cfbenchmarks
a PAYWARD company

CF Pre-IPO-Dollar Spot Rates

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1 Version History

Version	Date Issued	Summary of Change	Owner
V1.0	29 Oct 2026	Document creation: initial methodology for the CF Pre-IPO-Dollar Spot Rates	CF Benchmarks Product

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2 Overview

A CF Pre-IPO-Dollar Spot Rate is intended to serve as a transparent and representative indicator of the market price of one share of an asset before that asset has completed an initial public offering, expressed in U.S. Dollars per share. Each Index is calculated from the order books of perpetual futures contracts on that asset and from the implied price of the prediction market contracts on that asset. The rules in this methodology apply to every such Index. Each Index is designed to be a rules-based, reproducible benchmark. The value published at a Calculation Time is calculated from that Calculation Time's inputs only, and a Calculation Time with no result does not repeat the previously published value.

Input Data

At each Calculation Time the Administrator retrieves the order book of the perpetual futures contract on the asset from each Constituent Exchange in that Index's Constituent Exchange panel. Each order book is a price per share. The official CME CF Real Time Index calculation is applied to that order book alone. The resulting venue value is one input to the Index. A further input is the implied price derived from the prediction market contracts on that asset. The implied price is also a price per share, as described in Section 4.3. The Index is published when at least the Minimum Number of Inputs are eligible.

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3 Definitions

Asset: The pre-IPO equity referenced by an Index.

Index: A CF Pre-IPO-Dollar Spot Rate. A price per share in U.S. Dollars of an asset before that asset has completed an initial public offering.

Constituent Exchange: A trading venue approved by the Administrator as a source of perpetual-futures order books for an Index. The panel for an Index is defined in Section 6.

Order Book: The set of bid prices and sizes and the set of ask prices and sizes of the perpetual futures contract on the asset, published by a Constituent Exchange and expressed as a price per share.

Venue Value: The CME CF Cryptocurrency Real Time Index of one Constituent Exchange's Order Book at a Calculation Time (Section 4.2).

Implied Price: The price per share derived from the prediction market contracts on the asset at a Calculation Time (Section 4.3).

Calculation Time (t): Each time at which an Index is calculated and published, at the frequency defined in Section 6.

Candidate: A Venue Value, or the Implied Price, that has passed the data preparation rules of Section 5.1 and is presented to the deviation gate of Section 5.2.

Pre-Gate Median: The median of all Candidates at a Calculation Time, calculated before any Candidate is removed by the deviation gate.

Eligible Input: A Candidate whose absolute deviation from the Pre-Gate Median is within the applicable threshold of Section 5.2.

Deviation Threshold: The maximum permitted absolute percentage deviation of a Candidate from the Pre-Gate Median (see Section 6).

Re-entry Threshold: The stricter deviation, equal to half the Deviation Threshold, that a previously excluded input must satisfy before it is included again (see Sections 5.2 and 6).

Minimum Number of Inputs: The minimum number of Eligible Inputs required for the Index to be published at a Calculation Time (see Sections 5.3 and 6).

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4 Methodology

4.1 Qualitative Description

At each Calculation Time t, for each Index:

1. The Order Book of the perpetual futures contract is retrieved from each Constituent Exchange. Books that fail the data preparation rules of Section 5.1 are disregarded.
2. The CME CF Cryptocurrency Real Time Indices methodology is applied to each remaining Order Book on its own, with the parameters in Section 6. The result is that exchange's Venue Value. A Venue Value that the calculation cannot produce is disregarded.
3. The Implied Price of Section 4.3 is included as a Candidate. An Implied Price that the calculation cannot produce is disregarded.
4. The Pre-Gate Median is the median of the Candidates. A Candidate whose absolute deviation from that median exceeds the Deviation Threshold is excluded. A Candidate that was excluded at a previous Calculation Time is included again only when its absolute deviation is within the Re-entry Threshold. The test is applied once, against the Pre-Gate Median, and not against the median of the survivors.
5. If fewer than the Minimum Number of Inputs remain, a Calculation Failure is recorded and no Index value is published for that Calculation Time (Section 5.3). The previously published value is not repeated.
6. Otherwise the Index is the median of the Eligible Inputs. Where the number of Eligible Inputs is even, the median is the arithmetic mean of the two central values.

4.2 CME CF RTI

The Venue Value is the CME CF Cryptocurrency Real Time Index of that Constituent Exchange's Order Book. The calculation is the one set out in the CME CF Real Time Indices Methodology:

https://docs.cfbenchmarks.com/CME%20CF%20Real%20Time%20Indices%20Methodology.pdf

It is applied to each Order Book separately. The Order Books are not aggregated into one consolidated book. The parameters passed to that calculation are the constants and the index-specific parameters in Section 6. A Venue Value that the calculation cannot produce is disregarded, and the Index is calculated from the inputs that remain.

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4.3 Prediction Markets Implied Price

The Implied Price is a price per share. It is calculated from the prediction market contracts on the asset's valuation at an initial public offering, as follows.

1. The outcome in which the asset does not complete an initial public offering is removed.
2. The probabilities of the remaining brackets are renormalized so that they sum to one.
3. Each remaining bracket is assigned one representative price. The representative price of a bracket with a lower and an upper bound is the midpoint of the two. A bracket with no lower bound uses its upper bound. A bracket with no upper bound uses its lower bound.
4. The Implied Price is the sum of each representative price multiplied by that bracket's renormalised probability.

Let the remaining brackets be $i = 1, \ldots, n$, with market probability π_i and representative price c_i. The Implied Price is

$$p = \sum_{i=1}^{n} \frac{\pi_i}{\sum_{j=1}^{n} \pi_j} c_i \tag{1}$$

If a probability required for this calculation is missing, no Implied Price is produced for that Calculation Time. As with a Venue Value that cannot be produced, it is disregarded, and the Index is calculated from the inputs that remain.

4.4 Mathematical Representation of the Index

The following table shows the symbols used in the aggregation of the Index. The Venue Value $r_{v,t}$ is the CME CF Cryptocurrency Real Time Index of Constituent Exchange v, calculated as set out in Section 4.2.

Symbol	Name	Description	Type
t	Calculation Time	The time at which the Index is calculated	Parameter, see Section 6
V	Constituent Exchange panel	The approved exchanges for the Index	Parameter, see Section 6
$r_{v,t}$	Venue Value	The Real Time Index of exchange v at time t	Calculated

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p_t	Implied Price	The price from the prediction market contracts at time t	Calculated
C_t	Candidates	The Venue Values and the Implied Price at time t	Calculated
m_t	Pre-Gate Median	The median of C_t	Calculated
X	Deviation Threshold	Maximum absolute deviation from m_t	Parameter, see Section 6
R	Re-entry Threshold	Stricter deviation required of a previously excluded input	Parameter, see Section 6
E_t	Eligible Inputs	The Candidates that pass Section 5.2	Calculated
N	Minimum Number of Inputs	Minimum $\lvert E_t \rvert$ required for publication	Parameter, see Section 6
I_t	Index	The value published at time t	Calculated

The Pre-Gate Median at Calculation Time t is

$$m_t = \text{MEDIAN}(C_t) \tag{2}$$

A Candidate $x \in C_t$ is an Eligible Input when

$$\left|\frac{x}{m_t} - 1\right| \leq \begin{cases} R & \text{if } x \text{ remains excluded from a previous Calculation Time} \\ X & \text{otherwise} \end{cases} \tag{3}$$

Subject to the Minimum Number of Inputs, the Index at time t is

$$I_t = \begin{cases} \text{MEDIAN}(E_t) & \text{if } |E_t| \geq N \\ \text{not published} & \text{otherwise (Calculation Failure, Section 5.3)} \end{cases} \tag{4}$$

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5 Contingency Calculation Rules

5.1 Erroneous Order Books

Each Order Book is subject to an automated screening before a Venue Value is calculated:

1. An Order Book that cannot be parsed is disregarded.
2. An Order Book with an empty bid side or an empty ask side is disregarded.
3. A crossed Order Book is disregarded.
4. A price or a size that is not positive is removed. If that removal leaves a side empty, the Order Book is disregarded.
5. A perpetual futures contract that is paused, halted, suspended, or delisted is disregarded.

An Order Book disregarded under this section contributes no Venue Value at that Calculation Time. The Index is calculated from the inputs that remain.

5.2 Deviation from the Pre-Gate Median

All Candidates are subject to a single cross-sectional screen:

1. The Pre-Gate Median is calculated from every Candidate, including any Candidate that the screen will remove (Equation 2).
2. A Candidate whose absolute percentage deviation from the Pre-Gate Median exceeds the Deviation Threshold X is excluded from the Index at that Calculation Time.
3. A Candidate excluded under this rule is included again at a later Calculation Time only when its absolute percentage deviation from that later Calculation Time's Pre-Gate Median is within the Re-entry Threshold R. Until that condition is met, the Candidate remains excluded. There is no separate test against the Candidate's own previous value.
4. The screen is applied once. A Candidate is not tested again against the median of the survivors.

The same rule applies to a Venue Value and to the Implied Price. The rule is intended to keep a single input that has moved far from the others out of the published median, and to require that input to move back inside a tighter band before it is used again.

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5.3 Calculation Failure

If, after Sections 5.1 and 5.2, the number of Eligible Inputs is below the Minimum Number of Inputs N, a Calculation Failure is deemed to have occurred. No Index value is published for that Calculation Time. The previously published Index value is not repeated (Equation 4).

5.4 Expert Judgement

The Administrator does not utilise expert judgement in the day-to-day calculation of the CF Pre-IPO-Dollar Spot Rates. In extraordinary circumstances, Expert Judgement may be exercised by the Administrator in accordance with its codified policies and processes, which are available upon request.

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6 Index Parameters

A CF Pre-IPO-Dollar Spot Rate is denominated in U.S. Dollars per share. The parameters below apply to every such Index.

Parameter	**Value**
Index	A CF Pre-IPO-Dollar Spot Rate
Unit	U.S. Dollars per share
Constituent Exchange panel	The trading venues approved by the Administrator for that Index. The panel is maintained by the Administrator and reviewed periodically.
Aggregation	Median of the Eligible Inputs (Equations 2–4)
Venue calculation	CME CF Cryptocurrency Real Time Index of each Order Book. The Order Books are not consolidated.
Implied Price	Input to the Index (Equation 1)
Calculation & Publication Frequency	Every 5 minutes, 24/7, 365 days a year
Deviation Threshold (X)	10%
Re-entry Threshold (R)	5%
Minimum Number of Inputs (N)	3

6.1 CME CF Real Time Indices Parameters

The Venue Value uses the CME CF Real Time Indices Methodology linked in Section 4.2. The constants below are those of Section 6.1 of that methodology. The index-specific parameters are stated in the same way as Section 6.2 of that methodology. Each value is applied to one Constituent Exchange's Order Book.

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Constants

Parameter	Value
Lambda (λ)	0.3
Target Level (L)	100

Index-specific parameters

Parameter	Value
Spacing (s)	Dynamic (refer to the CME CF Real Time Indices Methodology)
Deviation from Mid (D)	10%
Order Size Cap (C)	Dynamic (refer to the CME CF Real Time Indices Methodology)

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7 Methodology and Review Changes

This methodology is subject to internal review by the Administrator and the Oversight Function at least annually. Any changes to this methodology are overseen by the Oversight Function, and in accordance with UK 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 Oversight Function. Should the Administrator deem it necessary to cease providing a CF Pre-IPO-Dollar Spot Rate 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 Oversight Function.

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