

# **S&P MARC 5% Index** *Methodology*

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# Introduction

## Index Objective and Highlights

The S&P MARC 5% Index<sup>1</sup> measures the performance of a risk-weighted strategy consisting of three component indices that represent different asset classes, and adjusts the weights of the component indices based on their respective realized volatilities.

Underlying Component Index	Asset Class Represented
S&P 500 ER (Fed Funds Rate) Index	Equities
S&P GSCI Gold Excess Return Index	Commodities
S&P 10-Year U.S. Treasury Note Futures Excess Return Index	Fixed Income

For information on the underlying component indices, please refer to their respective index methodologies available at [www.spglobal.com/spdji/](http://www.spglobal.com/spdji/).

Please refer to Index Construction for details on each index's allocation to equities, commodities, and fixed income.

## Supporting Documents

This methodology is meant to be read in conjunction with supporting documents providing greater detail with respect to the policies, procedures and calculations described herein. References throughout the methodology direct the reader to the relevant supporting document for further information on a specific topic. The list of the main supplemental documents for this methodology and the hyperlinks to those documents is as follows:

Supporting Document	URL
S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology	<a href="#">Equity Indices Policies &amp; Practices</a>
S&P Dow Jones Indices' Index Mathematics Methodology	<a href="#">Index Mathematics Methodology</a>
S&P Dow Jones Indices' Commodities Indices Policies & Practices Methodology	<a href="#">Commodities Indices Policies &amp; Practices</a>
S&P Dow Jones Indices' Fixed Income Policies & Practices Methodology	<a href="#">Fixed Income Policies &amp; Practices</a>
S&P Dow Jones Indices' Fixed Income Index Mathematics Methodology	<a href="#">Index Mathematics Methodology</a>

This methodology was created by S&P Dow Jones Indices to achieve the aforementioned objective of measuring the underlying interest of each index governed by this methodology document. Any changes to or deviations from this methodology are made in the sole judgment and discretion of S&P Dow Jones Indices so that the index continues to achieve its objective.

<sup>1</sup> MARC stands for Multi Asset Risk Control.

# Index Construction

## Approach

The index adjusts the weights of its three component indices based on their respective realized volatilities.

The underlying commodities and fixed income indices are calculated and published by S&P Dow Jones Indices on a daily basis as excess return indices. For purposes of the S&P MARC 5% Index, an excess return version of the S&P 500 is calculated from the S&P 500 Total Return Index as follows and is used as the underlying equities component index.

$$SP500\ ER\ (fed\ funds\ rate)_t = \left( \frac{SP500\ TR\ Index_t}{SP500\ TR\ Index_{t-1}} - 1 \right) - \left( InterestRate_{t-1} * \frac{NumDays_t}{360} \right)$$

$$SP500\ ER\ (fed\ funds\ rate)\ Index_t = SP500\ ER\ (fed\ funds\ rate)\ Index_{t-1} * (1 + SP500\ ER\ (fed\ funds\ rate)_t)$$

where:

*InterestRate* = Effective Federal Funds Rate.

To calculate the target allocation for each asset class, the index:

1. Uses an exponentially weighted model to calculate the realized variance of each underlying component index and the realized covariance between them.
2. Adjusts the underlying component index weights using up to a maximum leverage of 150%.
3. Targets 5% volatility.
4. Uses a short- and long-term decay factor of 94% and 97%, respectively, to calculate the volatilities.

As part of the daily rebalancing, the following are calculated:

1. The short- and long-term variance and covariance numbers for all three underlying component indices as defined in *Index Level Calculations* on the following pages.
2. The weights for each of the three underlying component indices (A) are calculated using the following formula:

$$W_{L,t}^A = \frac{(Variance_{L,t}^A)^{-1/2}}{\sum_{A=1}^3 (Variance_{L,t}^A)^{-1/2}}$$

3. The realized volatility of the underlying component indices using the following formula:

$$RealizedVolatility_t = \sqrt{252 \cdot \max(PortfolioVar_{L,t}, PortfolioVar_{S,t})}$$

where:

$$\begin{aligned} PortfolioVar_{L,t} = & W_{L,t}^{Eq^2} * Variance_{L,t}^{Eq} + W_{L,t}^{FI^2} * Variance_{L,t}^{FI} + W_{L,t}^{Com^2} * Variance_{L,t}^{Com} + \\ & 2 * Covariance_{L,t}^{Eq,FI} W_{L,t}^{Eq} W_{L,t}^{FI} + 2 * Covariance_{L,t}^{Eq,Com} W_{L,t}^{Eq} W_{L,t}^{Com} + \\ & 2 * Covariance_{L,t}^{FI,Com} W_{L,t}^{FI} W_{L,t}^{Com} \end{aligned}$$

$$\begin{aligned}
PortfolioVar_{S,t} = & W_{L,t}^{Eq^2} * Variance_{S,t}^{Eq} + W_{L,t}^{FI^2} * Variance_{S,t}^{FI} + W_{L,t}^{Com^2} * Variance_{S,t}^{Com} + \\
& 2 * Covariance_{S,t}^{Eq,FI} W_{L,t}^{Eq} W_{L,t}^{FI} + 2 * Covariance_{S,t}^{Eq,Com} W_{L,t}^{Eq} W_{L,t}^{Com} + \\
& 2 * Covariance_{S,t}^{FI,Com} W_{L,t}^{FI} W_{L,t}^{Com}
\end{aligned}$$

4. The total return and excess return index values as described in *Index Level Calculations* below.

### Index Level Calculations

On any business day  $t$  when the index is calculated, the excess return and total return index values are calculated using the following formulas:

$$Excess\ Return_t = \sum_A AdjW_{t-2} * W_{t-2}^A * \left( \frac{Index_t^A}{Index_{t-1}^A} - 1 \right)$$

$$Total\ Return_t = Excess\ Return_t + \left( InterestRate_{t-1} * \frac{NumDays_t}{360} \right)$$

$$IndexER_t = IndexER_{t-1} * (1 + Excess\ Return_t)$$

$$IndexTR_t = IndexTR_{t-1} * (1 + Total\ Return_t)$$

where:

$$AdjW_{t-2} = \text{Min}(\text{Max Leverage}, \frac{\text{Target Volatility}}{\text{Realized Volatility}_{t-2}})$$

$W_t^A$  = The weight of the respective underlying component index (A) as of time  $t$ .

$Index_t^A$  = The excess return index level of the respective underlying component index A as of time  $t$ .

$InterestRate_{t-1}$  = Effective Federal Funds Rate. A 360-day year is assumed for the interest calculations in accordance with U.S. banking practices.

$NumDays_t$  = The number of calendar days between day  $t-1$  and  $t$ .

**Exponentially Weighted Variance and Covariance.** On any business day  $t$  when the index is calculated, the index calculates the realized short- and long-term variances and covariances of the underlying component indices. The calculations are based on exponentially weighted moving averages, and are as follows:

$Variance_{S,t}^A$  = The short-term variance for index A, at time  $t$ , is calculated as:

$$Variance_{S,t}^A = \begin{cases} \lambda_S Variance_{S,t-1}^A + (1 - \lambda_S) \left[ \ln \left( \frac{Index_t^A}{Index_{t-1}^A} \right) \right]^2 & \text{if } t > T_0 \\ \sum_{i=m+1}^{T_0} \frac{\alpha_{S,m,i}}{WF_S} \left[ \ln \left( \frac{Index_i^A}{Index_{i-1}^A} \right) \right]^2 & \text{if } t = T_0 \end{cases} \quad (1a)$$

$Variance_{L,t}^A$  = The long-term variance for index A, at time  $t$ , is calculated as:

$$Variance_{L,t}^A = \begin{cases} \lambda_L Variance_{L,t-1}^A + (1 - \lambda_L) \left[ \ln \left( \frac{Index_t^A}{Index_{t-1}^A} \right) \right]^2 & \text{if } t > T_0 \\ \sum_{i=m+1}^{T_0} \frac{\alpha_{L,m,i}}{WF_L} \left[ \ln \left( \frac{Index_i^A}{Index_{i-1}^A} \right) \right]^2 & \text{if } t = T_0 \end{cases} \quad (1b)$$

$Covariance_{S,t}^{A,B}$  = The short-term covariance between index A and B, at time  $t$ , is calculated as:

$$Covariance_{S,t}^{A,B} = \begin{cases} \lambda_S Covariance_{S,t-1}^{A,B} + (1 - \lambda_S) \ln\left(\frac{Index_t^A}{Index_{t-1}^A}\right) \ln\left(\frac{Index_t^B}{Index_{t-1}^B}\right) & \text{if } t > T_0 \\ \sum_{i=m+1}^{T_0} \frac{\alpha_{S,m,i}}{WF_S} \ln\left(\frac{Index_i^A}{Index_{i-1}^A}\right) \ln\left(\frac{Index_i^B}{Index_{i-1}^B}\right) & \text{if } t = T_0 \end{cases} \quad (1c)$$

$Covariance_{L,t}^{A,B}$  = The long-term covariance between index A and B, at time  $t$ , is calculated as:

$$Covariance_{L,t}^{A,B} = \begin{cases} \lambda_L Covariance_{L,t-1}^{A,B} + (1 - \lambda_L) \ln\left(\frac{Index_t^A}{Index_{t-1}^A}\right) \ln\left(\frac{Index_t^B}{Index_{t-1}^B}\right) & \text{if } t > T_0 \\ \sum_{i=m+1}^{T_0} \frac{\alpha_{L,m,i}}{WF_L} \ln\left(\frac{Index_i^A}{Index_{i-1}^A}\right) \ln\left(\frac{Index_i^B}{Index_{i-1}^B}\right) & \text{if } t = T_0 \end{cases} \quad (1d)$$

where:

$T_0$  = The start date of the S&P MARC 5% Index.

$n$  = The number of days in the return calculation.  $n = 1$  as daily returns are used to calculate realized volatility.

$\lambda_S$  = The short-term decay factor used for exponential weighting. The decay factor is a number greater than zero and less than one that determines the weight of each daily return in the calculation of historical variance.

$\lambda_L$  = The long-term decay factor used for exponential weighting. The decay factor is a number greater than zero and less than one that determines the weight of each daily return in the calculation of historical variance.

$\alpha_{S,m,i}$  = Weight of date  $t$  in the short-term volatility calculation, as calculated based on the following formula:

$$\alpha_{S,t} = (1 - \lambda_S) * \lambda_S^{N+m-i} \quad (2a)$$

$$WF_S = \sum_{i=m+1}^{T_0} \alpha_{S,m,i} \quad (2b)$$

$\alpha_{L,m,i}$  = Weight of date  $t$  in the long-term volatility calculation, as calculated based on the following formula:

$$\alpha_{L,t} = (1 - \lambda_L) * \lambda_L^{N+m-i} \quad (2c)$$

$$WF_L = \sum_{i=m+1}^{T_0} \alpha_{L,m,i} \quad (2d)$$

$m$  = The  $m^{\text{th}}$  trading date prior to  $T_0$ .

$N$  = The number of trading days observed for calculating the initial variance as of the start date of the index.  $N = 60$ .

# Index Maintenance

## Rebalancing

The index is rebalanced daily after the market close, following the U.S. equity market trading calendar. If an underlying component index is not published on the rebalancing date, the prior value of that component is used. As part of the rebalancing process, the weights of the various asset class components are determined based on the asset class weights in the underlying component indices as described in *Index Construction*.

## Currency of Calculation and Additional Index Return Series

The index is calculated in U.S. dollars.

In addition to the indices detailed in this methodology, additional return series versions of the indices may be available, including, but not limited to: currency, currency hedged, decrement, fair value, inverse, leveraged, and risk control versions. For a list of available indices, please refer to [S&P DJI Methodology & Regulatory Status Database](#).

*For information on the calculation of different types of indices, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.*

*For the inputs necessary to calculate certain types of indices, including decrement, dynamic hedged, fair value, and risk control indices, please refer to the Parameters documents available at [www.spglobal.com/spdji/](http://www.spglobal.com/spdji/).*

## Base Date and History Availability

Index history availability, base date and base value are shown in the table below.

Index	Launch Date	First Value Date	Base Date	Base Value
S&P MARC 5% Index	03/27/2017	12/06/1989	12/06/1989	100

# Index Governance

## **Index Committee**

An S&P Dow Jones Indices' Index Committee maintains the index. The Committee meets regularly. At each meeting, the Committee reviews matters that may affect index constituents, statistics comparing the composition of the index to the market, and any significant market events. In addition, the Index Committee may revise index policy covering rules for selecting constituents, treatment of dividends, share counts or other matters.

S&P Dow Jones Indices' considers information about changes to its indices and related matters to be potentially market moving and material. Therefore, all Index Committee discussions are confidential.

S&P Dow Jones Indices' Index Committees reserve the right to make exceptions when applying the methodology if the need arises. In any scenario where the treatment differs from the general rules stated in this document or supplemental documents, clients will receive sufficient notice, whenever possible.

In addition to the daily governance of indices and maintenance of index methodologies, at least once within any 12-month period, the Index Committee reviews the methodology to ensure the indices continue to achieve the stated objectives, and that the data and methodology remain effective. In certain instances, S&P Dow Jones Indices may publish a consultation inviting comments from external parties.

*For information on Quality Assurance and Internal Reviews of Methodology, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.*

# Index Policy

## **Holiday Schedule**

The index is calculated on all U.S. equity market business days.

*A complete holiday schedule for the year is available at [www.spglobal.com/spdji/](http://www.spglobal.com/spdji/).*

## **Unexpected Exchange Closures**

For information on Unexpected Exchange Closures, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

## **Rebalancing**

The Index Committee may change the date of a given rebalancing for reasons including market holidays occurring on or around the scheduled rebalancing date. Any such change will be announced with proper advance notice where possible.

## **Recalculation Policy**

For information on the recalculation policy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.

*For information on Calculations and Pricing Disruptions, Expert Judgment and Data Hierarchy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology.*

## **Contact Information**

For questions regarding an index, please contact: [index\\_services@spglobal.com](mailto:index_services@spglobal.com).

# Index Dissemination

Index levels are available through S&P Dow Jones Indices' Web site at [www.spglobal.com/spdji/](http://www.spglobal.com/spdji/), major quote vendors (see codes below), numerous investment-oriented Web sites, and various print and electronic media.

## Tickers

The table below lists headline indices covered by this document. All versions of the below indices that may exist are also covered by this document. Please refer to [S&P DJI Methodology & Regulatory Status Database](#) for a complete list of indices covered by this document.

Index	Return Type	BBG	RIC
S&P MARC 5% Index	Excess Return	SPMARC5P	.SPMARC5P
	Total Return	SPMARC5T	.SPMARC5T

## Index Data

Daily constituent and index level data are available via subscription.

For product information, please contact S&P Dow Jones Indices, [www.spglobal.com/spdji/en/contact-us](http://www.spglobal.com/spdji/en/contact-us).

## Web site

For further information, please refer to S&P Dow Jones Indices' Web site at [www.spglobal.com/spdji/](http://www.spglobal.com/spdji/).

# Appendix

## ESG Disclosures

<b>EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL &amp; GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY<sup>2</sup></b>		
1.	<b>Name of the benchmark administrator.</b>	S&P Dow Jones Indices LLC.
2.	<b>Underlying asset class of the ESG benchmark.<sup>3</sup></b>	N/A
3.	<b>Name of the S&amp;P Dow Jones Indices benchmark or family of benchmarks.</b>	<a href="#">S&amp;P DJI Multi-Asset Indices Benchmark Statement</a>
4.	<b>Do any of the indices maintained by this methodology take into account ESG factors?</b>	No
<b>Appendix latest update:</b>		January 2021
<b>Appendix first publication:</b>		January 2021

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<sup>2</sup> The information contained in this Appendix is intended to meet the requirements of the European Union Commission Delegated Regulation (EU) 2020/1817 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the minimum content of the explanation of how environmental, social and governance factors are reflected in the benchmark methodology and the retained EU law in the UK [The Benchmarks (amendment and Transitional Provision) (EU Exit) Regulations 2019].

<sup>3</sup> The 'underlying assets' are defined in European Union Commission Delegated Regulation (EU) 2020/1816 supplementing Regulation (EU) 2016/1011 of the European Parliament and of the Council as regards the explanation in the benchmark statement of how environmental, social and governance factors are reflected in each benchmark provided and published.

# Disclaimer

## Performance Disclosure/Back-Tested Data

Where applicable, S&P Dow Jones Indices and its index-related affiliates (“S&P DJI”) defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the index is set to a fixed value for calculation purposes. The Launch Date designates the date when the values of an index are first considered live: index values provided for any date or time period prior to the index’s Launch Date are considered back-tested. S&P DJI defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company’s public website or its data feed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed “Date of introduction”) is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index’s public release date.

Please refer to the methodology for the Index for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Information presented prior to an index’s launch date is hypothetical back-tested performance, not actual performance, and is based on the index methodology in effect on the launch date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. In addition, forks have not been factored into the back-test data with respect to the S&P Cryptocurrency Indices. For the S&P Cryptocurrency Top 5 & 10 Equal Weight Indices, the custody element of the methodology was not considered; the back-test history is based on the index constituents that meet the custody element as of the Launch Date. Back-tested performance reflects application of an index methodology and selection of index constituents with the benefit of hindsight and knowledge of factors that may have positively affected its performance, cannot account for all financial risk that may affect 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.

Typically, when S&P DJI creates back-tested index data, S&P DJI uses actual historical constituent-level data (e.g., historical price, market capitalization, and corporate action data) in its calculations. As ESG investing is still in early stages of development, certain datapoints used to calculate certain ESG indices may not be available for the entire desired period of back-tested history. The same data availability issue could be true for other indices as well. In cases when actual data is not available for all relevant historical periods, S&P DJI may employ a process of using “Backward Data Assumption” (or pulling back) of ESG data for the calculation of back-tested historical performance. “Backward Data Assumption” is a process that applies the earliest actual live data point available for an index constituent company to all prior historical instances in the index performance. For example, Backward Data Assumption inherently assumes that companies currently not involved in a specific business activity (also known as “product involvement”) were never involved historically and similarly also assumes that companies currently involved in a specific business activity were involved historically too. The Backward Data Assumption allows the hypothetical back-test to be extended over more historical years than would be feasible using only actual data. For more information on “Backward Data Assumption” please refer to the FAQ. The methodology and factsheets of any index that employs backward assumption in the back-tested history will explicitly state so. The methodology will include an Appendix with a table setting forth the specific

data points and relevant time period for which backward projected data was used. Index returns shown do not represent the results of actual trading of investable assets/securities. S&P DJI maintains the index and calculates the index levels and performance shown or discussed but does not manage any assets.

Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the Index or investment funds that are intended to track the performance of the Index. The imposition of these fees and charges would cause actual and back-tested performance of the securities/fund to be lower than the Index performance shown. As a simple example, if an index returned 10% on a US \$100,000 investment for a 12-month period (or US \$10,000) and an actual asset-based fee of 1.5% was imposed at the end of the period on the investment plus accrued interest (or US \$1,650), the net return would be 8.35% (or US \$8,350) for the year. Over a three-year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US \$5,375, and a cumulative net return of 27.2% (or US \$27,200).

### **Intellectual Property Notices/Disclaimer**

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It is not possible to invest directly in an index. Exposure to an asset class represented by an index may be available through investable instruments based on that index. S&P DJI does not sponsor, endorse, sell, promote or manage any investment fund or other investment vehicle that is offered by third parties and that seeks to provide an investment return based on the performance of any index. S&P DJI makes no assurance that investment products based on the index will accurately track index performance or provide positive investment returns. S&P DJI is not an investment advisor, commodity trading advisor, fiduciary, "promoter" (as defined in the Investment Company Act of 1940, as amended) or "expert" as enumerated within 15 U.S.C. § 77k(a), and S&P DJI makes no representation regarding the advisability of investing in any such investment fund or other investment vehicle. A decision to invest in any such investment fund or other investment vehicle should not be made in reliance on any of the statements set forth in this document. S&P DJI is not a tax advisor. Inclusion of a security, commodity, crypto currency, or other asset within an index is not a recommendation by S&P DJI to buy, sell, or hold such security, commodity, crypto currency, or other asset, nor is it considered to be investment or trading advice.

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