



CF Pando Asset Crypto Bitcoin Ethereum Momentum Index

Methodology Guide

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1 Version History

2 Introduction

2.1 Index Aims

The CF Pando Asset Crypto Bitcoin Ethereum Momentum Index (the “**Index**”) is a long-only portfolio Index containing the largest two crypto assets and that seeks to gain exposure to the trending returns of Bitcoin and Ethereum. To achieve this, the Index is rebalanced quarterly to reflect each asset’s cumulative performance over the past 3 months, excluding the month immediately preceding the rebalance month.

The Index has been designed to be investible and to be used as a benchmark as defined by **EU Benchmark Regulations (“EU BMR”)** including for:

- The performance benchmarking of actively managed portfolios of Digital Assets and determine relative performance
- The passive replication in investment funds and financial instruments and products
- The settlement of financial instruments including derivative contracts
- As a means of valuing or “marking to market” portfolio holdings of cryptocurrency.

2.2 Requirements

For the Index to meet its stated aims it must be:

- Representative
 - To achieve true representation the index will provide exposure to the trending returns of the current market leaders in the crypto space, Bitcoin and Ethereum.
- Replicable
 - The Index portfolio shall utilize a weighting methodology based on the return trend of each constituent, whereby, each constituent’s weight is proportional to its cumulative performance over the past 3 months, excluding the month immediately preceding the rebalance month.
 - For the purpose of minimizing transaction costs and mitigating risks associated with portfolio concentration, the weight difference between the two assets is capped at 40 percentage points.
- Reliable
 - The Index shall be capable of calculation and administration in a reliable and robust manner in accordance with all CF Benchmarks Administration Policies and the provisions of **EU BMR**

2.3 Underlying Economic Reality

The Index is intended to provide exposure to Bitcoin and Ethereum and their trending returns. This is achieved by overweighting the outperforming asset proportionally to its performance over the past 3 months (excluding the month immediately preceding the rebalance month) and conversely, underweighting the underperforming asset. This is achieved by observing the exchange of the base assets for the quote asset and vice versa. This is accomplished by the use of transactional input data from Constituent Exchanges, the criteria for eligibility for which are available in the CF Constituent Exchange Criteria.

3 Index Parameters

3.1 Portfolio Composition & Eligible Constituents

The Index Portfolio shall be constituted of Bitcoin and Ethereum, the two largest digital assets at the time of the Index inception.

3.2 Index Denomination

The Index is denominated in U.S. Dollars

3.3 Index Return Type

The Index corresponds to that of a **Total Return Index**, that is:

- Inclusive of distributions (such as forks, airdrops amongst others) and deductions - the definition and treatment of distributions and deductions are defined in the ***CF Cryptocurrency Index Family - Multi Asset Series Ground Rules – Section 7 Treatment of Distributions & Section 8 Treatment of Deductions***

3.4 Calculation & Publication Frequency

The Index shall be calculated once a day at 16:05:00 London time and published soon after, 365 days a year.

3.5 Constituent Reviews

Bitcoin and Ethereum, the current two largest digital assets, shall be considered as the only constituents of the Index at all times.

3.6 Constituent Weighting

The constituents are weighted in proportion to their cumulative performance over the past 3 months, excluding the immediate month preceding the rebalance month. The weight difference between the two assets is capped at 40 percentage points. This is for the purpose of minimizing transaction costs to the extent that the inherent nature of the index allows, as well as to avoid portfolio concentration.

3.7 Index Constituent Pricing Sources (Input Data)

The Index Constituent Pricing Source shall be the CF Benchmarks Reference Rates available on www.cfbenchmarks.com or other CF Benchmarks pricing sources that utilise the same calculation methodology as CF Benchmarks single Asset Reference and Settlement Prices - see Parameter table for observation windows and partition lengths.

The respective methodologies for each of these pricing benchmarks is available at <https://www.cfbenchmarks.com/documentation>

Should these sources become permanently unavailable then CF Digital Asset Index Family - Multi Asset Series Ground Rules - Section 6 Input Data Hierarchy shall be applied after review by the CF Digital Asset Index Family Oversight Function.

3.8 Rebalance Frequency

The Index shall be rebalanced per the frequency defined in the Index Parameters Table.

3.8.1 Rebalance Determination Point

16:00:00 UTC on the day which is 10 business days prior to the Rebalance Implementation Point.

3.8.2 Rebalance Implementation Point

At the Index Calculation & Publication time on the first business day of the Rebalance month.

3.8.3 Rebalance Determination Pricing Sources

The Index Rebalance Determination Pricing Source shall be the CF Benchmarks Reference Rates available on www.cfbenchmarks.com or other CF Benchmarks pricing sources that utilise the same calculation methodology as CF Benchmarks single Asset Reference and Settlement Prices - see Parameter table for observation windows and partition lengths.

The respective methodologies for each of these pricing benchmarks is available at <https://www.cfbenchmarks.com/documentation>

Should these sources become permanently unavailable then CF Digital Asset Index Family - Multi Asset Series Ground Rules - Section 6 Input Data Hierarchy shall be applied after review by the CF Digital Asset Index Family Oversight Function.

4 Parameter Table

4.1 Index Parameter Table

| | |
|--|---|
| Index Name | CF Pando Asset Crypto Bitcoin Ethereum Momentum Index - Settlement Rate |
| Ticker (Total Return) | CFPBERTLDN_RR_TR |
| Inception Date | December 1st, 2022 |
| Inception Value | 1000 |
| Base Currency | USD |
| Constituents | Bitcoin Ethereum |
| Constituent Pricing Sources | CF Cryptocurrency Reference Rates |
| Constituent Selection Method | BTC & ETH at all times |
| Return Types | Total Return |
| Dissemination Time | Between 16:05 and 16:30 London time |
| Calculation & Dissemination Frequency | Every day, 365 days a year. |
| Constituent Weighting | Proportional to the past 3 months performance (excluding the immediate month preceding the rebalance month) |
| Weighting Caps | 40 percentage points max weight difference between the two constituents |
| Weighting Floors | None |
| Rebalance Frequency | Quarterly – 1st business day of March, June, September & December |
| Rebalance Determination Point | 16:00:00 UTC on the day which is 10 business days prior to the Rebalance Implementation Point |

Rebalance Implementation Point

On the Calculation & Publication time, on the first business day of the Rebalance month.

4.2 Constituent Observation Windows and Partition Lengths

Index Calculation Time Zone:

- British Standard Time (BST)

| Constituents | Partition Length | Partition Count | Index Calculation Time Zone | |
|--------------|------------------|-----------------|-----------------------------|------------|
| | | | Window Start | Window End |
| BTC | 5 mins | 12 | 15:00 | 16:00 |
| ETH | 5 mins | 12 | 15:00 | 16:00 |

4.3 Expert Judgement

The Administrator does not utilise expert judgment in the day to day calculation of the Index. In extraordinary circumstances Expert Judgement may be exercised by the Administrator in the calculation, constituent review and rebalance procedure for the Index. This will be done in accordance with its codified policies and processes which are available upon request.

5 Index Calculation Method

5.1 Definitions

| Symbol | Name | Description |
|---------------|-------------------------------|---|
| t | Effective time | The time at which the index is calculated |
| r_i | Rebalance Determination Time | The time when the rebalance parameters are determined for the i^{th} rebalance |
| k_i | Rebalance Implementation Time | The time when the rebalance parameters are implemented for the i^{th} rebalance |
| $c \in C_i$ | Index Constituents | The list of constituents that are determined to be index constituents for the i th rebalance |
| p_t^c | Constituent Pricing Source | The price of constituent c at time t |
| Q_t^c | Determination Price | The price of constituent c used at time t used for rebalance, distribution and deduction. Note that this may be different from the Constituent Pricing Source |
| $mom_{r_i}^c$ | Momentum | Momentum of constituent c at time r_i |
| $Ret_{r_i}^c$ | Monthly Return | Monthly return for constituent c for the full month of r_i |
| $w_{k_i}^c$ | Modified weight | The weight of constituent c after capping |
| $w_{k_i}^c$ | Initial weight | The weight of constituent c |
| $g_{k_i}^c$ | Relative supply | The relative supply of constituent c |
| d_{k_i} | Divisor | Divisor used for the i^{th} rebalance |
| R_t | Return factor | Return factor at time t |
| A_{r_i} | Return amount | Return amount used for the i^{th} rebalance |
| I_t | Index value | Index value at time t |

Usage of Parameters between Variants: Parameters q_i^c , p_t^c , R_{k_i} , A_{r_i} and I_t are different between variants of this index family. Each section shall apply to each variant independently, except for those equations which have parameters marked with the variant label:

| Type | Label |
|--------------|-------|
| Total Return | TR |
| Price Return | PR |

5.2 Weights Computation

Weights are computed as follows, where $mom_{r_i}^{c_i}$ represents asset c_i 's momentum at time r_i , $R_s^{c_i}$ asset c_i 's monthly return for the full month s and $w_{r_i}^{c_i}$ asset c_i 's uncapped weight at time r_i .

$$\{ mom_{r_i}^{c_i} = \prod_{s=r_i-3}^{r_i-1} (1 + Ret_s^{c_i}) - 1$$

$$\text{If } mom_{r_i}^{c_1} \geq 0 \vee mom_{r_i}^{c_2} > 0 \text{ then } \{ w_{r_i}^{c_1} = \frac{mom_{r_i}^{c_1}}{\sum_{i=1}^2 mom_{r_i}^{c_i}}, w_{r_i}^{c_2} = \frac{mom_{r_i}^{c_2}}{\sum_{i=1}^2 mom_{r_i}^{c_i}}$$

$$\text{If } mom_{r_i}^{c_1} < 0 \vee mom_{r_i}^{c_2} \geq 0 \text{ then } \{ w_{r_i}^{c_1} = 0, w_{r_i}^{c_2} = 1$$

$$\text{If } mom_{r_i}^{c_1} < 0 \vee mom_{r_i}^{c_2} < 0 \text{ then } \{ w_{r_i}^{c_1} = \frac{\frac{1}{abs(mom_{r_i}^{c_1})}}{\sum_{i=1}^2 \frac{1}{abs(mom_{r_i}^{c_i})}}, w_{r_i}^{c_2} = \frac{\frac{1}{abs(mom_{r_i}^{c_2})}}{\sum_{i=1}^2 \frac{1}{abs(mom_{r_i}^{c_i})}}$$

$$\text{If } mom_{r_i}^{c_1} = 0 \vee mom_{r_i}^{c_2} = 0 \text{ then } \{ w_{r_i}^{c_1} = w_{r_i}^{c_2} = 0.5$$

5.3 Weights Capping

As indicated in the Parameters Table, weights are capped such that the weight difference between the two constituents is capped at 40 percentage points, that is, the following condition has to be satisfied:

$$w^i \leq 70\% , w^j \geq 30\% \text{ s.t. } w^i + w^j = 100\%$$

5.4 Relative Supply Calculation

The relative supply $g_{k_i}^c$ and the weight $w_{r_i}^c$ relation is the following:

$$\{ g_{k_1}^c p_{k_1}^{c,RTI} = w_{k_1}^c I_{k_1} \quad i \geq 2, \quad g_{k_i}^c q_{k_i}^c = w_{r_i}^c \sum_{a \in C_i} g_{k_{i-1}}^a q_{k_i}^a \quad (1)$$

The Index initial value is $I_{k_1} = 1000$ if not specified otherwise in the Index Parameter Table.

Example:

Index composed of two assets, i and j , with the following hypothetical parameters:

$$w^i = 50\% , w^j = 50\% , p_{k_1}^{i,RTI} = 50, p_{k_1}^{j,RTI} = 25 , I_{k_1}^{RTI} = 1000,$$

At $T=k_1$:

$$\text{using (eq 1): } g_{t_1}^i = \frac{w^i I_{k_1}^{RTI}}{p_{k_1}^{i,RTI}} = \frac{0.5 * 1000}{50} = 10 \text{ (unit A)}, \quad g_{t_1}^j = \frac{w^j I_{k_1}^{RTI}}{p_{k_1}^{j,RTI}} = \frac{0.5 * 1000}{25} = 20 \text{ (unit B)}$$

At $T=k_2$:

Suppose the rebalancing price is now:

$$q_{k_2}^i = 50 , q_{k_2}^j = 40$$

The index value before rebalancing is the following:

$$\sum_{c \in C_1} g_{k_1}^c q_{k_2}^c = 10 * 50 + 20 * 40 = 1300$$

Hence the new relative supply is:

$$\text{using (eq 1): } g_{k_2}^i = \frac{w^i * \sum_{c \in C_1} g_{k_1}^c q_{k_2}^c}{q_{k_2}^i} = \frac{0.5 * 1300}{50} = 13, \quad g_{k_2}^j = \frac{w^j * \sum_{c \in C_1} g_{k_1}^c q_{k_2}^c}{q_{k_2}^j} = \frac{0.5 * 1300}{40} = 16.25$$

5.5 Index Calculation

The index value at time t where $k_i \leq t < k_{i+1}$ is given by

$$I_t = \frac{R_t}{d_{k_i}} \sum_{c \in C_i} g_{k_i}^c p_t^c$$

About R_t :

If the application point of distribution and deduction events is at time t , where $k_i \leq t < k_{i+1}$, let the Return Amount A_t be the sum of all Distribution Proceeds and Deductions Amounts from said events. Then the distribution adjustment factor shall be

$$R_t = R_{t-1} \left(1 + \frac{A_t}{\sum_{c \in C_t} g_t^c \varrho_t^c} \right) \quad (12)$$

Otherwise $R_t = R_{t-1}$

About d_{k_i} :

The divisor is used to scale the index so that the value of the index is fixed at inception and continuous at each rebalancing. The divisor factor shall be:

$$\left\{ d_{k_1} = \frac{1}{I_{k_1}} \sum_{c \in C_1} g_{r_1}^c p_{k_1}^c \quad \forall i \geq 2, \quad d_{k_i} = d_{k_{i-1}} \frac{\sum_{c \in C_i} g_{k_i}^c \varrho_{k_i}^c}{\sum_{c \in C_{i-1}} g_{k_{i-1}}^c \varrho_{k_i}^c} \right.$$

5.6 Metadata

The *index share* of a constituent is defined as the number of units of a constituent one needs to buy such that the composition of all constituents reproduces the value of the index.

Example:

The index value is 1000. Assume a return factor of 1.6.

$$share_i^c = \frac{R_{k_i}}{d_{k_i}} g_{k_i}^c$$

| Constituent | Price | Weight | Relative supply | Index share |
|-------------|-------|--------|-----------------|-------------|
| A | \$5 | 50% | 62.5 | 100 |
| B | \$2 | 50% | 156.25 | 250 |

6 Contingency Calculation Rules

There may be instances where the Index cannot be calculated according to the calculation methodology.

6.1 Delayed Calculation and Dissemination

Where any Constituent Pricing Source for the calculation of the Index is delayed, missing or otherwise not available for any Index calculation time the Index value shall be deemed delayed, where no Index value will be published. The Index shall resume publication when valid Constituent Pricing Source(s) are published.

Where any Determination Price for the calculation of the Index is delayed, missing or otherwise not available for a Rebalance, Distribution or Deduction Implementation Point, the Index value(s) on and subsequent from Rebalance Implementation Point shall be deemed delayed, where no Index value(s) will be published. The Index shall resume publication when valid Determination Price(s) are published.

Where for the above or any reason the Administrator is not able to calculate and publish the Index within the Dissemination Time on any given Calculation Day then the Administrator shall publish a notification on its website at blog.cfbenchmarks.com informing Index users that calculation and publication has been delayed. The Administrator will seek to publish the Index for that Calculation Day as soon as it is able to.

6.2 Calculation Failure

If the Index cannot be calculated for a given Calculation Day before 23:59:59 London time, for instance because:

- A Constituent Pricing Source for the calculation time is not published, or published but not retrieved by the Calculation Agent before 23:59:59 London time
- A Determination Price for the Rebalance, Distribution or Deduction Implementation Point is not published, or published but not retrieved by the Calculation Agent before 23:59:59 London time
- Any other reason or circumstance that prevents the orderly calculation of the Index

Then the Index value for that calculation day is given by the Index value on the previous calculation day and this Index value shall be published with a marker of (*).

The occurrence of any Index calculation failure is reported to the CF Oversight Function and announced at blog.cfbenchmarks.com

7 Restatement & Republishing

The Index is subject to restatement and republishing before 23:59:59 London time of any given Calculation Day due to republication of underlying Constituent Pricing Sources, or errors made by the Calculation Agent or its systems. The Index shall not be subject to republishing after this time.

7.1 Restatement and Republishing of the Index Level

The Administrator shall only Restate and Republish the Index on any given Calculation Day if the Administrator can restate and republish the Index before 23:59:59 London of the given calculation day. The Administrator shall announce on its website that a restatement and republishing of the Index will take place for that Calculation Day.

The Administrator shall restate the Index as soon as possible after the restated Constituent Pricing Source has been published or the errors made by the Calculation Agent or its systems are acknowledged and shall do so by overwriting the previously published Index level. This restated Index level will carry no mark when published and will be final and not subject to any further change or republication.

The Index shall be not restated if any Determination Price is republished.

8 Methodology Review and Changes to the Index

This methodology is subject to internal review by the Administrator and the CF Digital Asset Index Family Oversight Function at least annually.

Any changes to this methodology are overseen by the CF Digital Asset Index Family Oversight Function, and in accordance with EU BMR Article 13.

All *material* changes to the methodology shall only be implemented after a consultation process with users and relevant stakeholders that shall be conducted according to the Administrator's policies and overseen by the CF Digital Asset Index Family Oversight Function.

Should the Administrator deem it necessary to cease providing the Index it shall only do so after a consultation process with users and relevant stakeholders that shall be conducted according to the Administrator's policies and overseen by the CF Digital Asset Index Family Oversight Function.