MarketVector™

INDEX GUIDE

MarketVector™ Decentralized Finance

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1 Introduction

In accordance with Art. 13 No. 1 (a) of Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 (the "Benchmark Regulation"), this document provides the rules for establishing, calculating and maintaining the MarketVector™ Decentralized Finance index (the "Index").
MarketVector Indexes GmbH (the "Index Owner") makes no warranties or representations as to the accuracy and/or completeness of the Indexes and does not guarantee the results obtained by persons using the Indexes in connection with trading funds or securities. The Index Owner makes no representations regarding the advisability of investing in any fund or security.
The Index Owner reserves the right to update the rules in this Index Guide at any time. The Index Owner also reserves the right to make, in exceptional cases or in temporary situations, exceptions to the rules in this Index Guide. The Indexes are the property of MarketVector Indexes GmbH. The Index Owner has selected an index calculator to calculate the Indexes.
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1.1 Approval of Index Methodologies

The Index Owner has established the index and it's individual methodology covered in this Index Guide. A detailed written "Procedure for Index Development" describes the steps and approvals required to develop, document and approve an Index and its methodology. The intention of the Procedure for Index Development is to ensure that the methodology of an Index meets the requirements of Art. 12 of the Benchmark Regulation and is approved and implemented according to a robust and reliable process.
The methodology for the index and its methodology covered in this Index Guide has been analysed by the Index Owner's Index Operations department in order to ensure that it is robust and reliable, has clear rules on use of discretion, allows sustainable validation (based on reasonable back testing) and is traceable and verifiable. Furthermore, the size, liquidity and transparence of the underlying market for the methodology has been tested and particular circumstances for each relevant market have been taken into account.

The index methodology and the related detailed analysis was presented by the Index Operations Department to the Independent Oversight Function for its approval. Based on the aforementioned approval process and its documentation each Index Methodology was presented to the Management Board (Geschäftsführer) of the Index Owner for final approval.

1.2 Review of this Index Guide

According to Art. 13 No. 1 (b) of the Benchmark Regulation, the Index Owner reviews this Index Guide on an annual basis and immediately in case of special circumstances that require a review. The review takes place in meetings attended by the Independent Oversight Function and the Management Board of the Index Owner. If changes to this Index Guide are considered necessary, the process described in Section 5.5 applies.

2 Index Universe

2.1 Index Universe

The index universe of the MarketVector™ Decentralized Finance index includes all crypto currencies (excl. security tokens and financial instruments) covered by the respective calculation agent. A detailed list of these crypto currencies is available on request.

In addition, the universe might be restricted based on applicable regulatory jurisdictions of the client.

3 General Definitions

3.1 Weighting Schemes

Most MarketVector™ Digital Assets Indexes use cap-factors to guarantee diversification and avoid overweighting.

An uncapped index reflects the real market capitalization of its components.

All components are ranked by their market capitalization without a capping. All weighting cap factors are fixed at 1.

3.2 Review Schedule

The index is rebalanced monthly.

The reviews is based on the opening data on the fourth but last business day in that month. If a security does not trade on a business day, then the last available price for this security will be used.

A "business day" means any day (other than a Saturday or Sunday) on which commercial banks and foreign exchange markets settle payments in Frankfurt.

Adjustments to constituents will be announced four business days prior to the first business day of the next month at 23:00 CET.

The index is rebalanced after closing of the last trading day in each month.

3.3 Pricing Source

For each component price in the MarketVector™ Indexes, the respective CCIX by CCData (https://ccdata.io) is used. CCIX is a weighted average of the latest available trading price at each exchange covered. Exchanges can be added/removed by decision of CCData.
For clarification, 'respective CCIX' means

- Exchange selection might vary dependent on the respective index rules (see respective constraints per index).
- Exchanges may be excluded if they are not licensed to be added to an index.
- Exchanges are not immediately added/removed, but only on a monthly basis or if required following quality reviews from CCData.
- Values are not backadjusted.

3.4 Index Dissemination

The Indexes are calculated with the constituent prices converted to USD. Dissemination is in USD.
Real-time index values are calculated with the latest available CCIX prices.

4 Index

The following section defines all relevant index parameters, this includes

- Universe and selection lists,
- Review: selections and weightings,
- Dissemination: times, currencies and identifiers.

4.1 MarketVector™ Decentralized Finance Index

The MarketVector™ Decentralized Finance Index is designed to track the performance of assets classified as ”decentralized finance” by MarketVector Indexes and serve as a benchmark/universe for the respective market. This covers financial services built on top of distributed networks with no central intermediaries. The weightings are uncapped as described in section 3.1.

Review procedure:

The index is derived from the MarketVector™ Digital Assets 100 Index (MVDA). Current and new components for the MarketVector™ Decentralized Finance Index, which fulfil the following criteria, qualify for the index:

- new components of MarketVector™ Digital Assets 100 Index (MVDA).
- classified as ”decentralized finance” by MarketVector™ Indexes.

In case the number of components is below 10, additional assets classified as ”decentralized finance” are selected from the MVDA universe with an average-daily-trading value of at least 1,000,000 USD for the current month. These assets are sorted by market capitalization in descending order and selected top to bottom until the number of constituents equals 10.

If the number of eligible assets is still below 10, additional assets are added by the Index Owner’s decision until the number of assets equals 10.

All qualified digital assets must not carry short term security risks (e.g. 51% attacks).

In case of a hard fork, which results in several active lines, rule 5.2.2 applies.

The index is calculated daily between 00:00 and 24:00 (GMT) and the index values are disseminated to data vendors every 15 seconds. The index is disseminated in USD and the closing value is calculated at 17:00:00 GMT with fixed 17:00 GMT exchange rates.

Adjustments to constituents will be announced four business days prior to the first business day of the next month at 23:00 CET/CEST.
The Index is rebalanced at 17:00:00 GMT of the last trading day in each month.

The MarketVector™ Decentralized Finance Index has the following identifiers:

Index Type	ISIN	SEDOL	WKN	Bloomberg	Reuters
Price Return Index	DE000SL0D7T5	BPG67B6	SL0D7T	MVDF	.MVDF

The index was launched on 8 October 2021 with a base index value of 100.00 as of 31 January 2021.

5 Ongoing Maintenance

Events are announced at least four days prior to implementation.

5.1 Changes in Amount Outstanding

Changes in the amount outstanding will not be adjusted during the month, but with the next review.

5.2 Changes due to Forks

A hard fork occurs when a blockchain protocol is radically changed, such that it becomes incompatible with older versions. In effect, participants taking part in transactions on the old blockchain must upgrade to the new one in order to continue validating transactions. However, participants that do not upgrade may continue to support and validate transactions on the older blockchain protocol separately.

The result of this is that a blockchain splits into two - hence the name 'hard fork'. If there are nodes permanently supporting the new chain, then the two chains will co-exist.

Users that once held digital assets on an older blockchain before the protocol change at a pre-specified blockchain length will now also hold an amount of new coins on the altered blockchain. This new asset has essentially been derived from an older token as well as its associated blockchain's transaction history.

In case of a hard fork, the forked coin is not added to the index. Only in case it is significant enough to replace the old line in terms of market capitalization and acceptance, MarketVector Indexes may decide for a different treatment.

5.3 Initial Coin Offerings (ICOs)

An ICO coin is eligible for fast-track addition to the investable index universe even if there is no full month of traded values. In order to be added to the index the ICO coin has to meet the liquidity requirements:

- the ICO must have an average-daily-trading volume of at least 1,000,000 USD, and
- must have traded for at least 10 days.

This rule is applicable for newly forked non-component coins as well.

5.4 Changes to Pricing (CCIX)

In case an exchange is added to CCIX or removed from it, the index divisor will not be adjusted.

5.5 Changes to the Index Guide

Any changes to the Index Guide will be reviewed and approved by the Legal and Compliance Department. Legal and Compliance may also request a conclusive description and further information on any change and may consult the operations department on such changes. The key elements to be analysed in this phase of the change process are robustness, transparency, reliability and integrity. The result of the review will be communicated to the operations department. The email will be archived by the operations department.

In case of changes that might immediately change the composition of an index or must be considered material for any other reason also need to be approved by the Independent Oversight Function ("IOF") prior to their publication and implementation.

In case of material changes an advance notice will be published and provided to users. MarketVector Indexes will generally disseminate a notification related to an Index Guide change 30 days prior to the change. A shorter period of time may be applied at MarketVector Indexes's discretion if the relevant index has not been licensed for a financial product to a third party. The notice will describe a clear time frame that gives the opportunity to analyse and comment upon the impact of such proposed material change. Any material comments received in relation to the Index Guide change and MarketVector Indexes's response to those comments will be made publicly accessible after any consultation, except where confidentiality has been requested by the originator of the comments.

5.6 Discretion regarding the Use of Input Data and Extraordinary Events

Pursuant to Art. 12 No.1. (b), MarketVector Indexes has established the following rules identifying how and when discretion may be exercised in the administration of an index.
In case input data are or appear to be qualitatively inferior or different sources provide different data, an extraordinary event, or a situation is not covered by the index rules, MarketVector Indexes may use or change data/index composition at its own discretion according to the following discretion policy after a plausibility check. Regarding input data, this may include:

- Liquidity and size data,
- Event information,
- Other secondary data.

Regarding extraordinary events, this may include:

- Trading stops,
- Regulatory actions (depending on the applicable jurisdiction),
- Hacks,
- Detection of fraud,
- Changes in custodian coverage,
- Etc.

Any changes must subject to reasonable discretion. The decision on any change must be required, appropriate, commensurable and in line with the respective index scope and objective and must reasonably consider in a balance weight the interest of Users, investors in related products and the integrity of the market.

Index operations ensures consistency in the use of discretion in its judgement and decision. Employees involved in the operations team must have shown the respective experience and skills. Significant decisions are subject to sign-off by a supervisor. In case of material changes to data the relevant situation will be analyzed in detail, described and presented to the IOF and discussed and reviewed with the IOF.

The broad range of possible data quality problems does not allow to define specific steps for each possible instance. MarketVector Indexes will always weight the different interest of the index users, the

integrity of the market and other involved parties and determine the least disadvantageous measure that equally considers the relevant interests best.

In order to avoid individual decisions in similar cases for the future an update of the index rules can be taken into consideration if applicable. Regarding the use of data, other possible mitigation measures are the change of input data sources or providers and/or own data research where possible and reasonable.

Records are kept about material judgement or discretion by MarketVector Indexes and will include the reasoning for said judgement or discretion.

5.7 Input Data and Contributor Selection

According to the input data requirements under Art. 11 of the Benchmark Regulation, the following shall apply with regard to the input data used for the management and provision of an index and the relevant input data providers ("Contributors"):

- the input data shall be sufficient to represent accurately and reliably the market or economic reality that the benchmark is intended to measure;
- the input data shall be transaction data, if available and appropriate. If transaction data is not sufficient or is not appropriate to represent accurately and reliably the market or economic reality that the index is intended to measure, input data which is not transaction data may be used, including estimated prices, quotes and committed quotes, or other values;
- the input data shall be verifiable;
- clear guidelines regarding the types of input data, the priority of use of the different types of input data and the exercise of expert judgement, to ensure compliance with the Index Guide and index methodology and the aforementioned requirements are defined in the Code of Conduct for Contributors; and
- where an index is based on input data from Contributors, MarketVector Indexes will obtain, where appropriate, the input data from a reliable and representative panel or sample of Contributors so as to ensure that the resulting index is reliable and representative of the market or economic reality that the index is intended to measure.

In order to control the quality of contributors, MarketVector Indexes will conduct the following controls:

- Evaluate market share, reputation, quality and cost of possible input data sources and providers before selecting them on the basis of the gathered information and data;
- Compare the input data of one Contributor with the input data from one or more other Contributors in order to ensure the integrity and accuracy of the input data and in case of bad quality replace a Contributor with another Contributor.

MarketVector Indexes will not use input data from a contributor if it has any indication that the Contributor does not adhere to its Code of Conduct for Contributors and in such a case shall obtain representative publicly available data.

6 Calculation

6.1 Index Formula

The Indexes are calculated using the Laspeyres' formula:

$$Index\ Value = \frac{\sum_{i=1}^{n} p_i * q_i * cf_i * fx_i}{D} = \frac{M}{D}.$$

Where (for all tokens (i) in the Index):
p_i = price,
q_i = amount outstanding,
cf_i = weighting cap factor (if applicable, otherwise set to 1),
fx_i = exchange rate (index currency to USD),
M = market capitalization of the index,
D = divisor.

6.2 Input Data

The following rounding procedures are used for the index calculation:

- Rounding to 2 decimal places:
  - index values,
- Rounding to 6 decimal places:
  - divisors (D),
- Rounding to 18 decimal places:
  - prices (p_i),
  - exchange rates (fx_i),
  - weighting cap factors (cf_i).

6.3 Divisor Adjustments

Index maintenance - reflecting changes in amount outstanding, events, addition or deletion of tokens to the Index - should not change the level of the index. This is accomplished with an adjustment to the divisor. Any change to the tokens in the index that alters the total market value of the index while holding token prices constant will require a divisor adjustment.

$$Divisor_{new} = Divisor_{old} * \frac{\sum_{i=1}^{n} p_i * q_i * cf_i * fx_i \pm \Delta MC}{\sum_{i=1}^{n} p_i * q_i * cf_i * fx_i}.$$

$\Delta MC =$ Difference between closing and adjusted closing market capitalization of the index.

6.4 Event Related Adjustments

Events range widely from routine coin issuances to unusual events like forks. These are listed on the table below with notes about the necessary changes and whether the divisor will be adjusted.
p_i = token price.

- Hard Fork — Divisor change: No.

  Investors receive 'B' new coins for every 'A' coin held.

  $p_{(i,adjusted)} = ((p_i * A) - (price\ of\ forked\ coin * B))/A$

  Coin B is added to the index according to the terms.

- Addition/Deletion of a component — Divisor change: Yes.

  Net change in market value determines the divisor adjustment.

- Other — Divisor change: TBD.

  Net change in market value determines the divisor adjustment. In case of no change, the divisor change is 0.

6.5 Data Correction and Disruptions

MarketVector Indexes will usually receive information about errors or disruption from calculation agent, client, internal systems (IT) or by monitoring the respective output.
The following list of errors does not affect the indexes, as data are not considered in the calculation process:

- Bad data such as non-numerical price, volume or timestamp,
- Late/delayed transactions,
- Non-reporting exchanges.
- For BBR/EBR only: Full exchange exclusion when weighted median price of an exchange within the total index window deviates more than 10% from the median of the rest of the exchanges' median price.

Incorrect or missing input data will be corrected immediately:

- The error is immediately communicated to the calculation agent, if applicable.
- Calculation agent will be asked to investigate the reason for the error.
- An email will be sent to all affected clients to inform them about the error; this includes the reason for the issue and an estimate on when the issue will be solved.
- MarketVector Indexes recalculates missing EOD data points and disseminates to vendors and clients.

In case of a material error,

- Legal and Compliance to check the relevant agreements for liability of the calculation agent.
- If MarketVector Indexes identifies any conduct that may involve manipulation or attempted manipulation of the index by calculation agent it will report this to the regulator.
- Where possible and economically reasonable MarketVector Indexes will try to use another calculation agent.

6 CALCULATION

Investigations and communication regarding disruptions with calculation agents will be handled by Compliance and Senior Management. They are either caused by disruptions in calculation or dissemination, which might affect different servicers.

- The disruption is immediately communicated to the calculation/dissemination agent, if applicable.
- Calculation/dissemination agent will be asked to investigate the reason for the disruption.
- An email will be sent to all affected clients to inform them about the disruption; this includes the reason for the issue and an estimate on when the issue will be solved.
- MarketVector Indexes prompts calculation agent to make all efforts to restart index calculation.
- MarketVector Indexes prompts Dissemination agent to make all efforts to restart index dissemination.
- MarketVector Indexes recalculates missing EOD data points and disseminates to vendors and clients.
- Legal and Compliance to check the relevant agreements for liability of the calculation/dissemination agent.
- If MarketVector Indexes identifies any conduct that may involve manipulation or attempted manipulation of the index by calculation/dissemination agent it will report this to BaFin.
- Where possible and economically reasonable MarketVector Indexes will try use another calculation and/or dissemination agent.

7 Appendix

7.1 Changes to the Index Guide

This table contains all changes to the index guide after 1 January 2018, when the European Benchmark Regulation became effective.

Date	IG Version	Change
24 May 2022	-	Minimum component count (5) for category indexes
31 August 2022	-	Changed definition of el. exchanges in case of forks
01 March 2023	-	”MVIS® / CryptoCompare” name changed to ”MarketVector™”
01 April 2023	-	”Cryptocompare” name changed to ”CCData”
14 July 2023	-	Rule Changes for MVDF
27 May 2024	1.00	Initial publication of the individual index guide and discontinuation of the MarketVector™ Digital Assets Index Guide

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