

SUBMISSION COVER SHEET

IMPORTANT: Check box if Confidential Treatment is requested

Registered Entity Identifier Code (optional): 23-242

Organization: Chicago Mercantile Exchange Inc. ("CME")

Filing as a: DCM SEF DCO SDR

Please note - only ONE choice allowed.

Filing Date (mm/dd/yy): 07/14/23 Filing Description: Initial Listing of the Ether/Bitcoin Ratio Futures Contract

SPECIFY FILING TYPE

Please note only ONE choice allowed per Submission.

Organization Rules and Rule Amendments

- Certification § 40.6(a)
- Approval § 40.5(a)
- Notification § 40.6(d)
- Advance Notice of SIDCO Rule Change § 40.10(a)
- SIDCO Emergency Rule Change § 40.10(h)

Rule Numbers:

New Product

Please note only ONE product per Submission.

- Certification § 40.2(a)
- Certification Security Futures § 41.23(a)
- Certification Swap Class § 40.2(d)
- Approval § 40.3(a)
- Approval Security Futures § 41.23(b)
- Novel Derivative Product Notification § 40.12(a)
- Swap Submission § 39.5

Product Terms and Conditions (product related Rules and Rule Amendments)

- Certification § 40.6(a)
- Certification Made Available to Trade Determination § 40.6(a)
- Certification Security Futures § 41.24(a)
- Delisting (No Open Interest) § 40.6(a)
- Approval § 40.5(a)
- Approval Made Available to Trade Determination § 40.5(a)
- Approval Security Futures § 41.24(c)
- Approval Amendments to enumerated agricultural products § 40.4(a), § 40.5(a)
- "Non-Material Agricultural Rule Change" § 40.4(b)(5)
- Notification § 40.6(d)

Official Name(s) of Product(s) Affected: See filing.

Rule Numbers: See filing.



Christopher Bowen
Managing Director and Chief Regulatory Counsel
Legal Department

July 14, 2023

VIA ELECTRONIC PORTAL

Mr. Christopher J. Kirkpatrick
Office of the Secretariat
Commodity Futures Trading Commission
3 Lafayette Center
1155 21st Street NW
Washington, DC 20581

**Re: CFTC Regulation 40.2(a) Certification. Initial Listing of the Ether/Bitcoin Ratio
Futures Contract.
CME Submission No. 23-242**

Dear Mr. Kirkpatrick:

Chicago Mercantile Exchange Inc. (“CME” or the “Exchange”) certifies to the Commodity Futures Trading Commission (“CFTC” or “Commission”) the initial listing of the Ether/Bitcoin Ratio Futures contract (the “Contract”) for trading on the CME Globex electronic trading platform (“CME Globex”) effective on Sunday, July 30, 2023, for trade date Monday, July 31, 2023, as more specifically described below.

Contract Specifications

Contract Title	Ether/Bitcoin Ratio Futures
Rulebook Chapter	CME 351
Commodity Code	CME Globex and CME ClearPort: EBR
Contract Size	\$1,000,000
Trading Unit	USD 1,000,000 times the Ether/Bitcoin Ratio. Ether/Bitcoin Ratio shall be defined as the ratio of the US Dollar price of one (1) Ether Futures contract (ETH) divided by the US Dollar price of one (1) Bitcoin Futures contract (BTC).
Trading Venues	CME Globex & CME ClearPort
Trading and Clearing Hours	CME Globex Pre-Open: 4:45 p.m. – 5:00 p.m. Central Time (CT) CME Globex: Sunday - Friday 5:00 p.m. - 4:00 p.m. CT with a 60-minute break each day beginning at 4:00 p.m. CT CME ClearPort: Sunday 5:00 p.m. - Friday 5:45 p.m. CT with no reporting Monday - Thursday from 5:45 p.m. - 6:00 p.m. CT
Settlement Method	Financial
Listing Schedule	Monthly contracts listed for 6 consecutive months, quarterly contracts (Mar, Jun, Sep, Dec) listed for 4 additional quarters and a second Dec contract if only one is listed.
Initial Listing Schedule	August 2023, September 2023, October 2023, November 2023, December 2023, January 2024, March 2024, June 2024, September 2024 and December 2024.
Price Quotation	U.S. Dollars and cents

Minimum Price Fluctuation	0.000005 index points = \$5.00 per contract
Termination of Trading	Trading in expiring futures shall terminate at 4 p.m. London time on the last Friday of the contract month if that day is a business day in either the UK or the US. If that day is not a business day in both the UK and the US, trading shall terminate on the preceding day that is a business day in either the UK or the US.
Final Settlement	The final settlement price of the Ether/Bitcoin Ratio Futures shall be determined by the final settlement prices of the Ether Futures contract (ETH) and the Bitcoin Futures contract (BTC) of the same contract month. It shall be calculated by the final settlement price of the Ether Futures divided by the final settlement price of the Bitcoin Futures, rounded to the nearest 0.000001.
Final Settlement Increment	0.000001 index points = \$1.00 per Contract
Block Trade Minimum Threshold	5 contracts, subject to a 15-minute reportable window.
CME Globex Matching Algorithm	F: First In First Out (FIFO)

Evaluation of Underlying Markets

The Ether/Bitcoin Ratio shall be defined as the ratio of the US Dollar price of one (1) Ether futures Contract (CME Chapter 349) to the US Dollar price of one (1) Bitcoin futures Contract (CME Chapter 350).

The contract shall be defined as USD 1,000,000 multiplied by the Ether/Bitcoin Ratio.

Trading in expiring futures shall terminate at 4:00 p.m. London time on the last Friday of the contract month if that day is a business day in either the UK or the US. If that day is not a business day in both the UK and the US, trading shall terminate on the preceding day that is a business day in either the UK or the US.

Final settlement shall be by cash settlement.

The final settlement price of the Ether/Bitcoin Ratio futures shall be determined by the final settlement prices of the Ether futures contract and the Bitcoin futures contracts of the same contract month. It shall be calculated by the final settlement price of the Ether futures divided by the final settlement price of the Bitcoin futures, rounded to the nearest 0.000001.

Evaluation of CME's Crypto Futures Contracts

Since their launch, CME Crypto futures contracts have continuously developed liquidity. Clearing support is provided by a broad spectrum of futures commission merchants ("FCM").

Index Administration, Governance, and Methodology

Analysis of BRR and ETHUSD_RR

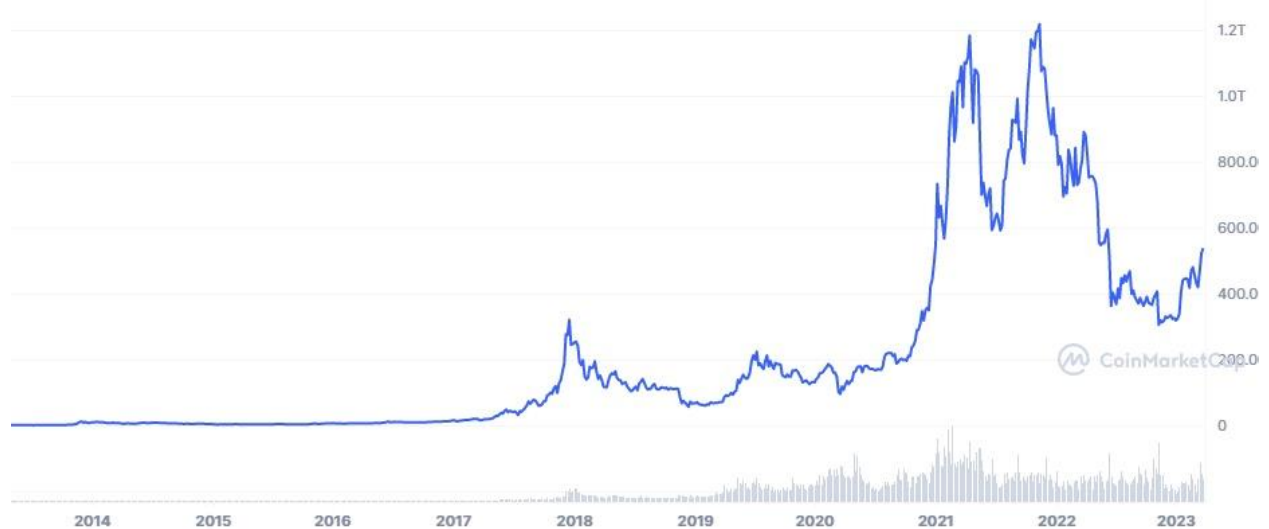
The table below shows the number of trades and number of bitcoin or ether included in the daily reference rate calculation, by average per month, vs the number of trades and number of bitcoin or ether included in the daily reference rate calculation on the Futures Final Settlement Day.

Bitcoin Market Overview

Bitcoin was created by Satoshi Nakamoto, a pseudonymous person or team who outlined the technology in a 2008 white paper. The bitcoin network went live in 2009. Every transaction involving bitcoin is tracked on the bitcoin blockchain ledger which is public and permissionless. Unlike a bank's ledger, the bitcoin blockchain is distributed across the entire network. No company, country, or third party is in control of it; and anyone can become part of that network.

The network's native cryptocurrency token is bitcoin. According to [Coinmarketcap.com](https://coinmarketcap.com), the market cap for all digital assets is over \$1.2 TN as of 31 March 2023. Bitcoin is the largest cryptocurrency by market capitalization, is estimated to be \$550 BN¹ as of 31 March 2023. The 24-hour trading volume in bitcoin is currently \$19 BN. Bitcoin is actively traded across approximately 400 spot exchanges and other execution platforms that offer leveraged exposure. Bitcoin is traded against many other crypto pairs (e.g., Ether) and in a number of fiat currency pairs. The dominant fiat currency pair is the USD.

Bitcoin Market Capitalization



Source: CoinMarketCap.com

¹ Source: <https://coinmarketcap.com/currencies/bitcoin/>

Bitcoin Price History



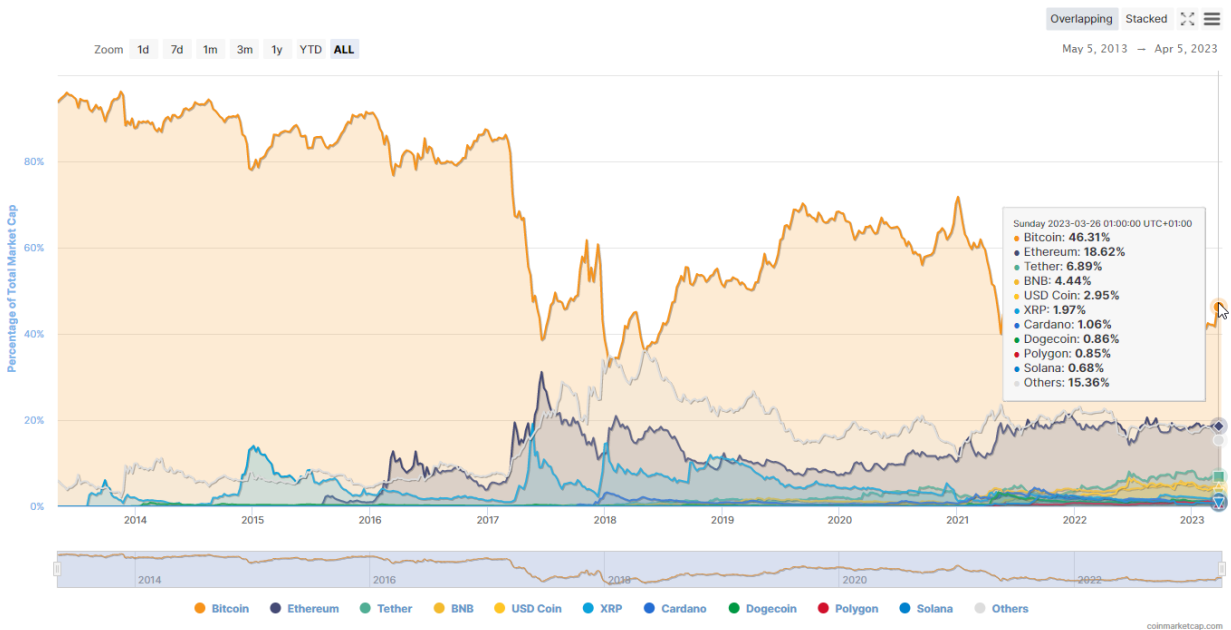
Source: CoinMarketCap.com

The value of a single bitcoin has steadily climbed to an all-time high of \$68,789.63 on November 10, 2021. The current price on March 31, 2023, is \$28,500.

In terms of market dominance, bitcoin is consistently the dominant cryptocurrency. As of March 26, 2023, bitcoin's dominance stood at 46.31%

Bitcoin's Percentage of Total Market Capitalization (Dominance)

Major Cryptoassets By Percentage of Total Market Capitalization (Bitcoin Dominance Chart)



Source: CoinMarketCap.com

Bitcoin Deliverable Supply Analysis

Bitcoin Mining and Blocks

The bitcoin protocol defines, in advance, how the currency will be created and at what rate. Upon release of bitcoin in 2009, Satoshi Nakamoto coded the creation of 21 million bitcoin. The supply of new bitcoins is designed to grow toward a ceiling of 21 million units. However, not all 21 million coins are currently in circulation.

Bitcoin mining is the process by which new bitcoin enter circulation. Miners are individuals or groups who work to secure the network by verifying transactions and adding them to a public ledger; the bitcoin blockchain, in what is called blocks. A block contains details of all the transactions that have been transacted within a given timeframe. Blocks form a chain by referring to the hash (or fingerprint) of the previous block.

Mining requires specialist equipment and great power. The miners are an important part of preserving the blockchain ledgers. The miner that first finds the newest block is rewarded with new bitcoin for their work. Miners also take transaction fees paid by parties sending bitcoin.

The bitcoin code is designed to create a new block every ten minutes. As such the number of bitcoins in existence increases about every 10 minutes when new blocks are mined and added to the bitcoin blockchain.

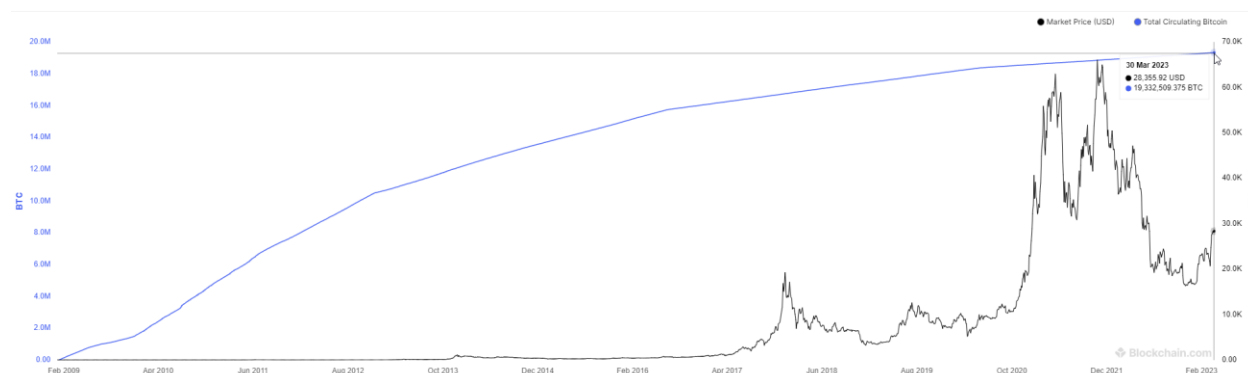
The bitcoin protocol defines how many bitcoins are released each time a miner discovers a new block. At the current mining rate each new block adds 6.25 bitcoins into circulation, which is approximately 900 bitcoins per day.

Initially, the block reward was set to 50 bitcoins per solved block. The protocol states that the number of bitcoins created per block, i.e., the mining reward, will decrease geometrically. This system is in place to systematically reduce the rate at which new bitcoins are issued into circulation. This gradual systematic process will see a 50% reduction every 210,000 blocks, or approximately every four (4) years, until all the 21 million units of bitcoin have been created, which will occur in 2140.

Bitcoin in Circulation

As of March 30 2023, 19,332,509 million bitcoin are in circulation. This represents circa 92%² of all the bitcoin supply originally set.

Bitcoin Total Circulating Supply



As designed, the percent growth of bitcoin in circulation has slowed since inception. The growth of the bitcoin in circulation is expected to slow with time, eventually ending at 21 million bitcoins.

²<https://www.blockchain.com/en/charts/total-bitcoins>

The theoretical circulating supply of bitcoin, however, is not the total spendable supply. The total spendable supply is lower than the total circulating supply due to accidental loss, willful destruction, and technical peculiarities.

From the total circulating supply of 19.33 million bitcoins, it would be prudent to discount for unrecoverable bitcoins that are burned (bitcoins that will never be spent - for example, if the bitcoin were sent to a public address without any party knowing or having a way to compute the private key, the bitcoin associated with that key are considered "burned."); permanently withdrawn from circulation or lost. There is no consensus on the number to be deducted, but best estimates indicate there to be about a 20% total loss. This would produce an estimate of 15.46 million bitcoin as circulating supply (equal to 19.33 million x 0.80).

Deliverable Supply

For the discussion of position limits that follows, the contract size referenced is for the existing Bitcoin futures contract. The standard contract has a 5 bitcoin multiplier.

In theory, all 15.46 million units extant may be considered as notional deliverable supply of contract-grade commodity. A prudent and conservative estimate, however, would acknowledge that bitcoin is traded in multiple currency denominations, of which USD is one.

For illustration, consider that during the six months ending March 31, 2023, around 60% of fiat bitcoin transaction volume was in U.S. dollars. Were this used as a proxy for the share of outstanding bitcoin that stands as notional contract-grade supply for Bitcoin futures, it would produce an estimate of 9.28 million bitcoin (equal to 15.46 million x 0.60) as the 'money stock' notionally eligible for delivery in fulfillment of expiring contract months. The following analysis uses this estimate.

By the standards applicable to agricultural or other commodity futures for physical delivery (i.e., 17 CFR 150.5(b)(1)), the position limit would be set at or below 25 percent of estimated spot month deliverable supply. Under current bitcoin market conditions, the resultant maximum position limit would be 2.32 million bitcoin, or 463,920 contracts ((equal to 9.28 million bitcoin x 0.25) / (5 bitcoin per contract)).

An alternative approach is based on the standard that the Exchange has typically applied to foreign exchange futures products, according to which the position limit is set at or below one percent of the money stock in the contract-grade currency denomination. Applied to the estimated bitcoin 'money stock', the result would be a position limit of 92,784 bitcoin, or 18,556 contracts ((equal to (9.28 million bitcoin x 0.01) / (5 bitcoin per contract)) or less.

Ethereum Market Overview

Vitalik Buterin founded Ethereum as a concept in a [White Paper](#)³ in late 2013. Since then, the development of Ethereum has been managed by a community of developers. A crowd sale to fund development took place in July 2014, and the blockchain went live on 30 July 2015.

Ethereum is a decentralized open source blockchain featuring smart contract functionality. The main Ethereum network is public and permissionless. Anyone can download or write software to connect to the network and start creating transactions and smart contracts without needing permission from any organization.

Ethereum's inbuilt native token is called ether (ETH). It can be traded for other cryptocurrencies or other sovereign currencies, just like bitcoin (BTC). According to [Coinmarketcap.com](https://coinmarketcap.com/) (<https://coinmarketcap.com/>), Ether's market capitalization is estimated to be \$219.5 B⁴ as of March 31, 2023. It is the second-largest cryptocurrency by market capitalization, behind bitcoin.

Ether Market Capitalization



Source: coinmarketcap.com

The 24-hour trading volume in ether is \$9B as of March 31, 2023. Many alt-coins are based on the Ethereum network, which brings liquidity into the network's native cryptocurrency. Ether is actively traded across approximately 400 spot exchanges and other execution platforms that offer leveraged exposure. The value of a single ether has steadily climbed to an all-time high of \$4,891.70 on November 16, 2021, the current price on March 31, 2023 is approximately \$1,820.

³ Source: <https://ethereum.org/en/whitepaper/>

⁴ Source: <https://coinmarketcap.com/currencies/ethereum/>

Ethers Price History



Source: coinmarketcap.com

Total Supply

Ethereum has its own blockchain, which contains blocks of data pertaining to transactions on the Ethereum network. A block contains details of all the transactions and smart contracts that have been transacted within a given timeframe. Blocks form a chain by referring to the hash (or fingerprint) of the previous block.

The biggest difference between ether and bitcoin are the rules around token generation. For bitcoin, there will be a maximum supply of 21 million coins. According to the protocol, future ETH generation will be capped at 25% of the pre-mine, per year. This is to say that there is a maximum growth rate of 18 million ether which can be mined per year. There is no upper cap or limit. Theoretically the maximum is infinite.

Ether Token Generation

New units of ether are created through mining. Mining is the process of confirming transactions, combining them into blocks and adding them to the blockchain. As a reward, and to keep miners incentivized, every time a block is completed, the miner responsible for creating that block receives a reward in the form of new ether. Miners compete to earn newly issued tokens known as the block reward.

Ether in Circulation

The total number of ETH in existence can be calculated as:

Pre-mine + Block rewards + Uncle rewards + Uncle referencing rewards + Eth2 staking rewards

Pre-mine

Around 72 million ETH were issued for the genesis block – the first ever block of the Ethereum blockchain. 60 million ETH were allocated to the initial contributors in the 2014 crowd sale that funded the project, and 20% or 12 million ETH were given to the development fund and the Ethereum Foundation.

Block reward

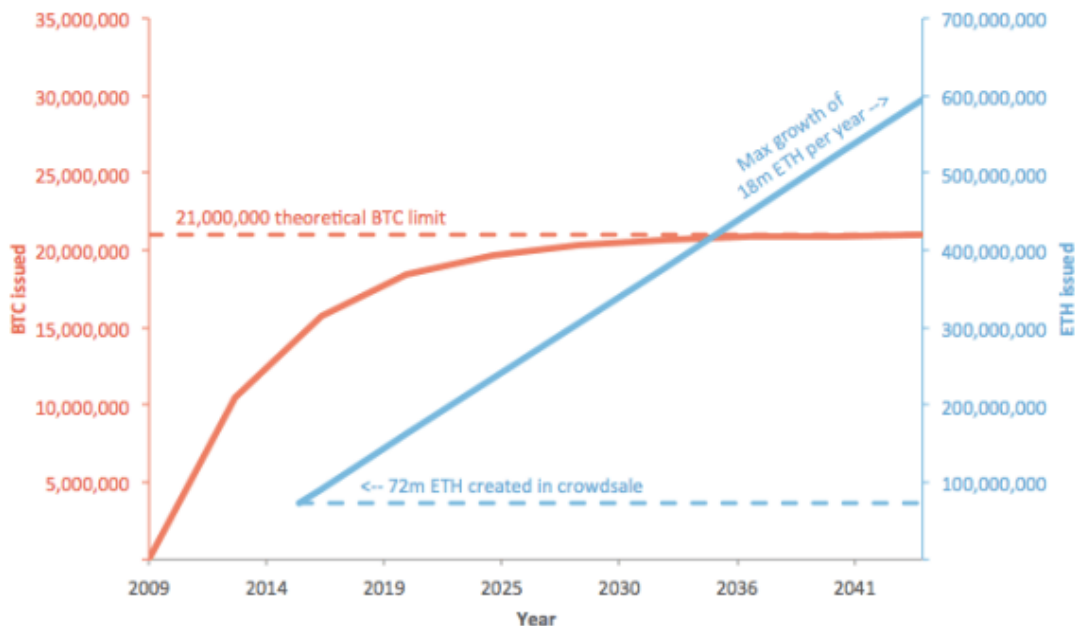
In Ethereum the time between blocks is around 14 seconds, compared with bitcoin's ~10 minutes.

The original block reward in 2015 was 5 ETH per block, which later went down to 3 ETH in late 2017. As of 2019, when a block is successfully mined on the Ethereum blockchain, a miner receives 2 ETH as a reward.

Over time, as more and more ETH are mined, the constant amount mined becomes a smaller and smaller portion of the total amount of existing ETH. The percentage mined of the total existing amount tends to 0% over time, asymptotically, never actually reaching 0%. Therefore, mining will never tail off. A constant amount of ETH will be mined forever. The chart below shows the bitcoin and Ethereum generation models.

Additionally, an equilibrium will eventually be reached when the rate of ETH lost due to carelessness, destruction, etc. equals the rate of new ETH mined.

BTC vs ETH generation model



Source: <https://bitsonblocks.net/2016/10/02/gentle-introduction-ethereum/>

Uncle reward

Ethereum’s rate of block generation is much higher than that of bitcoin. When more blocks get created more quickly, the rate of “block clashes” increases – i.e., multiple valid blocks can get created at almost the same time, but only one of them can make it into the main chain.

In bitcoin these blocks, that are mined a little late and don’t form part of the main blockchain are called ‘orphans’ and are entirely discarded. However, with Ethereum they are called ‘uncles’ and can be referenced by later blocks. This is called the uncle reward.

Uncle referencing reward

A miner who references an uncle also gets a fraction of ETH per uncle.

Gas Reward

The blocks are created or mined by some participants and distributed to other participants for validation.

When a user sends ether or uses an Ethereum application, a small fee in ETH is charged to use the Ethereum network. In addition to block rewards for mining new ether tokens, the miner also receives a fee as an incentive to process and verify what the user is doing. Miners are like the record-keepers of Ethereum – they check and assure the validity of the transaction and keep the Ethereum network secure and free of centralized control.

In bitcoin, the maximum block size is specified in bytes whereas Ethereum's block size is based on complexity of contracts being run – it is known as a Gas limit per block, and the maximum can vary slightly from block to block.

Recent Developments

Ethereum moved to a consensus mechanism called proof-of-stake (PoS) in 2022, this change has been on Ethereum's roadmap, as a plan to move from the electricity-expensive Proof of Work (PoW) mining to a more energy-efficient PoS protocol as part of the Eth2 upgrades.

Eth2 refers to a set of interconnected upgrades that will make Ethereum more scalable, more secure, and more sustainable. These upgrades are being built by multiple teams from across the Ethereum ecosystem.

Proof-of-stake is the underlying mechanism that activates validators upon receipt of enough stake. For Ethereum, users will need to stake 32 ETH to become a validator. Validators are chosen at random to create blocks and are responsible for checking and confirming blocks they do not create.

Unlike proof-of-work, validators do not need to use significant amounts of computational power because they are selected at random and are not competing.

Validators do not mine blocks; they just need to create blocks when chosen and validate or attest proposed blocks when they are not. Validators get rewards for proposing new blocks and for attesting to ones they've seen.

A user's stake is also used to incentivize good validator behavior. For example, a user can lose a portion of their stake for things like going offline (failing to validate) or their entire stake for deliberate collusion.

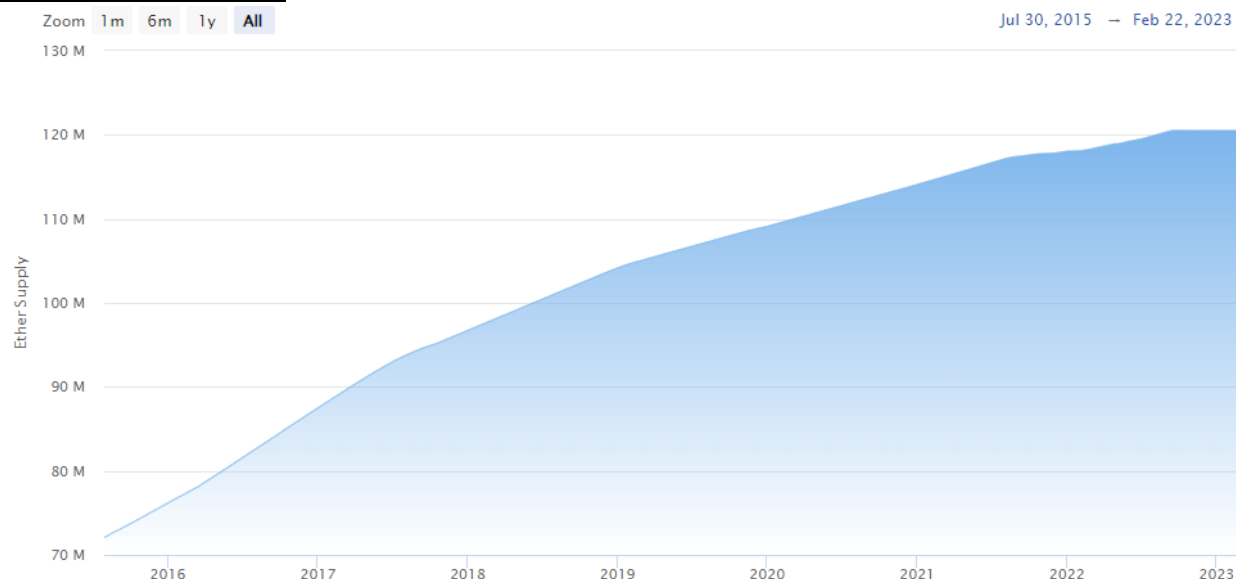
With any changes to Ethereum, such as the transition to PoS, the generation rate is guaranteed to not increase. But it may decrease.

Ether in Circulation

Currently there are 120.45 million ether in circulation, as of February 22, 2023 (see Ether Supply Growth Chart below). 72 million of which were issued in the genesis block. The remaining amount has been generated in the form of block rewards to the miners on the Ethereum network.

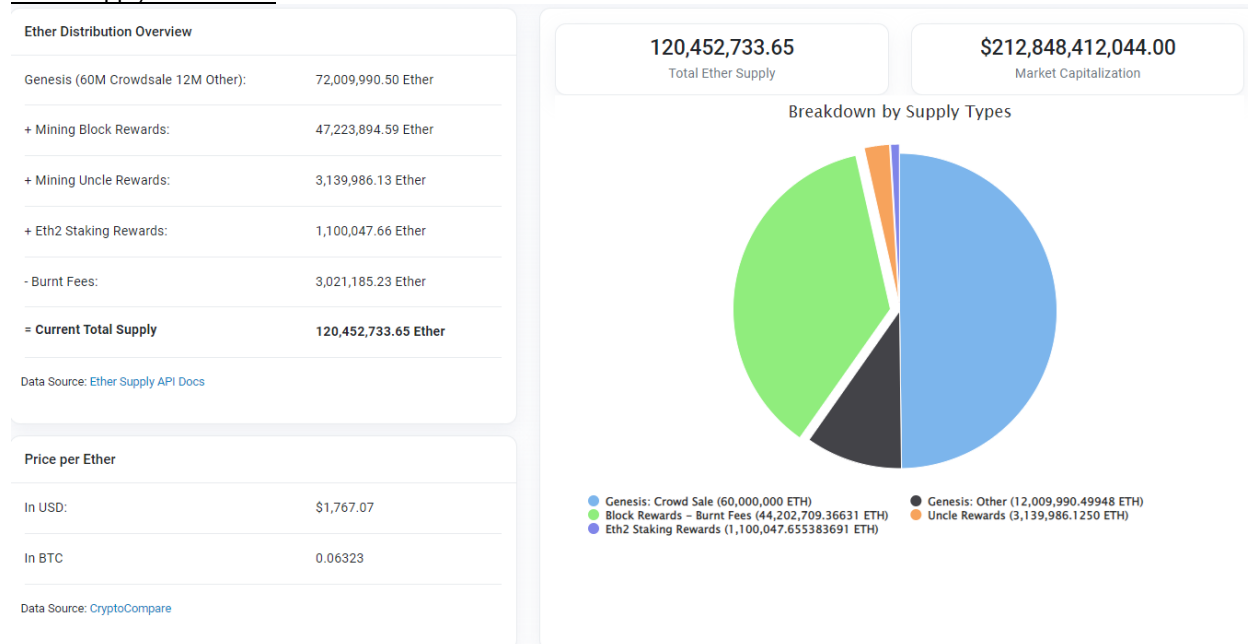
The chart below shows the ether supply growth – a breakdown of daily block reward, uncle inclusion reward, uncle reward and Eth2 staking to arrive at the total daily Ether supply.

Ether Supply Growth Chart



Source: etherscan.io

Ether Supply Distribution



Source: etherscan.io

The table and pie chart above, shows the distribution of ether from reward of both block and uncle block mining to arrive at the current total ether supply of 120.45 million.

The total circulating supply of ETH is not the total spendable supply. The total spendable supply is lower than the total circulating supply, due to accidental loss, willful destruction, and technical peculiarities.

From the total circulating supply of 120.45 million ether, one must discount for unrecoverable ether that are burned; permanently withdrawn from circulation or lost. There is no consensus on the number to be deducted, but best estimates indicate there to be about a 20% total loss. This would produce an estimate of 96.36 million ether as circulating supply (equal to 120.45 million x 0.80).

Deliverable Supply

For the discussion of position limits that follows, the contract size referenced is for the existing Ether futures contract. The standard contract has a 50 ether multiplier.

In theory, all 96.36 million units extant may be considered as notional deliverable supply of contract-grade commodity. A prudentially conservative estimate, however, would acknowledge that ether is traded in multiple currency denominations, of which USD is one.

For illustration, consider that during the six months ending March 31, 2023, approximately 80% of fiat ether transaction volume was in the ETH:USD currency pair⁵. Using 80%, as a conservative USD market share as a proxy for the share of outstanding ether that stands as notional contract-grade supply for Ether futures, it would produce an estimate of 77.09 million ether (equal to 96.36 million x 0.80) as the 'money stock' notionally eligible for delivery in fulfillment of expiring Contracts. The following analysis uses this estimate.

By the standards applicable to agricultural or other commodity futures for physical delivery (i.e., 17 CFR 150.5(b)(1)), the position limit would be set at or below 25 percent of estimated spot month deliverable supply. Under current ether market conditions, the resultant maximum position limit would be 19.27 million ether, or 385,440 contracts ((equal to 77.09 million ether x 0.25) / (50 ether per contract)).

An alternative based on the standard that the Exchange has typically applied to foreign exchange futures products, according to which the position limit is set at or below one percent of the money stock in the contract-grade currency denomination. Applied to the estimated ether 'money stock', the result would be a position limit of 770,880 ether or 15,417 contracts ((equal to (77.09 million ether x 0.01) / (50 ether per contract)) or less.

⁵ Source: www.coinmarketcap.com

Analysis CME CF Bitcoin Reference Rate and Ether-Dollar Reference Rate

Overview

The final settlement price of the Ether/Bitcoin Ratio futures shall be determined by the final settlement prices of the Ether futures contract and the Bitcoin futures contracts of the same contract month. It shall be calculated by the final settlement price of the Ether futures divided by the final settlement price of the Bitcoin futures, rounded to the nearest 0.000001.

The Bitcoin futures contract final settlement is determined by reference to the CME CF Bitcoin Reference Rate (BRR) on the futures contract's last day of trading.

The Ether futures contract final settlement is determined by reference to the CME CF Ether-Dollar Reference Rate (ETHUSD_RR) on the futures contract's last day of trading.

The Exchange commenced daily publication of the BRR in November 2016 and the ETHUSD_RR in May 2018. The Exchange publishes the rates on its website at 4:00 p.m. London time 365 days per year. The BRR/ETHUSD_RR is the U.S. dollar price of bitcoin or ether as derived from the aggregate executed trade flow on major cryptocurrency spot exchanges during a specific calculation window; 3:00 p.m. and 4:00 p.m. London time.

Governance

The Reference Rates are calculated and administrated by CF Benchmarks, a leading provider of cryptocurrency benchmarks and indices. CF Benchmarks is registered with the European Securities and Markets Authority ("ESMA") as a benchmark administrator in accordance with Article 34 of the EU Benchmark Regulation and under the regulatory supervision of the UK Financial Conduct Authority. The CME CF Benchmark Statement, which provides additional details on regulatory compliance requirements, is available on the CF Benchmarks website.⁶

Furthermore, an Oversight Committee is responsible for overseeing certain activities undertaken in connection with the Reference Rates by approving and regularly reviewing the calculation methodology, practice, standards, and definition of the reference rate to ensure it remains relevant and robust. Currently there are seven (7) members of the Oversight Committee. The Oversight Committee is comprised of a (1) CF Benchmarks representative, two (2) representatives from CME Group, and at least two (2) independent experts. The Oversight Committee meets at least once per quarter and publishes its minutes publicly on the CF Benchmark's website. Further details of the Oversight Committee's charter and related governance policies are available on the [CF Benchmarks](#) website.⁷

License Arrangements

There is sufficiency of data inputs for the calculation, and the data is provided under licensing arrangements with each Constituent Exchange, who in turn meet strict entry criteria.

The Exchange uses the Bitcoin and Ether-Dollar Reference Rate under the terms of a data sharing license agreement with CF Benchmarks Ltd.

⁶ CME-CF Benchmark Statement: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Benchmark+Statement.pdf>

⁷ CME-CF Oversight Committee Charter:

<https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Oversight+Committee+Charter.pdf>

CME-CF Practice Standards: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Practice+Standards.pdf>

CME-CF Conflicts of Interest Policy: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Conflicts+of+Interest+Policy.pdf>

Constituent Exchange Eligibility Criteria

The BRR and ETHUSD_RR are calculated from U.S. Dollar bitcoin and ether trades transacted on specific constituent exchanges. Specific eligibility criteria must be adhered to, in order to become a constituent exchange. The constituent exchanges eligibility criteria are publicly available on the CF Benchmarks website.⁸

To assure that the rates reflect global cryptocurrency trading activity in a representative and unbiased manner, a geographically diverse set of constituent exchanges are included within the current framework for deriving valuations. Applications in connection with potential additions of new constituent exchanges will continue to be based on the predefined eligibility criteria, and the operation of all existing constituent exchanges will continue to be monitored against the same criteria.

To assure that the CME CF Reference Rates 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. Applications for new Constituent Exchanges to be added will be based on a set of predefined criteria, and the operation of existing Constituent Exchanges will be monitored against the same criteria. The Constituent Exchanges eligibility criteria is publicly available on the CF Benchmarks website.⁹

A trading venue is eligible as a Constituent Exchange in any of the CME CF Cryptocurrency Reference Rates if it facilitates spot trading of the relevant cryptocurrency against the corresponding fiat currency (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, in the opinion of the Oversight Committee, fulfil the below criteria

1. The venue’s Relevant Pair spot trading volume for an index must meet the minimum thresholds as detailed below 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.
2. 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.
3. 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.
4. 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 (AML) regulations.
5. 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 fulfil criteria 2 to 5 inclusive. 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.

Currently, there are six (6) Constituent Exchanges: Bitstamp, Coinbase, Gemini, itBit, LMAX Digital and Kraken as more specifically noted below. The list of current Constituent Exchanges is also available on the CF Benchmarks website.¹⁰

Constituent Exchanges

8 CME-CF Constituent Exchanges Eligibility Criteria: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Constituent+Exchanges+Criteria.pdf>

9 CME-CF Constituent Exchanges Eligibility Criteria: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Constituent+Exchanges+Criteria.pdf>

10 CME-CF Constituent Exchanges List: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Constituent+Exchanges.pdf>

Constitute Exchange	Date Added
Bitstamp	May 14, 2018
Coinbase	Oct 28, 2019
Gemini	Aug 30, 2019
itBit	July 15, 2019
LMAX Digital	May 3, 2022
Kraken	May 14, 2018

Calculation Methodology

The Reference rates are the aggregation of executed trade flow of major cryptocurrency spot exchanges that participate in the price discovery process as constituent exchanges during a specific one-hour calculation window (3:00 p.m. to 4:00 p.m. London time). All relevant transactions are added to a joint list, recording the trade price and size for each transaction. This one-hour window is then partitioned into twelve, five-minute intervals. For each partition, the volume-weighted median trade price is calculated from the trade prices and sizes of all relevant transactions across all constituent exchanges. The BRR and ETHUSD_RR are then derived from the equally-weighted average of the volume-weighted medians of all partitions and published daily at 4:00 p.m. London time.

The calculation methodology is publicly available on the CF Benchmarks website.¹¹

A pre-defined CF Benchmarks policy has also been established to evaluate any hard fork for its significance and impact on the rates. Procedural policy details are provided in a Hard Fork Policy document on the CF Benchmark website.¹²

Qualitative Description

CME CF Cryptocurrency Reference Rates are calculated based on the Relevant Transactions of all Constituent Exchanges. Calculation steps on any given Calculation Day are as follows:

1. All Relevant Transactions in the specified pair, from Constituent Exchanges are added to a joint list, recording the trade price and size for each transaction. The assessment is calculated based on one hour of trades per day from 3:00 p.m. to 4:00 p.m. London time (the "Observation Period").
2. The list is partitioned into a number of equally sized time intervals (12, 5-minute partitions).
3. For each partition separately, the volume-weighted median trade price is calculated from the trade prices and sizes of all Relevant Transactions, i.e., across all Constituent Exchanges.
4. The CME CF Cryptocurrency Reference Rate is then given by the equally weighted average of the volume-weighted medians of all partitions.

A pre-defined CF Benchmarks policy has also been established to evaluate any hard fork for its significance and impact on the index. Procedural policy details are provided in a Hard Fork Policy document on the CF Benchmark website.¹³

Methodology Design Choices

The calculation methodology mitigates to a high degree against price anomalies, while being replicable through spot trading on the Constituent Exchanges. This is achieved through several design choices around partitions, the weighting of those partitions, medians, and the volume weighting of medians. Further details on the methodology are available on the CF Benchmarks website.¹⁴

¹¹ CME-CF Reference Rate Methodology: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Reference+Rates+Methodology.pdf>

¹² CME-CF Hard Fork Policy: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Hard+Fork+Policy.pdf>

¹³ CME-CF Hard Fork Policy: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Hard+Fork+Policy.pdf>

¹⁴ CME-CF Reference Rate Methodology: <https://docs-cfbenchmarks.s3.amazonaws.com/CME+CF+Reference+Rates+Methodology.pdf>

Overall, the Reference Rates are designed to have limited susceptibility to temporary price swings and outlier prices. There are criteria for an exchange to charge a fee for trading, which reduces the likelihood of wash trading to increase volumes. The calculation only includes ether trades executed in US Dollar and (1) excludes alternate currency pairs or crypto to crypto trading, (2) does not apply conversion calculations, and (3) excludes stable coin transactions.

Not Readily Susceptible to Manipulation

The index is not readily susceptible to manipulation due to the design of the methodology. As noted above, the use of medians reduces the effect of outlier prices on one or more Constituent Exchange. The volume-weighting of medians filters out high numbers of small trades that may otherwise control the value of a non-volume weighted median. The use of twelve (12) non-weighted partitions assures that price information is sourced equally over the entire observation period. Influencing the rate would therefore require trading activity during multiple partitions on several exchanges over an extended period, which would prove a costly and an operationally intensive undertaking. The methodology is designed to remove the reliance on any single contributing exchange, where delayed or missing data from an exchange does not cause a calculation failure.

In accordance with the methodology, if for any Constituent Exchange the absolute percentage deviation of the volume-weighted median trade price in comparison with the median of the volume-weighted median trade prices of all Constituent Exchanges exceeds a given threshold (currently set at 10% and defined in the methodology), all relevant transactions of that Constituent Exchange are flagged as potentially erroneous and are disregarded in the calculation of index for that calculation day.

Furthermore, for inclusion in the calculation, a Constituent Exchange's spot trading volume must meet the minimum threshold (currently, 3% relative contribution over two (2) consecutive quarters) as detailed in the methodology.

The criteria collectively cause that Constituent Exchanges deliver transparent and consistent trade and order data to CF Benchmarks via an API with sufficient reliability, detail, and timeliness.

The Constituent Exchanges maintain fair and transparent market conditions to impede illegal, unfair, or manipulative trading practices, and comply with applicable law and regulations including, capital markets regulations, money transmission regulations, client money custody requirements, know-your-client ("KYC") requirements, and anti-money-laundering ("AML") regulations.

The Constituent Exchanges are also required to cooperate with inquiries and investigations of the administrator (CF Benchmarks) and execute a data sharing agreement with CME.

In aggregate, the six (6) Constituent Exchanges that contribute data to the Reference Rate host several thousand transactions on a daily basis and represent over 60% for Bitcoin and 80% for Ether to USD transactions, making the indices a source of price discovery and transparency for the market.

Quality of Data Inputs

The Reference Rate methodology adheres to rules in consideration of the following factors to ensure the robustness of the index:

- Delayed data and missing data
- Erroneous data
- Potentially erroneous data
- Calculation failure

The calculation process includes automated screening for erroneous data for non-numeric or non-positive trade price or trade size and un-parseable data.

Automated data validation checks are implemented for each Constituent Exchange individually. Such validation checks are made to ensure that the volume-weighted median trade price for one Constituent Exchange does not deviate too widely from the median of the volume-weighted median trade prices of all Constituent Exchanges. Any data that is outside of a pre-defined deviation tolerance of the other Constituent Exchanges results in the entire data set from that particular Constituent Exchange being discarded.

Customer Feedback

The Exchange engaged with numerous market participants regarding the proposal. Market participants are supportive of the new contract and have validated the specifications of the Contract. The Exchange did not obtain any opposing views from market participants regarding the Contract.

Compliance with Core Principles

The Exchange reviewed the designated contract market core principles (“DCM Core Principles”) as set forth in the Commodity Exchange Act (“CEA” or the “Act”) and identified that the following DCM Core Principles may be impacted as follows:

Core Principle 2 – Compliance with Rules

Trading in the Contracts shall be subject to CME Rulebook Chapter 4, which includes prohibitions against fraudulent, noncompetitive, unfair, and abusive practices. Additionally, trading in the Contracts shall be subject to the Exchange’s trade practice rules, the majority of which are contained in Chapter 5 and Chapter 8 of the Rulebook. Trading activity in the Contracts shall be subject to monitoring and surveillance by CME Group’s Market Regulation Department, which has the authority to exercise its investigatory and enforcement power where potential rule violations are identified.

Core Principle 3 – Contracts Not Readily Subject to Manipulation

The underlying settlement rates are not readily subject to manipulation. The final settlement price of the Ether/Bitcoin Ratio futures shall be determined by the final settlement prices of the Ether futures contract and the Bitcoin futures contracts of the same contract month.

The Bitcoin futures and Ether futures final settlement is determined by reference to the CME CF Bitcoin Reference Rate (BRR) and CME CF Ether-Dollar Reference Rate (ETHUSD_RR), respectively, on the futures contract’s last day of trading.

The CME CF Bitcoin Reference Rate (BRR) and the CME CF Ether Reference Rate (ETHUSD_RR), are not readily subject to manipulation. The index is calculated from a large number of trades observed during the calculation window. The combination of volume weighting of medians plus non-weighted partitions prevents manipulation in the reference rates. Ultimately, influencing the BRR or ETHUSD_RR would require significant trading activity on several exchanges over an extended period of time.

BRR and ETHUSD_RR are calculated and administered by CF Benchmarks (registered with the European Securities and Markets Authority as a benchmark administrator in accordance with Article 34 of the EU Benchmarks Regulation) under the regulatory supervision of the UK Financial Conduct Authority.

Core Principle 4 – Prevention of Market Disruption

Trading in the Contract will be subject to CME Rulebook Chapters 4 and 7, which include prohibitions on manipulation, price distortion, and disruption to the expiration and assignment process. As with any new product listed for trading on a CME Group designated contract market, trading activity in the Contracts will be subject to monitoring and surveillance by CME Group’s Market Regulation Department.

Core Principle 5 – Position Limits or Accountability

The spot month position limits will be set at 4,000 EBR contracts effective on the first trading day of the expiring contract month. A position accountability level of 5,000 EBR contracts shall be applied to positions in single months outside the spot month and in all months combined.

The reportable level shall be 1 EBR contract.

Core Principle 7 – Availability of General Information

The Exchange shall disseminate a Special Executive Report (“SER”) that sets forth information in regard to specifications, terms, and conditions of the Contracts. The SER will also be published on the Exchange’s website.

Core Principle 8 – Daily Publication of Trading Information

The Exchange shall publish trading volumes, open interest levels, and price information daily of the Contracts on the CME Group website and through quote vendors.

Core Principle 9 – Execution of Transactions

The Contracts will be listed for trading on the CME Globex electronic trading and for clearing through CME ClearPort. The CME Globex electronic trading venue provides for competitive and open execution of transactions. CME Globex affords the benefits of reliability and global connectivity.

Core Principle 10 – Trade Information

All requisite trade information shall be included in the audit trail and will suffice for the Market Regulation Department to monitor for market abuse.

Core Principle 11 – Financial Integrity of Transactions

The Contracts shall be cleared by CME Clearing, which is registered with the Commission as a derivative clearing organization, and which is subject to all CFTC regulations related thereto.

Core Principle 12 – Protection of Markets and Market Participants

Chapters 4 and 5 in the CME Rulebook set forth multiple strictures that preclude intermediaries from disadvantaging their customers. These Rules apply to trading in the Exchange’s competitive trading venues and will apply to transactions in the Contract.

Core Principle 13 – Disciplinary Procedures

Chapter 4 of the CME Rulebook provide for the Exchange to discipline, suspend, or expel members or market participants who violate the rules of the Exchange. Trading in the Contract shall be subject to these provisions. The Exchange’s Market Regulation Department has the authority to exercise its powers of enforcement, in the event that rule violations in the Contracts are identified.

Core Principle 14 – Dispute Resolution

Disputes in respect of the Contract shall be subject to the arbitration provisions set forth in Chapter 6 of both the CME Rulebook, which allow all nonmembers to submit to arbitration claims for financial loss resulting from transactions on the Exchange. Pursuant to these provisions, any member named as a respondent in any such claim submitted by a nonmember is required to participate in arbitration proceedings. Additionally, the Exchange requires members to resolve via arbitration all disputes concerning transactions on the Exchange.

Pursuant to Section 5c(c) of the Act and CFTC Regulation 40.2(a), the Exchange certifies that listing the Contract complies with the Act including all regulations thereunder. As previously noted, there were no substantive opposing views to this proposal.

The Exchange certifies that this submission has been concurrently posted on the Exchange's website at <http://www.cmegroup.com/market-regulation/rule-fillings.html>.

Should you have any questions concerning the above, please contact the undersigned at (212) 299-2200 or CMEGSubmissionInquiry@cmegroup.com.

Sincerely,

/s/ Christopher Bowen
Managing Director and Chief Regulatory Counsel

Attachments:	Appendix A	CME Rulebook Chapter 351 ("Ether/Bitcoin Ratio Futures")
	Appendix B	Position Limit, Position Accountability, and Reportable Level Table, CME Rulebook Chapter 5 (attached under separate cover)
	Appendix C	Rule 588.H. – ("Globex Non-Reviewable Trading Ranges") Table
	Appendix D	Rule 589. – Special Price Fluctuation Limits and Daily Price Limits Table
	Appendix E	Daily Settlement Procedure Document
	Appendix F	Exchange Fees

Appendix A

CME Rulebook Chapter 351 Ether/Bitcoin Ratio Futures

35100. SCOPE OF CHAPTER

This chapter is limited in application to the cash settlement of Ether/Bitcoin Ratio Futures. In addition to this chapter, futures shall be subject to the general rules and regulations of the Exchange as applicable.

35101. ETHER/BITCOIN RATIO

The Ether/Bitcoin Ratio Index shall be defined as the ratio of the settlement US Dollar price of one (1) Ether Futures Contract (CME Chapter 349) divided by the settlement US Dollar price of one (1) Bitcoin Futures Contract (CME Chapter 350).

35102. TRADING SPECIFICATIONS

35102.A. Trading Schedule

Futures contracts shall be scheduled for trading during such hours and for delivery in such months as may be determined by the Exchange.

35102.B. Trading Unit

The contract shall be defined as USD 1,000,000 multiplied by the Ether/Bitcoin Ratio Index.

35102.C. Price Increments

Prices shall be quoted in index points. The minimum price increment shall be 0.000005 index points, equivalent to \$5.00 per Contract.

35102.D. Position Limits, Exemptions, Position Accountability and Reportable Levels

The applicable position limits and/or accountability levels, in addition to the reportable levels, are set forth in the Position Limit, Position Accountability and Reportable Level Table in the Interpretations & Special Notices Section of Chapter 5.

A Person seeking an exemption from position limits for bona fide commercial purposes shall apply to the Market Regulation Department on forms provided by the Exchange, and the Market Regulation Department may grant qualified exemptions in its sole discretion.

Refer to Rule 559 for requirements concerning the aggregation of positions and allowable exemptions from the specified position limits.

35102.E. Price Limits and Trading Halts

At the commencement of each Trading Day, the contract shall be subject to special price fluctuation limits and daily price limits as set forth in Rule 589 and in the Special Price Fluctuation Limits and Daily Price Limits Table in the Interpretations & Special Notices Section of Chapter 5.

35102.F. Termination of Trading

Trading in expiring futures shall terminate at 4:00 p.m. London time on the last Friday of the contract month if that day is a business day in either the UK or the US. If that day is not a business day in both the UK and the US, trading shall terminate on the preceding day that is a business day in either the UK or the US.

35103. FINAL SETTLEMENT

Final settlement shall be by cash settlement.

35103.A. Final Settlement Price

The final settlement price of the Ether/Bitcoin Ratio Futures shall be determined by the final settlement prices of the Ether Futures contract and the Bitcoin Futures contracts of the same contract month. It shall be calculated by the final settlement price of the Ether Futures divided by the final settlement price of the Bitcoin Futures, rounded to the nearest 0.000001.

35103.B. Market Disruption Events

In the event of Disruption to the Final Settlement price Determination for Ether Futures (per Rule 34903.A.) and or the Final Settlement Price Determination for Bitcoin Futures (per Rule 35003.A.), the settlement price of Ether/Bitcoin Ratio Futures shall be deferred until the Disruption of the Bitcoin Futures and or Ether Futures final settlement price determination have been resolved.

(End of Chapter 351)

Appendix B

**CME Rulebook
Chapter 5
("Trading Qualifications and Practices")
Position Limit, Position Accountability, and Reportable Level Table**

(attached under separate cover)

Appendix C

**CME Rulebook
Chapter 5
("Trading Qualifications and Practices")
Rule 588.H. – ("Globex Non-Reviewable Trading Ranges") Table
(additions underscored)**

Instrument Name	Globex Non-Reviewable Ranges (NRR)					
	Globex Symbol	Outrights			Spreads	
		Globex Non-Reviewable Ranges (NRR)	NRR: Globex Format	NRR: Minimum Ticks	NRR: Globex Format	NRR: Outright Minimum Ticks
<u>Ether/Bitcoin Ratio Futures</u>	<u>EBR</u>	<u>200 Index points</u>	<u>200</u>	<u>40</u>	<u>N/A</u>	<u>N/A</u>

Appendix D

**CME Rulebook
Chapter 5
("Trading Qualifications and Practices")
Rule 589. – Special Price Fluctuation Limits and Daily Price Limits Table
(additions underscored)**

Product	Rulebook Chapter	Commodity Code	Primary/Associated	Associated With	Daily Price Limit
<u>Ether/Bitcoin Ratio Futures</u>	<u>351</u>	<u>EBR</u>	<u>Primary</u>	<u>Primary</u>	<u>Daily Price Limit Table</u>

Appendix E

Ether/Bitcoin Ratio Futures – Daily Settlement Procedure Document

CME Ether/Bitcoin Ratio Futures Daily Settlement Procedure

Normal Daily Settlement Procedure

CME Group staff determines the daily settlements for Ether/Bitcoin Ratio futures based on the settlements in the individual Ether and Bitcoin futures contracts.

All Months

All Ether/Bitcoin Ratio Futures contract months will settle by taking the daily settlement price in the Ether futures contract and dividing it by the daily settlement price in the Bitcoin futures contract.

For example, if the settlement in the December 2023 Ether futures is 2,000 and the settlement in the December 2023 Bitcoin futures is 35,000 the settlement in the December 2023 Ether/Bitcoin Ratio futures will be $2,000/35,000 = 0.057142$ rounded to the nearest tradable tick.

Final Settlement Procedure

Please reference rule book chapter 351 (*link to follow*)

If you have any questions, please call the CME Global Command Center at 800.438.8616, in Europe at 44.800.898.013, or in Asia at 65.6532.5010.

Note: In the event the aforementioned calculations cannot be made or if CME Group staff, in its sole discretion, determines that anomalous activity produces results that are not representative of the fair value of the contract, staff may determine an alternative settlement price.

Appendix F

Exchange Fees

Membership Type	Venue/Transaction Type	Fee
Individual Members Clearing Members Rule 106.J Equity Member Firms & Rule 106.J Qualified Subsidiaries Rule 106.I Members & Rule 106.I Qualified Affiliates Rule 106.S Member Approved Funds	CME Globex	\$2.50
	EFP	\$3.75
	EFR	\$3.75
	Block	\$3.75
	Delivery	\$1.25
	Exe Asn Future From	\$1.30
Rule 106.D Lessees Rule 106.F Employees	CME Globex	\$3.75
	EFP	\$5.63
	EFR	\$5.63
	Block	\$5.63
	Delivery	\$1.90
	Exe Asn Future From	\$1.95
Rule 106.R Electronic Corporate Members (For other than CME Globex - Non-Member rates apply)	CME Globex	\$3.83
Rule 106.H and 106.N Firms	CME Globex	\$4.00
	EFP	\$6.00
	EFR	\$6.00
	Block	\$6.00
	Delivery	\$2.00
	Exe Asn Future From	\$2.05
International Incentive Program (IIP) Participants International Volume Incentive Program (IVIP) Participants (For other than CME Globex - Non-Member rates apply)	CME Globex	\$5.00
Central Bank Incentive Program (CBIP) Participants Latin American Fund Manager Incentive Program (FMIP) Participants (For other than CME Globex - Non-Member rates apply)	CME Globex	\$5.00
Members Trading Outside of Division (For other than CME Globex During ETH - Non-Member rates apply)	CME Globex During ETH Only	\$4.90
Non-Members	CME Globex	\$5.00
	EFP	\$7.50
	EFR	\$7.50
	Block	\$7.50
	Delivery	\$2.50
	Exe Asn Future From	\$2.55

Processing Fees	Fee
Position Adjustment/Position Transfer	\$0.10
Give-Up Surcharge	\$0.05
Facilitation Fee	\$0.40