dxFeed Bixie Index Methodology

dxFeed Index Management Team <im@dxfeed.com>

January 19, 2023

1 Description

dxFeed Bixie index™ ("BXY") measures the value of Bitcoin relative to a selected basket of cryptocurrencies. It is specifically a long position's value in Bitcoin (expressed in percent) measured in other cryptocurrencies proportionally to their importance in the crypto ecosystem, indicated by the actual traded volume. Bixie is a step away from the dollar-centric valuation of crypto assets, and it strives to provide a value estimate of Bitcoin exclusively in terms of other cryptocurrencies.

Bixie is a crypto-twin of the *U.S. Dollar index*[1] ("USDX"), which measures the performance of the U.S. dollar versus major fiat currencies.[2]

The index follows the "*dxFeed Fair Asset Value*" methodology, described in a separate document.

2 Component Selection and Parameter Derivation

One way to estimate the cryptocurrency's "importance" is to set it equal to that currency's "*market capitalisation*". However, since the amount of issued tokens grows at a relatively slow pace, due to the high volatility of cryptocurrencies, the resulting importance metric changes its value too quickly, requiring frequent rebalancing of the affected indices. In addition, even if the market cap is high, the actual trading volume of a cryptocurrency can be low, which probably suggests that the asset does not play a big role in the market.

We tackle the above problems by using the relative *turnover* i.e., the value in U.S. dollar equivalents of purchases and sales entered into during each month for each cryptocurrency, as a measure of its importance. The turnover is computed by aggregating volume and price data from various exchanges and over sufficiently long periods.

Components The set of index components

$$C = \{\text{ETH}, \text{XRP}, \text{ADA}, \dots\}$$

is a set of cryptocurrencies derived the following way. Let $\mathcal{R} = \{c_1, \dots c_K\}$ be a set of top (by marketcap) K cryptocurrencies with stablecoins removed. Consider a time period (say, six months) and partition it into n sub-periods $\mathcal{T} = \{t_1, \dots t_n\}$ (say, by months). Suppose market data is available via m exchanges $\mathcal{E} = \{e_1, \dots, e_m\}$.

1. Let $\mathcal{U}$ be a set of "USD-equivalent" assets, e.g. USD, USDT, DAI, ... For each $c \in \mathcal{R}$ and each $t \in \mathcal{T}$, identify $u \in \mathcal{U}$ such that it has the maximum trading volume across all exchanges:

$$u_c^*(t) = \arg\max_{u \in \mathcal{U}} \left\{ \text{Volume}^e_{c/u}(t) \mid e \in \mathcal{E} \right\}, \quad c \in \mathcal{R},\ t \in \mathcal{T}.$$

[1] A registered trademark of ICE Data Indices, LLC.

[2] https://www.theice.com/publicdocs/futures_us/ICE_Dollar_Index_FAQ.pdf

2. For each target cryptocurrency $c \in \mathcal{R}$ compute its average price in the corresponding USD-equivalent asset, for all time periods t, as the average of the open, high and low prices for the corresponding period:
$$\text{Price}_{c/u_c^*(t)}(t) = \frac{1}{3}\left(\text{Open}_{c/u_c^*(t)}(t) + \text{High}_{c/u_c^*(t)}(t) + \text{Low}_{c/u_c^*(t)}(t)\right).$$

3. For each target cryptocurrency $c \in \mathcal{R}$, each time period $t \in \mathcal{T}$ and each exchange $e \in \mathcal{E}$, identify a set of quote cryptocurrencies $\mathcal{Q}_c$, $\mathcal{Q}_c \cap \mathcal{U} = \emptyset$, such that c was traded against all $q \in \mathcal{Q}_c$ on at least one exchange. Compute the corresponding monthly turnover of c per time period t per exchange e per quote currency q as
$$\text{Turnover}^e_{c/q}(t) = \text{Volume}^e_{c/q}(t) \cdot \text{Price}_{c/u_c^*(t)}(t).$$

4. Average the turnover over the whole period for all exchanges:
$$\text{Turnover}^e_{c/q} = \frac{1}{n}\sum_{t\in\mathcal{T}} \text{Turnover}_{c/q}(t).$$

5. Sum the average turnover over all exchanges and over all quote symbols:
$$\text{Turnover}_c = \sum_{q\in\mathcal{Q}_c}\sum_{e\in\mathcal{E}} \text{Turnover}^e_{c/q}.$$

6. Form the final set of components C by discarding elements of $\mathcal{R}$ such that the cumulative sum of their turnover (in ascending order) is less than 1% of the total amount.

Weights Each component is assigned a weight parameter
$$\text{Weight}_C = \{\text{Weight}_{\text{ETH}}, \text{Weight}_{\text{XRP}}, \dots\}$$
simply as its relative turnover
$$\text{Weight}_c = \frac{\text{Turnover}_c}{\sum_{c'\in C}\text{Turnover}_{c'}}, \quad c \in C.$$

Divisor The Divisor parameter is set so that the very first value of the index is equal to 100. It is adjusted at each rebalancing to ensure price continuity.

Base, Quote Symbols For each component c, a real-time exchange rate BTC/c at time t is computed as a cross-rate as follows. As before, let $\mathcal{U}$ be a set of "USD-equivalent" assets. A $u_c^* \in \mathcal{U}$ is selected such that it maximises the mean of trade volume of c/u_c^* over all exchanges and time periods—arguably, the larger the volume, the higher the market participants' confidence that the price is "fair" at the moment of the trade:
$$u_c^* = \arg\max_{u\in\mathcal{U}}\left\{\frac{1}{n+m}\sum_{t\in\mathcal{T}}\sum_{e\in\mathcal{E}}\text{Volume}^e_{c/u}(t)\right\}, \quad c \in C.$$
u^*_{BTC} is chosen in exactly the same way. Then $\text{SymbolBase}_c = \text{BTC}/u^*_{\text{BTC}}$ and $\text{SymbolQuote}_c = c/u_c^*$ (from particular sources, omitted). We consider differences in real-time rates of all $u \in \mathcal{U}$ insignificant for a given base currency.

3 Index Computation

The index follows "*dxFeed Fair Asset Value*" methodology and is computed as a weighted geometric mean of exchange rates.

$\text{Rate}(t, s)$ is the *last known valid trade price* of a pair given by the symbol s at time t.

4 Lifecycle & Maintenance

The index is rebalanced with a fixed periodicity; see the "*dxFeed Fair Asset Value*" methodology and the accompanying factsheet for details.

Disclaimer

Devexperts Inc. ("dxFeed") might receive compensation for licensing its indices to third parties and providing custom calculation services. dxFeed products are governed by the terms and conditions of the agreements under which they are provided. A license is required from dxFeed to display, create derivative works of, and/or distribute any product or service that uses, is based upon, and/or refers to any dxFeed index data.

It is not possible to invest directly in an index. Exposure to an asset class represented by an index is available through investable instruments based on that index. dxFeed makes no assurance that investment products based on the index will accurately track index performance or provide positive investment returns. dxFeed is not an investment advisor and makes no representation regarding the advisability of investing in any investment fund or other investment vehicle, including those based on dxFeed products or any documents and statements found in this document. Prices for dxFeed indices are calculated by dxFeed based on the prices of the index's individual constituents as set by their primary exchange or source. Prices are received by dxFeed either directly or from one of its third-party vendors. Vendors receive the prices from the primary exchanges.

Charts and graphs are provided for illustrative purposes only. The charts and graphs may reflect hypothetical historical performance. All information presented before the launch date is back-tested. Back-tested performance is hypothetical, not actual performance. The back-test calculations are based on the same methodology in effect after the indices' official launch. Back-tested performance reflects the application of an index's methodology and selection of index constituents. It adds the benefit of hindsight and knowledge of factors that may have positively affected its performance. Back-testing cannot account for all financial risks affecting results and may be considered to reflect survivor/look-ahead bias. Actual returns may differ significantly from, and be lower than, back-tested returns. Past performance is not an indication or guarantee of future results. Except for certain custom index calculation services, all information provided by dxFeed is impersonal. It is not tailored to the needs of any person, entity, or group of persons.

The materials contained in this document have been prepared solely for informational purposes based upon information generally available to the public, retrieved from sources believed to be reliable. No content within these materials (including index data, ratings, analysis, research, valuations, model, software, or other application or output therefrom), or any part thereof ("Content") may be modified, reverse-engineered, reproduced, or distributed in any form or by any means, nor copied or stored in a database or retrieval system, without dxFeed's prior written permission.

dxFeed does not assume any obligation to update the Content following publication in any form or format. The Content shall not be used for any unlawful or unauthorized purposes. dxFeed and its third-party data providers and licensors (collectively "dxFeed Parties") do not guarantee the Content's accuracy, completeness, timeliness, or availability. dxFeed is not responsible for any errors or omissions, regardless of the cause, for the results obtained from the Content's use.

The Content is provided on an "as is" basis. dxFeed disclaims all express or implied warranties, including, but not limited to, any warranties of merchantability or fitness for a particular purpose or use, freedom from bugs, software errors or defects, and warranties of the Content's uninterrupted functioning or operation with any software or hardware configuration.

In no event shall dxFeed be liable to any party for any direct, indirect, incidental, exemplary, compensatory, punitive, special, or consequential damages, costs, expenses, legal fees, or losses (including, but not limited to, lost income or lost profits and opportunity costs) in connection with any use of the Content, even if advised of the possibility of such damages.