

COINMETRICS

CRYPTOASSET FREE FLOAT: AN EXPLORATION OF SUPPLY DYNAMICS

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INTRODUCTION

In designing market cap weighted indexes, the primary goal of a benchmark administrator is to provide the most accurate representation of the underlying market through creating a robust methodology and leveraging high quality data. The two primary inputs into any market cap weighted index calculation are:

1. **Price data:** Reliable and relevant pricing sources coupled with a robust pricing methodology is essential in order to represent the fair market value of the index.
2. **Supply data:** Data that is reflective of market trading opportunities in order for index weights to accurately represent the supply / demand function of the market.

With the increase in quality global trading venues, trade volumes, order book depth and semi-regulated USD on-ramps, cryptoasset price discovery and aggregated price feeds are significantly better understood than they have been previously. The presence of institutional quality data feeds such as CM Market Data Feed and cross venue price aggregation methodologies such as CM Reference Rates demonstrate confidence that index price inputs are well on their way to meeting traditional capital market standards.

Supply, however, still remains a hotly debated topic within the cryptoasset ecosystem. While decentralized cryptoassets are, by definition, open networks with readily available on-chain data, reporting of token holdings is far from transparent (often very intentionally). Further, in these early and nascent stages of the ecosystem, multiple token economic models have been developed (fair launch, ICOs, IEOs, premines, hard forks, etc.), adding complexity to determination of assets that are considered 'available' for trade.

One of CMBI's core principles is to design indexes that accurately reflect their underlying market. In the absence of transparent, independent and reliable supply metrics, Coin Metrics has designed the CM Free Float Supply to set a standard for the objective determination of a cryptoasset's supply that is 'available' to the market. This newly designed metric will act as the basis for all CMBI Market Cap Weighted Indexes. Our supply methodology takes into consideration many of the best practices from equity markets and applies them to cryptoassets.

Since cryptoassets/founding teams/foundations do not follow the reporting standards and regulatory requirements of traditional assets, obtaining a representation of supply data that is reflective of market trading opportunities can be a rather difficult task. Currently there are three primary methods that market participants have taken to address this issue:

1. **Current supply** – This method relies on what is visible on the ledger, which in crypto, acts as a source of truth. Any participant that runs a node can observe the total outstanding native units by simply querying the ledger. And from a purist's perspective, for decentralized networks that don't abide by strict regulations, everything may be tradable. This method falls

short because an index constructed with this supply metric will misrepresent the market's supply/demand relationship. For example, by weighting Stellar by their ~105B tokens, an index could overstate the weight of XLM in an index given that ~55B of those tokens have been sent to an unspendable address and a large portion of the remaining tokens have remained within foundation accounts since genesis.

2. **Reported Supply** - This method relies on the reliable, timely and accurate reporting of founding teams and foundations. However, in lieu of strict regulatory compliance requirements, non-frequent reporting of foundation and team tokens, misaligned incentive structures, historical misrepresentation of cryptoasset supply from some founding teams, and different governance and reporting structures between tokenomics models (e.g. fair launch foundation vs ICO founding team), such reporting has previously proven to be misrepresentative of actual market dynamics.
3. **Case by case forensic analysis** - This method relies on a combination of founding team/foundation reporting, individual asset forensics and case-specific treatment. To date this method has most accurately represented the market trading opportunities and supply/demand relationship of markets. However, in taking such an approach it is extremely difficult to apply a consistent and transparent set of rules to maintain neutrality and avoid bias in methodology application.

THE TRADITIONAL EQUITY MARKET APPROACH

Interestingly enough, the issues faced by cryptoasset markets today have previously been faced by traditional capital markets. Prior to 2000, indexes were weighted by a market cap that was derived from price and total number of company shares. FTSE first altered this approach after noticing that companies in the late 1990s were increasingly launching with <25% of total shares available to the market.

As the frequency of companies launching with <25% of shares available to the market increased, index administrators and managers recognized that indexes that did not adjust for supply would misrepresent the liquidity profile and the supply/demand relationship of equities in the market. This meant that financial instruments that tracked indexes might not be able to replicate the index without unnecessary tracking error, stemming from the high assigned weights of relatively illiquid assets. For this reason, FTSE introduced an allowance for restricted holdings to reduce the weight of assets in an index where a portion of its shares were not available to the market, thus better representing the liquidity and supply/demand relationship of underlying markets.

In trying to apply it though, they realized that understanding the restricted supply was challenging given the inconsistent global reporting standards and varying levels of data quality.

Sounds familiar, right?

COIN METRICS' APPROACH TO CRYPTOASSET FREE FLOAT

Rather than reinventing the wheel, Coin Metrics has leveraged learnings from the trials and tribulations of traditional capital markets to develop principles that can be applied to determine the free float of cryptoassets and the construction of indexes.

Traditionally, the approach for determining the free float of assets is to subtract categories of asset holders that do not provide liquidity to markets. A comparison of the approach taken by FTSE, S&P and Coin Metrics to the restricted supply is described in the table below. Note that the below represents the shares / crypto native units that are removed from total supply.

EQUITY MARKETS		CRYPTOASSET MARKETS
FTSE ¹	S&P ²	COIN METRICS
Shares directly owned by governments	Government Entities at all levels	Not consistently applicable to cryptoassets given pseudonymity / anonymity
Shares held by directors, senior executives and managers	Officers and Directors (O+D) and related individuals	Native units held by asset foundations and founding team members
Shares held within employee share plans	Company-sponsored Employee Share Plans/Trusts, Defined Contribution Plans/Savings, and Investment Plans	Native units that are vesting for employees
Shares held by public companies or by non-listed subsidiaries of public companies	Shares held by another Publicly Traded Company	Foundations that hold another cryptoasset's tokens are not excluded (e.g. Tezos holding BTC and ETH) as they most often represent assets raised to fund project development
All shares where the holder is subject to a lock-in clause	Holders of Restricted Shares	All native units that are provably vesting on chain in smart contracts
All shares where the holder has a stated incentive to retain the shares		Not consistently applicable to cryptoassets given pseudonymity / anonymity
Shares held by an investor, investment company or investment fund for strategic reasons or has an employee on the board of directors of a company	Foundations or Family Trusts associated with the Company Asset Managers and Insurance Companies with board of director representation	Coin Metrics has decided to define a strategic investor as one that has held their assets without transacting for 5 years.

EQUITY MARKETS		CRYPTOASSET MARKETS
FTSE ¹	S&P ²	COIN METRICS
Shares that are subject to on-going contractual agreements		NA
Shares held by Sovereign Wealth Funds (if >10%)	Sovereign Wealth Funds	NA
Shares held by founders, promoters, former directors, venture capital and private equity firms, private companies, individuals (if >10%)	Private Equity, Venture Capital & Special Equity Firms	Cryptoasset Venture Capitalists have proven to be short term holders in many cases and as such are not excluded
		'Burned' native units that remain on the ledger but are in unspendable accounts
		Native units that have been provably lost on-chain within the last 5 years

1 – FTSE Russel Free Float Restriction v2.2: https://research.ftserussell.com/products/downloads/Free_Float_Restrictions.pdf

2 – S&P Dow Jones Indices Float Adjustment Methodology: <https://us.spindices.com/documents/index-policies/methodology-sp-float-adjustment.pdf>

It is important to note that what is considered restricted is not necessarily shares or tokens that are locked/vested or are under some regulatory oversight that prevents them from entering markets. The spirit of restricted supply in traditional capital markets, and Coin Metrics' calculations, can also include supply categories that are least likely to enter the market due to strategic purposes.

Using the above categories of asset holders that are considered to reduce cryptoasset liquidity from the market, Coin Metrics have settled on the following supply definitions:

SUPPLY TYPE	DESCRIPTION
Current Supply	Total number of a cryptoasset's native units that are visible on the ledger
Restricted Supply	Total number of native units that are held by foundations, founding teams, have been burned on-chain, are vesting on-chain or provably lost
Free Float Supply	<i>Current Supply</i> – <i>Restricted Supply</i> – native units not activated in over 5 years Or, for forked tokens: <i>Current Supply</i> – <i>Restricted Supply</i> – native units not activated in over 5 years - native units never activated on the forked ledger

In summary, Coin Metrics' approach for determination of a cryptoasset's free float is:

Current Supply – Foundation Tokens – Founding Team Tokens –
Tokens Inactive for > 5 years – Vesting Tokens – Burned Tokens – Provably Lost Tokens

Forked Blockchains:

Current Supply – Foundation Tokens – Founding Team Tokens – Inactive since Fork –
Tokens Inactive for > 5 years – Vesting Tokens – Burned Tokens – Provably Lost Tokens

Whilst fully acknowledging that there may be some subjectivity given the vastly different token rules and reporting standards for cryptoassets, Coin Metrics have tried to build an objective set of rules that can be applied across all cryptoassets. Where expert judgement is required, Coin Metrics has carefully documented all decisions, which are available upon request. If excess expert judgement has been used multiple times for a single asset, Coin Metrics has taken the more conservative estimation of free float.

Another of CMBI's core principles of index design and determination is to promote transparency and indexes that can be readily understood by industry participants. In aligning with this principle, Coin Metrics have decided to make all tagged addresses within our coverage universe that are considered to be restricted available to our community members. This information will be made available on the Coin Metrics website once an asset's supply data is assessed and finalized.

ACCOUNTING FOR VARIABILITY IN TRANSPARENCY

It should come as no surprise that in the early stages of cryptoasset emergence, the level of transparency and the reliability of data provided by cryptoasset teams and foundations varies greatly. As a result the accuracy of the calculated free float above can be debated endlessly, which in the context of indexes can lead to high turnover and rebalancing that can increase the administration costs, management effort and tracking error of funds, thus reducing the investability of an index. Further adding to the volatility in a cryptoassets supply is the continuous inflation schedule that is programmatically defined and/or frequent release of tokens onto the market from ICO projects.

Thankfully again this is not a cryptoasset unique situation. Equity markets experienced a similar phenomenon. As reporting became more regulated and standardized, Benchmark Administrator concerns around increasing index turnover and rebalancing requirements grew, which potentially threatened the investability of their indexes. As such, in 2000, FTSE introduced a 'banding' concept, whereby the calculated float as a percentage of total float was put into one of seven bands and float adjustments were standardized as follows:

CALCULATED FREE FLOAT (%)	ADJUSTED FREE FLOAT WITHIN FTSE INDEXES (%)
Under 15	Nil
15 - 20	20
20 - 30	30
30 - 40	40
40 - 50	50
50 - 75	75
Over 75	100

FTSE utilized banding for 12 years before the reporting requirements increased to a level that gave them greater confidence in the free float of constituents and allowed them to remove banding and use the calculated free float numbers. One of the key limitations identified by FTSE throughout the time that they utilized banding was, as constituents moved between bands, it imposed significant administrative work by index trackers during rebalance when small changes to free float resulted in band changes, especially as the weight in an index increased from 50% to 75% (an increase of 50%) and from 75% to 100% (an increase of 33%).

Coin Metrics has elected to adopt the banding technique due to the benefits that applying such an approach can provide to indexes, reducing asset turnover in a time when token holder reporting is not publicly available, often opaque, and teams/foundations are not required to provide transparent and timely information.

To reduce the impact to indexes that FTSE experienced by using large bands, Coin Metrics has decided to use smaller bands as follows:

CALCULATED FREE FLOAT (%)	ADJUSTED FREE FLOAT WITHIN CMBI INDEXES (%)
Under 15	Nil
15 - 20	20
20 - 30	30
30 - 40	40
40 - 50	50
50 - 60	60
60 - 70	70
70 - 80	80
80 - 90	90
Over 90	100

To further reduce unnecessary turnover in the index, Coin Metrics will use three percentage point buffers (i.e. an asset will not change bands until it is three percentage points into a new band).

ADJUSTED FREE FLOAT CASE STUDIES

As of April 1, 2020

Bitcoin (BTC)

To Coin Metrics' knowledge, there are no provably lost BTC, no Bitcoin Foundation wallets, no founding team tokens, no vested tokens and no burned tokens. As such, Bitcoin's:

- Current Supply: **18.3M**
- Restricted Supply: **0**
- Circulating Supply: **18.3M**

However, Bitcoin has many BTC that have not moved in over 5 years. These assets are considered to be unprovably lost or those of long term, strategic investors that do not provide liquidity to markets.

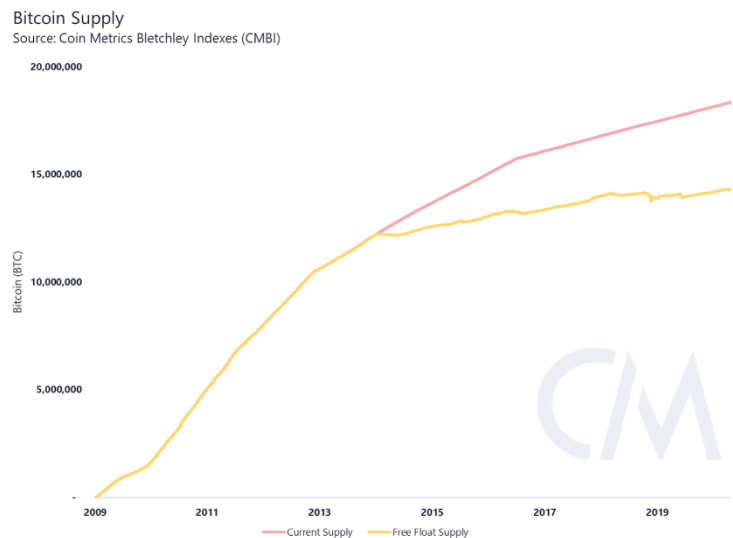
- Free Float Supply: **14.3M**

With the free float supply, we then determine what band Bitcoin would fall into, and with 78% of supply available to the market, it would receive an adjusted free float of 80% of Current Supply.

- Adjusted Free Float Supply: **14.6M**

Thus, the market cap of Bitcoin that Coin Metrics would use for CMBI market cap weighted indexes would be:

- Adjusted Free Float Market Cap: **14.6M * Price**, which would be 20% lower than all other currently quoted market caps for Bitcoin.



Bitcoin Cash (BCH)

To Coin Metrics' knowledge, there are no provably lost BCH, no Bitcoin Cash Foundation wallets, no founding team tokens, no vested tokens and no burned tokens. As such, Bitcoin Cash's:

- Current Supply: **18.4M**
- Restricted Supply: **0**
- Circulating Supply: **18.4M**

However, Bitcoin Cash was a fork of BTC, and since forking, not all BCH tokens have been activated (i.e. moved on-chain since the fork). Due to the pseudonymity of Bitcoin and Bitcoin Cash, we do not understand who these token holders are and cannot predict what their actions will be in the short/mid or long term (e.g. are they going to ever claim their tokens? Are they aware of their right to claim? Do they know how to claim? Do they still own their BTC keys so that they can claim?). With so much uncertainty, the conservative approach is to not overrepresent Bitcoin Cash's supply and liquidity and to consider these un-activated tokens as unavailable to the market.

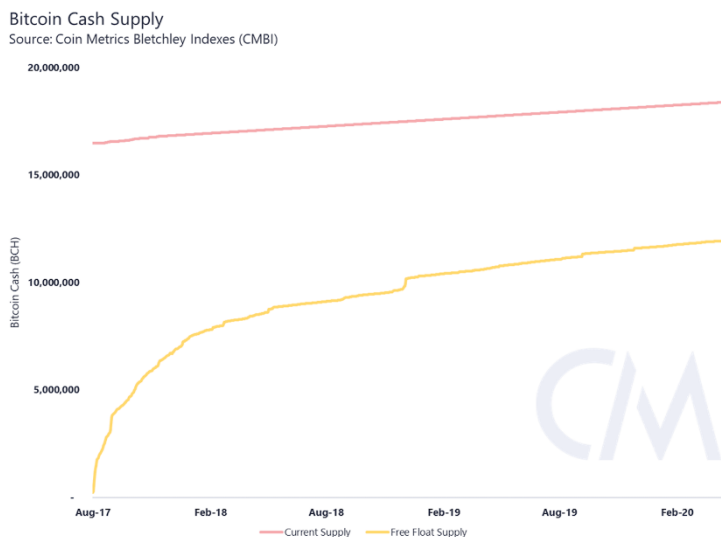
- Free Float Supply: **12.0M**

With the free float supply, we then determine what band Bitcoin Cash would fall into, and with 65% of supply available to the market, it would receive an adjusted free float of 70% of Current Supply.

- Adjusted Free Float Supply: **12.9M**

Thus, the market cap of Bitcoin Cash that Coin Metrics would use for CMBI market cap weighted indexes would be:

- Adjusted Free Float Market Cap: **12.9M * Price**, which would be 30% lower than all other currently quoted market caps for Bitcoin Cash.



Stellar Lumens (XLM)

To Coin Metrics' knowledge, there are multiple Stellar Development Foundation (SDF) wallets, vested tokens (in the SDF) and burned tokens. But there are no provably lost Lumens and no founding team tokens (outside the SDF). As such, Stellar's:

- Current Supply: **105.4B**
- Restricted Supply: **89.1B**
 - Stellar Development Foundation: **33.6B**
 - Burned: **55.4B**
- Circulating Supply: **16.4B**

Stellar is not yet 5 years old, so does not have any supply that has been inactive for over 5 years.

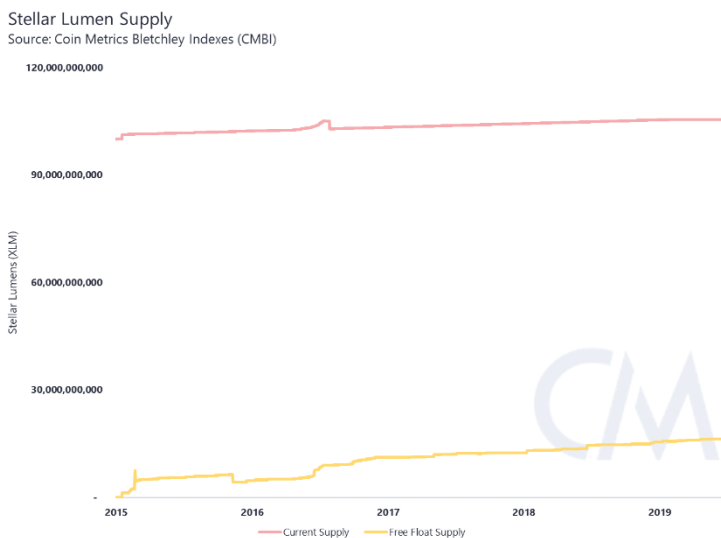
- Free Float Supply: **16.4B**

With the free float supply, we then determine what band Stellar would fall into, and with 16% of supply available to the market, it would receive an adjusted free float of 20% of Current Supply.

- Adjusted Free Float Supply: **21.1B**

Thus, the market cap of Stellar that Coin Metrics would use for CMBI market cap weighted indexes would be:

- Adjusted Free Float Market Cap: **21.1B * Price**



Summarizing the above and comparing to commonly used industry supply figures:

	COIN METRICS FREE FLOAT	COIN METRICS ADJUSTED FREE FLOAT	COMMON INDUSTRY REPORTED SUPPLY
Bitcoin	14.3M	14.6M	18.3M
Bitcoin Cash	12.0M	12.9M	18.4M
Stellar	16.4B	21.1B	20B - 43B

It is Coin Metrics’ ultimate goal to create cryptoasset products that meet the high standards and best practices that exist in traditional capital markets. Designing CMBI Indexes that meet the expectations of finance institutions means bringing principles that have been tested, tried and proven to be effective, such as determination of an assets free float (i.e. its ‘tradable’ supply) to cryptoasset markets.

Through the creation of Coin Metrics Adjusted Free Float Supply, CMBI Indexes strive to provide an accurate representation of the liquidity and supply/demand relationship of cryptoassets in the market. In doing so, indexes should be more investable and easier for asset managers to track and replicate without experiencing unnecessary tracking error and administrative costs that they may otherwise be incurred.

ABOUT COIN METRICS

Coin Metrics is a leading provider of transparent and actionable cryptoasset market and network data. Coin Metrics delivers mature data across multiple formats to various industry stakeholders, including financial enterprises, funds, media and research outlets, and data/application providers. Coin Metrics' data empowers its clients and the public to better understand, value, use, and ultimately steward public crypto networks.

ABOUT CMBI

Coin Metrics have launched CMBI to bring independent and transparent index solutions to the cryptoasset investment community. In the nascent and often complex cryptoasset market, CMBI Indexes strive to be dynamic and adjust to the rapidly changing market conditions to design and maintain investable products. CMBI Indexes provide markets and customers with industry leading solutions that aid in performance benchmarking and asset allocation.

To learn more, please visit coinmetrics.io/cmbi-indexes or contact the Coin Metrics CMBI team at:

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