023	0.23%	0.21%	0.29%	0.33%	0.19%	0.29%
Jun-2023	0.39%	0.13%	0.43%	0.30%	0.24%	0.18%
Jul-2023	0.18%	0.11%	0.35%	0.50%	0.20%	0.16%
Aug-2023	0.35%	0.08%	0.60%	0.61%	0.20%	0.14%
Sep-2023	0.66%	0.15%	0.10%	0.18%	0.27%	0.17%
Oct-2023	0.45%	0.12%	0.41%	0.15%	0.39%	0.16%
Nov-2023	0.16%	0.12%	0.21%	0.25%	0.26%	0.40%
Dec-2023	0.33%	0.09%	0.17%	0.16%	0.46%	0.10%
Jan-2024	0.37%	0.28%	0.43%	0.43%	0.36%	0.35%

CF Benchmarks has implemented a benchmark surveillance program for the investigation of alerts. Instances of suspected benchmark manipulation are escalated through appropriate regulatory channels in accordance with CF Benchmarks' obligations under the UK Benchmarks Regulation (UK BMR). As a regulated Benchmark Administrator, CF Benchmarks is subject to supervision by the UK FCA.[97]

In terms of correlation, an analysis was undertaken of the pair-wise correlation of prices from Constituent Exchanges on a per-minute basis (the price difference between transactions for each minute at each exchange) during the observation period. The results are shown in the below table.

[97] Furthermore, CF Benchmarks' Control Procedures with respect to compliance with the UK BMR have been audited by 'Big Four' accountancy firm Deloitte. The Independent Assurance Report on Control Procedures Noted by CF Benchmarks Regarding Compliance with the UK Benchmarks Regulation as of September 12, 2022 is available at: https://docs.cfbenchmarks.com/Deloitte_CF%20Benchmarks%20SOC1%20Audit%20Report.pdf.

Pairwise Correlation of Constituent Exchanges to BRRNY			
Constituent Pair Platform	Mean Correlation %	Median Correlation %	Standard Deviation
Bitstamp-Coinbase	98.41%	98.98%	1.72%
Bitstamp-Gemini	96.38%	98.23%	5.78%
Bitstamp-itBit	97.62%	98.66%	2.97%
Bitstamp-Kraken	96.72%	98.20%	4.29%
Bitstamp-LMAX Digital*	96.70%	98.03%	4.36%
Coinbase-Gemini	96.25%	98.19%	5.97%
Coinbase-itBit	97.33%	98.55%	3.55%
Coinbase-Kraken	96.43%	98.13%	4.78%
Coinbase-LMAX Digital*	96.65%	98.07%	4.63%
Gemini-itBit	96.44%	98.30%	5.97%
Gemini-Kraken	95.67%	97.83%	6.13%
Gemini-LMAX Digital*	95.16%	97.49%	6.55%
itBit-Kraken	97.51%	98.65%	3.48%
itBit-LMAX Digital*	96.70%	98.17%	4.53%
Kraken-LMAX Digital*	95.85%	97.66%	5.45%

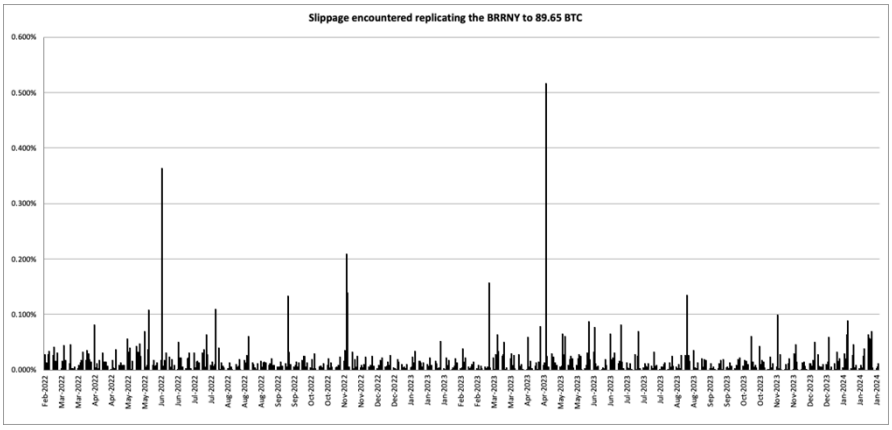
With respect to replicability, a simple replication simulation was thereby conducted of BRRNY to demonstrate the extent of slippage that implementation of the BRR would probably encounter. The methodology was as follows for weekdays only.

- Trades are executed on *n* (6) Constituent Exchanges, during a 3,600-second window.
- One trade is executed every second and the price achieved is assumed to be the last execution price observed in that second. Its associated volume is assumed to be the volume executed during that second.
- If no trade is completed in any single-second period, then the price achieved is assumed to be the price achieved in the previous second, but the associated volume from the previous second is not added to the volume executed in the latest second.

The results of this simulation are displayed below.

Slippage %	
MAX	0.51639%
MIN	0.00006%
MEDIAN	0.01063%
MEAN	0.01895%
STD. DEV.	0.03493%

Summary data for the above simulation is provided below.



As evidenced above, the BRRNY can be replicated with a high degree of confidence and usually with slippage of no more than 1 basis point (0.01%). On only 6.76% of days would slippage have been greater than 5 basis points (0.05%). Indeed, even on the most volatile day, slippage was approximately one half of one percent, 51.6 basis points (0.516%). Furthermore, in the 24-month period under observation slippage would have been in double-digit basis points only 10 times.

In 2024, the Commission approved various rule changes to list and trade Spot Bitcoin ETPs.[98] The Commission noted in the Spot Bitcoin ETPs Approval Order that, "…one way an exchange that lists bitcoin-based exchange-traded products ("ETPs") can meet the obligation under Exchange Act Section 6(b)(5) that its rules be designed to prevent fraudulent and manipulative acts and practices is by demonstrating that the exchange has a comprehensive surveillance-sharing agreement with a regulated market of significant size related to the underlying or reference bitcoin assets. Such an agreement would assist in detecting and deterring fraud and manipulation related to that underlying asset." The Commission has recognized that the "regulated market of significant size" standard is not the only means for satisfying Section 6(b)(5) of the Act, specifically providing that a listing exchange could demonstrate that "other means to prevent fraudulent and manipulative acts and practices" are

[98] See supra note 16.

sufficient to justify dispensing with the requisite surveillance-sharing agreement.[99] For example, in approving the Spot Bitcoin ETPs, the Commission found that there were "sufficient 'other means' of preventing fraud and manipulation," including that:

> [B]ased on the record before the Commission and the improved quality of the correlation analysis in the record, including the Commission's own analysis, the Commission is able to conclude that fraud or manipulation that impacts prices in spot bitcoin markets would likely similarly impact CME bitcoin futures prices. And because the CME's surveillance can assist in detecting those impacts on CME bitcoin futures prices, the Exchanges' comprehensive surveillance-sharing agreement with the CME—a U.S. regulated market whose bitcoin futures market is consistently highly correlated to spot bitcoin, albeit not of "significant size" related to spot bitcoin—can be reasonably expected to assist in surveilling for fraudulent and manipulative acts and practices in the specific context of the [Spot Bitcoin ETPs].[100]

As described in the Spot Bitcoin ETPs Approval Order, there is currently a regulated U.S. market with respect to spot bitcoin, the CME bitcoin futures ("Bitcoin Futures") market.[101] In its Spot Bitcoin ETPs Approval Order, the Commission found there was a high price correlation between the underlying and the futures market.[102] The proposed Nasdaq Bitcoin Index Options and the various Spot Bitcoin ETPs reference the same underlying market for spot bitcoin that trade on spot bitcoin trading platforms.

Specifically, the Exchange has a comprehensive surveillance-sharing agreement with the CME via its common membership in ISG, which facilitates the sharing of information that is available to the CME through its surveillance of its markets, including its surveillance of the

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99 See Securities Exchange Act Release No. 83723 (July 26, 2018), 83 FR 37579 at 37580 (August 1, 2018) (the "Winklevoss Order"). The Commission has also specifically noted that it "is not applying a 'cannot be manipulated' standard; instead, the Commission is examining whether the proposal meets the requirements of the Exchange Act and, pursuant to its Rules of Practice, places the burden on the listing exchange to demonstrate the validity of its contentions and to establish that the requirements of the Exchange Act have been met." See Winklevoss Order, 83 FR at 37582.

100 See Spot Bitcoin ETPs Approval Order 89 FR 3010 and 3011.

101 CME began offering trading in Bitcoin Futures in 2017. Each contract represents five bitcoin and is based on the CME CF Bitcoin Reference Rate. The contracts trade and settle like other cash settled commodity futures contracts.

102 A correlation analysis was conducted by the Commission in analyzing the Spot Bitcoin ETP proposals. The results of the Commission's analysis confirmed that the CME bitcoin futures market has been consistently highly correlated with the subset of the spot bitcoin market utilized in the analysis for the timeframe reviewed. See Spot Bitcoin ETPs Approval Order at 89 FR 3010.

Bitcoin Futures market. Similar to the Spot Bitcoin ETPs previously approved by the SEC, Nasdaq's ability to obtain information regarding trading in the Bitcoin Futures market from other markets that are members of the ISG (specifically the CME) would assist Nasdaq in detecting and deterring misconduct.

Further, the exchanges that list Spot Bitcoin ETPs comprehensively surveil market conditions and price movements on a real time and ongoing basis in order to detect and prevent price distortions, including price distortions caused by manipulative efforts. Thus, the CME's surveillance as well as Nasdaq's surveillance and other equity markets that list Spot Bitcoin ETPs can reasonably be relied upon to capture the effects on the Bitcoin Futures market and Spot Bitcoin ETPs, as applicable, that are caused by a person attempting to manipulate the futures ETP or Spot Bitcoin ETPs by manipulating the price of bitcoin futures contracts or Spot Bitcoin ETPs, whether that attempt is made by directly trading on the Bitcoin Futures market or Spot Bitcoin ETPs, or indirectly by trading outside of the Bitcoin Futures market or Spot Bitcoin ETPs.

The Exchange would have an adequate surveillance program in place for Nasdaq Bitcoin Index Options as it intends to apply the same program procedures that it applies to the Exchange's other index options products.[103] Index products and their respective symbols are integrated into the Exchange's existing surveillance system architecture and are thus subject to the relevant surveillance processes. This is true for both surveillance system processing and manual processes that support the Phlx's surveillance program. Additionally, the Exchange is also a member of the Intermarket Surveillance Group ("ISG") under the Intermarket Surveillance Group Agreement. ISG members work together to coordinate surveillance and investigative

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[103] The surveillance program includes real-time patterns for price and volume movements and post-trade surveillance patterns (e.g., spoofing, marking the close, pinging, phishing).

information sharing in the stock and options markets. Both the Exchange and CME are members of ISG.[104]

The Exchange, in its normal course of surveillance, will monitor for any potential manipulation of the Nasdaq Bitcoin Index Options settlement value according to the Exchange's current procedures. The Exchange believes that its surveillance procedures currently in place will allow it to adequately surveil for any potential manipulation in the trading of Nasdaq Bitcoin Index Options.

The Exchange believes that the proposed contract specifications will be attractive to market participants, and will remove impediments to and perfect the mechanism of a free and open market and a national market system. The proposal is designed to ensure that Nasdaq Bitcoin Index Options are listed and traded under the same terms that apply to other index options that are currently traded on the Exchange. Nasdaq Bitcoin Index Options will be subject to the same rules that presently govern the trading of index options, including sales practice rules, margin requirements, trading rules, and position and exercise limits. The proposed product is a cash-settled index option that permit holders to receive U.S. dollars representing the difference between the current bitcoin spot market and the exercise price of the option and would not involve holding physical bitcoin similar to the Spot Bitcoin ETPs, which entailed the custody of bitcoin assets. The Exchange's proposal to have a minimum increment of $0.01 for all series, similar to XND, which is also based on 1/100th of the value of the Nasdaq-100 Index, will enable traders to make the most effective use of the product for trading and hedging purposes. Nasdaq Bitcoin Index options would be P.M.-settled and the exercise settlement value would be derived from closing prices on the expiration day. The Exchange believes that providing P.M.-settlement will make this product more attractive to market participants and help garner additional support for this new index options product. In particular, retail investors, prefer P.M.-

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104 For a list of the current members and affiliate members of ISG, see https://www.isgportal.com/.

settled index options. P.M.-settlement is preferred by retail investors as it allows market participants to hedge their exposure for the full week. A.M.-settled options by contrast are based on opening prices on the day of expiration and therefore stop trading on the day prior, leaving residual risk on the day of expiration. Weekly expirations and EOMs should create greater trading and hedging opportunities and flexibility, and provide customers with the ability to tailor their investment objectives more closely. Additionally, position limits for Nasdaq Bitcoin Index Options would be equal to 250,000 contracts on the same side of the market, restricted to no more than 150,000 near-term contracts.[105] All position limit hedge exemptions applicable to broad-based index options would also apply to Nasdaq Bitcoin Index Options. The proposed position limits are similar to those applied to broad-based index options. Finaly, this proprietary index would be cash-settled. The Exchange therefore believes that the rules applicable to trading in Nasdaq Bitcoin Index Options are consistent with the protection of investors and the public interest.

Finally, the Exchange represents that it and OPRA have the necessary system capacity to support additional quotations and messages that will result from the listing and trading Nasdaq Bitcoin Index Options.

B. Self-Regulatory Organization's Statement on Burden on Competition

This proposed rule change does not impose any burden on competition that is not necessary or appropriate in furtherance of the purposes of the Act. The Exchange notes that the proposed rule change will facilitate the listing and trading of an index option product with a novel structure that will enhance competition among market participants, to the benefit of investors and the marketplace.

The Exchange does not believe that the proposed rule change will impose any burden on intramarket competition that is not necessary or appropriate in furtherance of the purposes of the Act as Nasdaq Bitcoin Index Options would be subject to Exchange rules that currently govern

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[105] See proposed Options 4D, Section 6(a).

the listing and trading of index options, including permissible expirations, strike prices, minimum increments, position and exercise limits, and margin requirements. Nasdaq Bitcoin Index Options will be equally available to all market participants who wish to trade such options.

The Exchange does not believe the proposal will impose any burden on intermarket competition that is not necessary or appropriate in furtherance of the purposes of the Act. To the extent that permitting Nasdaq Bitcoin Index Options to trade on the Exchange may make Phlx a more attractive marketplace to market participants, such market participants are free to elect to become market participants on the Exchange. Additionally, other options exchanges are free to amend their rules, as applicable, to permit them to list and trade index options that track the value of bitcoin. The Exchange believes that the proposed rule change may relieve any burden on, or otherwise promote, competition, as it is designed to increase competition for order flow on the Exchange in a manner that is beneficial to investors by providing them with a relatively low-cost means to hedge their portfolios and meet their investment needs in connection with spot bitcoin prices and bitcoin-related products and positions, in a cash-settled product. The Exchange notes that it operates in a highly competitive market in which market participants can readily direct order flow to competing venues that offer similar products.

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received from Members, Participants, or Others

No written comments were either solicited or received.

III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

Within 45 days of the date of publication of this notice in the Federal Register or within such longer period up to 90 days of such date (i) as the Commission may designate if it finds such longer period to be appropriate and publishes its reasons for so finding or (ii) as to which the Exchange consents, the Commission shall: (a) by order approve or disapprove such proposed rule change, or (b) institute proceedings to determine whether the proposed rule change should be disapproved.

IV. Solicitation of Comments

Interested persons are invited to submit written data, views and arguments concerning the foregoing, including whether the proposed rule change is consistent with the Act. Comments may be submitted by any of the following methods:

Electronic Comments:

- Use the Commission's internet comment form (https://www.sec.gov/rules/sro.shtml); or
- Send an email to rule-comments@sec.gov. Please include file number SR-Phlx-2025-08 on the subject line.

Paper Comments:

- Send paper comments in triplicate to Secretary, Securities and Exchange Commission, 100 F Street NE, Washington, DC 20549-1090.

All submissions should refer to file number SR-Phlx-2025-08. This file number should be included on the subject line if email is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's internet website (https://www.sec.gov/rules/sro.shtml). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for website viewing and printing in the Commission's Public Reference Room, 100 F Street NE, Washington, DC 20549, on official business days between the hours of 10 a.m. and 3 p.m. Copies of the filing also will be available for inspection and copying at the principal office of the Exchange. Do not include personal identifiable information in submissions; you should submit only information that you wish to make available publicly. We may redact in part or withhold entirely from publication submitted material that is obscene or subject to copyright

protection. All submissions should refer to file number SR-Phlx-2025-08 and should be submitted on or before [INSERT DATE 21 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.[106]

Sherry R. Haywood,

Assistant Secretary.

[FR Doc. 2025-02941 Filed: 2/21/2025 8:45 am; Publication Date: 2/24/2025]

[106] 17 CFR 200.30-3(a)(12).