CMBI Multi Asset Series Methodology

Version 1.1

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1 Introduction

Coin Metrics' mission is to provide transparent and actionable cryptoasset market and network (on-chain) data. As one of the early providers of both market and network data, Coin Metrics is uniquely positioned to provide investors with a high quality suite of crypto indexes.

The Coin Metrics Bletchley Indexes ("CMBI") are designed to provide cryptoasset markets with a diverse range of market capitalization-weighted, equal-weighted and network data-weighted indexes to measure performance of the largest and most utilized global cryptoassets. CMBI products are operated and calculated by Coin Metrics and are designed to serve as an independent, transparent, and comprehensive measure of cryptoasset market performance.

Indexes are weighted and calculated using a robust and resilient methodology that is resistant to manipulation and adheres to international best practices for financial benchmarks, including the International Organization of Securities Commissions' (IOSCO) Principles for Financial Benchmarks. The Coin Metrics Oversight Committee (the "Oversight Committee") protects the integrity of CMBI and ensures the indexes serve as a source of transparent and independent benchmarking.

1.1 Description

The CMBI Multi Asset Series reflects the returns an investor would expect by purchasing all of the cryptoassets at the corresponding weights for each index. Index levels are quoted in real time and assets are rebalanced at 16:00 ET on the first business day of every month to account for the inflation rate of each asset, changes in free float supply, changes in market pricing, and the addition or deletion of index constituents.

Coin Metrics conducts a comprehensive assessment of all cryptoassets to ensure that the Indexes represent the full breadth of investment opportunities in the global cryptoasset market. Coin Metrics formally defines a cryptoasset as any digital asset that exhibit the following characteristics:

1. The use of a distributed ledger to allow remote peer-to-peer transfer of native units of the cryptoasset
2. The state of the distributed ledger is maintained by distributed consensus and does not require a central authority or trusted intermediary to function
3. Ownership of native units of the cryptoasset can be proven by cryptography

Provided these requirements are met, the cryptoasset can be issued on any underlying blockchain architecture and use any distributed consensus mechanism.

Given the early stages and financial immaturity of the cryptoasset market, there is not enough sophisticated trading infrastructure, custody solutions, liquidity or other financial services to support the long tail of cryptoassets. Many of these factors have gone into the design of CMBI

products and the methodology outlined below so as to create a suite of truly investable indexes. As the ecosystem evolves and becomes more sophisticated it may be deemed that other indexes become investable.

Index levels are available through the Coin Metrics website (https://indexes.coinmetrics.io/), major financial quote vendors and print and electronic media outlets.

1.2 Administration

Coin Metrics serves as the administrator for CMBI products and has primary responsibility for all aspects of the index construction process, including development, definition, determination, dissemination, operation, and governance. All aspects of index production are carried out by Coin Metrics; however, Coin Metrics may rely on third party agreements to obtain data inputs for index calculation.

Coin Metrics ensures that transparency in relation to significant decisions and associated rationale are published and made available to external stakeholders. Data contingency and exclusion rules are in place to handle certain extraordinary circumstances and external factors beyond the control of Coin Metrics.

2 Other Documents

The CMBI Indexes are collectively governed by policies described in CMBI Index Policies, which outline the administration, oversight, conflicts of interest, significant changes and terminations, recalculations, internal controls, complaints, record retention, and compliance policies.

The CMBI Indexes are supervised by the CMBI Governance Committee Charter, which defines the roles and responsibilities of the Oversight Committee and the Index Committee.

3 Data Inputs

3.1 Coin Metrics Prices

Constituent price data for CMBI Multi Asset Indexes is sourced from Coin Metrics Reference Rates. Refer to the CM Prices Methodology for more information on hourly/end-of-day and real-time pricing.

3.2 Free-Float Market Capitalization

The Adjusted Free Float Supply is an approximation of the amount of a cryptoasset's native units that are considered to be available to the market. In the absence of a regulated definition of supply and accurate, reliable, and timely reporting from all cryptoasset companies/foundations, applying a standardized adjustment to all cryptoassets helps to overcome discrepancies in reporting standards and on-chain transparency. Coin Metrics have adopted a banding approach to make adjustments to an asset's Current Supply. Such an approach increases the investability of indexes by reducing the turnover and trading costs associated with index tracking.

3.3 Expected 10-Year Market Capitalization

The Expected 10-Year Future Supply is defined as the number of tokens that a foundation or company is allowed to issue over the next 10 years without adjustments to the protocol layer. This includes all tokens that vest in the next 10 years, unissued tokens that are created in Initial Coin Offerings (ICOs), Token Generation Events (TGEs), or any other sale or launch mechanisms, as well as the projected new supply of tokens as programmatically defined by the codebase as it currently stands. It does not include tokens that are burned or provably lost.

3.4 Eligibility Criteria

3.4.1 Pricing

Cryptoassets are required to meet the following price criteria to ensure there are reliable and robust sources and trade pairs on which to derive an asset's fair price.

- Cryptoassets must trade on at least one active market on an eligible exchange where the quote asset is the U.S. Dollar, Bitcoin, or Ethereum.

- Cryptoassets with extremely low prices are susceptible to liquidity and investability issues if the minimum price fluctuation of a cryptoasset represents a meaningful percentage of its price. For this reason, cryptoassets are required to meet a minimum price requirement. A cryptoasset's median price over the past 30 days denominated in Bitcoin must exceed 0.0000001 BTC, as measured by Coin Metrics Hourly Reference Rates, to be eligible for inclusion.

- Cryptoassets must have a free floating price (i.e., not pegged to any underlying real or digital asset).

3.4.2 Markets

Cryptoassets are required to have a listing on an eligible exchange to ensure there are reliable sources and trade pairs from which an asset's fair price can be derived. The following criteria are used in determination of eligibility:

- *Technology*: An assessment of whether the exchange's technology infrastructure provides sufficient availability and reliability for input data collection. Evaluates whether the exchange offers a REST API, WebSocket feed, or FIX API suitable for data collection. Evaluates the performance of the API in terms of reliability and latency.

- *Legal and Compliance*: An assessment of whether the exchange complies with laws and regulations. Coin Metrics evaluates whether the exchange: has publicly-disclosed trading policies; uses market surveillance technology; complies with national regulatory organizations; enforces KYC and AML requirements; has functioning fiat and cryptoasset withdrawals processed within a normal timeframe; has a data sharing license can be executed with the exchange.

- *Business Model*: An assessment of the exchange with respect to its business model, including its fee structure and asset listing standards.

- *Data Availability*: An assessment of the available data the exchange offers, including the number of markets that the given cryptoasset is the base currency, whether markets are quoted in fiat currencies or other cryptoassets, and the type of markets offered.

- *Price*: An assessment of the quality of the exchange's price data, including testing for the occurrence of price outliers and impactful price deviations from other exchanges, and whether the exchange operates markets that are anchored by observable transactions entered into at arm's length between buyers and sellers.

- *Volume*: An assessment of the quality of the exchange's volume data, including testing for manipulated volume figures, and implementing tests that determine whether the exchange operates active markets and are anchored by observable transactions entered into at arm's length between buyers and sellers. The size of the exchange's markets are also considered.

- *Order Book*: An assessment of the quality of the exchange's order book data, including tests for manipulated orders, and implementing tests that determine whether the exchange operates active markets and are anchored by observable transactions entered into at arm's length between buyers and sellers. The liquidity of the exchange's markets are also considered.

3.4.3 Volume

Cryptoassets are required to meet minimum liquidity requirements to ensure that a given cryptoasset has appropriate liquidity to facilitate trading and portfolio management with acceptable levels of market impact. Liquidity is measured by the 30-day and 180-day annualized traded value ratio (ATVR). The ATVR is designed to measure normal levels of liquidity and is robust to outliers where extremely high or low levels of volume may be observed on a given day. The 30-day ATVR and 180-day ATVR are used to evaluate a cryptoasset's liquidity over a short-term and intermediate-term period.

The ATVR is calculated for a given cryptoasset using the following steps:

1. For each day, the daily traded value is first calculated as the sum of the number of units traded of the given cryptoasset from markets traded on the set of eligible exchanges where the base asset is the given asset and the quote asset is the U.S. dollar, Bitcoin or Ethereum multiplied by the price in U.S. dollars of the given cryptoasset at the end of the daily interval. The price in U.S. dollars is obtained from the Coin Metrics Reference Rates.
2. For each day, the daily traded value ratio is calculated as the daily traded value divided by the asset's free float market capitalization.
3. The annualized traded value ratio is calculated as the median of the daily traded value ratios over the given time window and annualizing this figure by multiplying it by 365.

A cryptoasset is required to have a 30-day ATVR and 180-day ATVR of over 5 percent to be eligible for inclusion as an index constituent.

3.4.4 Supply

Cryptoassets are required to meet minimum free float supply requirements to ensure that a sufficient percentage of the supply is available for purchase in the public markets. A cryptoasset is required to have a free float supply of at least 15 percent of its total current supply to be eligible for inclusion as an index constituent.

3.4.5 Custody

A cryptoasset is required to be custodied by a regulated third-party custodian to be eligible for inclusion as an index constituent. The list of custodians considered to meet his criteria include: Anchorage, Bakkt Warehouse, BitGo, Coinbase Custody, Fidelity Digital Assets, Gemini Custody, itBit, Kingdom Trust, and New York Digital Investment Group.

3.4.6 New Token Eligibility

Newly created cryptoassets, by means of an initial coin offering, initial exchange offering, new blockchain launch, or other similar methods are subject to a minimum length of trading requirement. A cryptoasset is required to be traded on an eligible exchange for a minimum of 30 days to be eligible for inclusion as an index constituent.

A newly created asset that is created by means of a fork of an existing cryptoasset are excluded from the minimum length of trading requirement. Forked assets are eligible for inclusion as an index constituent in the following rebalance provided all other investability requirements are met.

3.4.7 Node Hosting

Coin Metrics must be able to independently rebuild a cryptoasset's ledger, for any point in time, using data provided by the asset's protocol implementation and, using this reconstructed ledger, verify that its supply matches what it should be according to the protocol's specification. This supply data is necessary for index construction.

Coin Metrics evaluates a cryptoasset's full node software and/or accompanying APIs under various dimensions. These dimensions include its ability to synchronize with the current state of the network, the ability for it to remain synchronized under normal operating conditions, the degree of code auditability, and the difficulty required in extracting raw blockchain data and reconstructing the ledger.

Access to a cryptoasset's full historical state is required to meet minimum requirements as determined by the Coin Metrics Index Committee. For certain assets, the Coin Metrics Index

Committee may consider this requirement to be satisfied if a third party API can be used to query the ledger and enable us to fully audit historical states in lieu of hosting a full node.

4 Index Calculation Methodology

4.1 Approach

There are two steps in the creation of CMBI Multi Asset Series products. The first is the selection of index constituents; the second is weighting constituents within the index.

At each rebalance, all cryptoassets that meet the eligibility criteria are selected as the possible investment universe of CMBI Multi Asset Series products.

Market capitalization indexes are rebalanced monthly at 16:00 ET on the first business day of the month ("Effective Date"). The rebalance reference date ("Reference Date") is three business days prior to the rebalancing day at midnight UTC. Business days are defined as Monday - Friday excluding public holidays, as defined by the New York Stock Exchange (NYSE) holidays and trading hours calendar.

4.2 Market Capitalization Indexes

4.2.1 CMBI Bitcoin and Ethereum

The rebalancing process is as described below:

1. Universe: The eligible investment universe is Bitcoin and Ethereum only.
2. Constituent Selection: The only constituents selected are Bitcoin and Ethereum.
3. Weighting: Index constituents are weighted by their Adjusted Free Float Market Capitalization.

4.2.2 CMBI 10

The rebalancing process is as described below:

1. Universe: Assess all new and existing cryptoassets against the eligibility criteria and update the CMBI universe of assets.

2. <u>Constituent Selection</u> : As of the rebalancing reference date, cryptoassets that meet the eligibility criteria are ranked in descending order by their expected adjusted free-float market capitalization in 10 years time. This is determined by multiplying the asset's price today by the expected float in 10 years. The top ten largest cryptoassets by their expected 10 year market capitalization are selected as constituents of the CMBI 10. A buffer rule is applied during the constituent selection process of each rebalance to reduce the index turnover.

   a. Cryptoassets in the top eight are automatically accepted for inclusion in the index.

   b. Of the other cryptoassets in the top twelve, those that were included during the last rebalance are selected based on expected 10 year market capitalization.

   c. If the index has not been filled, the highest ranking non-constituents in the top twelve are selected for inclusion.

3. <u>Weighting</u> : Index constituents are weighted by their Adjusted Free Float Market Capitalization.

4.2.3 CMBI 10 Excluding Bitcoin

The rebalancing process is as described below:

1. <u>Universe</u>: Assess all the new and existing cryptoassets, except for Bitcoin (BTC) which is ineligible for this index, against the eligibility criteria in 3 Eligibility Criteria and update the CMBI universe of assets.
2. <u>Constituent Selection</u>: The constituents are the same as CMBI 10 except with the removal of Bitcoin.
3. <u>Weighting</u>: Index constituents are weighted by their Adjusted Free Float Market Capitalization.

4.3 Equal-weighted Indexes

4.3.1 CMBI 10 Even

The rebalancing process is as described below:

1. <u>Universe</u>: As of the rebalancing reference date, cryptoassets that meet the eligibility criteria are ranked in descending order by market capitalization calculated off of the expected total supply in y+10yrs for each asset.
2. <u>Constituent Selection</u>: The CMBI 10 Even constituents are the same as the CMBI 10 constituents.

3. Weighting: Constituents of the CMBI 10 Even are equally-weighted during each rebalance using closing prices of each asset on the rebalancing reference date.

No additions or deletions are made to the index between rebalances, except in scenarios as articulated in the Contingency Rules section.

4.4 Calculation Algorithm

The calculation algorithm for market capitalization weighted indexes is described below

$$IndexLevel_t = \frac{\sum_{i=1}^{n} P_{i,t} * AFFS_i}{IndexDivisor}$$

Where,

$IndexLevel_t =$ Index level on day t

$P_{i,t} =$ CM Price for index constituent i on day t

$AFFS_i =$ Adjusted free float supply of index constituent i

4.4.1 Index Divisor

Core to maintaining the integrity and accuracy of the index is adjusting the index divisor. Changes to the circulating supply and constituents of indexes should not impact an index's Level. If an index closes at a level of 100, and subsequently a constituent's float increases or the constituents of an index change, the price of the index should open at a level of 100. To determine the required divisor adjustment, asset prices and circulating supply need to remain static during the calculation. As such, it will be assumed that prices and circulating supply at time t-1 and time t remain constant until the new divisor has been determined. To achieve this, adjustments to the divisor are required as described below.

$$IndexDivisor_0 = \frac{P_{i,0} * AFFS_i}{IndexBase} \tag{1}$$

Suppose a constituent is replaced during the monthly rebalance. Expanding the previous equation (Equation 1) to show the removed constituent, m, from the index:

$$IndexLevel_{t-1} = \frac{\left(\sum_i P_i * AFFS_{i,t-1}\right) + P_m * AFFS_m}{IndexDivisor_{t-1}} \tag{2}$$

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Once constituent *m* is replaced by constituent *n*:

$$IndexLevel_t = \frac{\left(\sum_i P_i * AFFS_{i,t}\right) + P_n * AFFS_n}{IndexDivisor_t} \qquad (3)$$

By definition, $IndexLevel_{t-1} = IndexLevel_t$, therefore:

$$IndexDivisor_t = IndexDivisor_{t-1} * \frac{\left(\sum_i P_i * AFFS_{i,t}\right) + P_n * AFFS_n}{\left(\sum_i P_i * AFFS_{i,t-1}\right) + P_m * AFFS_m} \qquad (4)$$

5 Appendix A: Coverage Universe

The following table lists the current coverage universe.

Index Name	Index Ticker
CMBI 10 Index	CMBI10
CMBI 10 Even Index	CMBI10E
CMBI 10 Excluding Bitcoin Index	CMBI10EX
CMBI Bitcoin & Ethereum Index	CMBIBE

6 Change Log

1. **Version 1.1 on October 2, 2023**: Annual Methodology Review.
2. **Version 1.0 on September 22, 2019**: Finalized CMBI Multi Asset Series Methodology.