S&P 500 Carry Adjusted Total Return Index

Methodology

March 2023
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Introduction

Index Objective and Highlights


The index consists of two components:

1. **Equity Component.** This consists of the S&P 500 total return index (“S&P 500 TR”).

2. **Funding Component.** This consists of floating rate payments and uses a reference rate (SOFR overnight + 0.13088%) that is applied to the notional value of the index (as observed at the most recent reference observation) for the days since the last reset (calculated on a settlement date basis).

*For details on the S&P 500 TR, please refer to the S&P U.S. Indices Methodology available on our website, [www.spglobal.com/spdji](http://www.spglobal.com/spdji).*

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:

<table>
<thead>
<tr>
<th>Supporting Document</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P Dow Jones Indices’ Index Mathematics Methodology</td>
<td><a href="http://www.spglobal.com/spdji">Index Mathematics Methodology</a></td>
</tr>
</tbody>
</table>

This methodology was created by S&P Dow Jones Indices in conjunction with the CME Group to achieve the aforementioned objective of measuring the underlying interest of the 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.
Index Construction

The index consists of two components: 1) the S&P 500 TR and 2) SOFR overnight + 0.13088%.

Index Calculations

The index value at time $t = T(I_T)$ is calculated as follows:

$$I_T = I_0 \left( \frac{S_T}{S_0} \right) - I_0 \left( \frac{r_0 d_0 - T}{360} \right) \tag{1}$$

where:

- $I_T$ = The S&P 500 CATR index level at time $t = T$
- $I_0$ = The S&P 500 CATR closing index level on the Tuesday prior to the third Friday
- $S_T$ = The S&P 500 TR index level at time $t = T$
- $S_0$ = The S&P 500 TR closing index level on the Tuesday prior to the third Friday
- $r_0$ = The SOFR overnight + 0.13088% rate published on the Wednesday effective for the Tuesday prior to the third Friday
- $d_0 - T$ = The number of calendar days from $t = 0$ to $t = T$

It should be noted that the subscript '0' refers to the most recent quarterly (i.e., March, June, September, and December) reference observations.

It can be seen that the right-hand side of equation (1) can be split into two components:

- $I_0 \left( \frac{S_T}{S_0} \right)$ corresponds to the equity leg and is the percentage change in the S&P 500 TR from $t = 0$ to $t = T$.
- $I_0 \left( \frac{r_0 d_0 - T}{360} \right)$ is the floating leg and reflects the funding of the index (notional at $t = 0$) for the number of calendar days from $t = 0$ to $t = T$.

Equation (1) can be simplified giving:

$$I_T = I_0 \left( \frac{S_T}{S_0} - \frac{r_0 d_0 - T}{360} \right) \tag{2}$$

Expiring equity futures contracts using the S&P 500 CATR as the underlying index require settlement versus a final cash payment. S&P Dow Jones Indices calculates a Special Opening Quotation ("SOQ") price for the S&P 500 CATR enabling settlement of relevant expiring futures contracts. Please refer to the Appendix of this document for further details on the SOQ.
Index Maintenance

Reset

The index is reset quarterly, consistent with standard total return swap treatment. The reset of the reference S&P 500 TR index level is observed on the Tuesday prior to the third Friday of the months of March, June, September, and December.

Due to different settlement conventions between equity markets and interest rate products, the SOFR overnight + 0.13088% rate is effective on the Tuesday and observed on the Wednesday following the Tuesday reset.

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 the S&P DJI Methodology & Regulatory Status Database.

For information on various index calculations, 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.

Base Date and History Availability

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

<table>
<thead>
<tr>
<th>Index</th>
<th>Launch Date</th>
<th>First Value Date</th>
<th>Base Date</th>
<th>Base Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 Carry Adjusted Total Return Index</td>
<td>02/08/2016</td>
<td>01/03/2005</td>
<td>01/03/2005</td>
<td>1000</td>
</tr>
</tbody>
</table>
Index Governance

Index Committee

An S&P Dow Jones Indices Index Committee maintains the index. All committee members are full-time professional members of S&P Dow Jones Indices’ staff. The committee meets regularly. At each meeting, the Index Committee reviews any significant market events. In addition, the Index Committee may revise index policy for timing of resets 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

Announcements
For more information, please refer to the Announcements section of S&P Dow Jones Indices’ Equity Indices Policies & Practices Methodology.

Holiday Schedule
The index is calculated daily, throughout the calendar year. The only days on which the index is not calculated are days when all exchanges where the index’s constituents trade are officially closed.

A complete holiday schedule for the year is available at www.spglobal.com/spdji.

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.

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

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

Real-Time Calculation
Real-time indices are not restated.

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.
Index Dissemination

Index levels are available through S&P Dow Jones Indices’ Web site at 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 the S&P DJI Methodology & Regulatory Status Database for a complete list of indices covered by this document.

<table>
<thead>
<tr>
<th>Index</th>
<th>Bloomberg</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P 500 Carry Adjusted Total Return Index</td>
<td>SPCATR</td>
</tr>
</tbody>
</table>

Index Data

Daily index level data is available via subscription.


Web site

For further information, please refer to S&P Dow Jones Indices’ Web site at www.spglobal.com/spdji.
Appendix I

Special Opening Quotation ("SOQ")

Expiring equity futures contracts using the S&P 500 CATR as the underlying index require settlement versus a final cash payment. Expiring equity futures are "closed out" by the exchange as though long holders had sold their positions and short holders had covered. The exchange/clearing house requires an objectively observable price (SOQ) for this process to occur.

S&P Dow Jones Indices calculates a SOQ price for the S&P 500 CATR, the S&P 500 Carry Adjusted Total Return SOQ Index ("S&P 500 CATR SOQ"). The S&P 500 CATR SOQ index value at time $t = T$ is calculated as follows:

$$I_{SOQ} = I_0 \left( \frac{S_{SOQ}}{S_0} \right) - I_0 \left( r_0 \frac{d_{0-T}}{360} \right)$$

(3)

where:

- $I_{SOQ}$ = The S&P 500 CATR SOQ index level at time $t = T$
- $I_0$ = The S&P 500 CATR closing index level on the Tuesday prior to the third Friday
- $S_{SOQ}$ = The S&P 500 Total Return SOQ Index level at time $t = T$ (see note below)
- $S_0$ = The S&P 500TR closing index level on the Tuesday prior to the third Friday
- $r_0$ = The SOFR overnight + 0.13088% rate on Wednesday prior to the third Friday
- $d_{0-T}$ = The number of calendar days from $t = 0$ to $t = T$

It should be noted that the subscript '0' refers to the most recent quarterly (i.e., March, June, September, and December) reference observations.

Equation (3) can be simplified giving:

$$I_{SOQ} = I_0 \left( \frac{S_{SOQ}}{S_0} - \frac{r_0 \cdot d_{0-T}}{360} \right)$$

(4)

Note: In order to calculate the S&P 500 CATR SOQ, the S&P 500 Total Return SOQ Index level is required.

The SOQ of the S&P 500 TR is derived from the S&P 500 Price Return SOQ Index. The S&P 500 Price Return SOQ Index is based on the opening prices of the underlying stocks in the S&P 500 (commencing at the market open [9:30 AM ET]), or the last price of a stock that does not open for trading on the relevant settlement day. The S&P 500 Total Return SOQ Index is then derived from the S&P 500 Price Return SOQ Index by applying the same process used to calculate the S&P 500 TR from the S&P 500 Price Return index. This process reinvests gross dividends, with respect to the relevant stocks that have gone ex-dividend, across the index on the relevant day.

For more information on SOQ index calculations, please refer to S&P Dow Jones Indices Index Mathematics Methodology.

\[\text{Note: The opening 30 minutes should be treated as a general guideline where constituents' opening prices can be determined. However, this window could be extended to the end of the business day for a particular constituent if it has not already opened.}\]
Appendix II

Methodology Changes

Methodology changes since February 8, 2016, are as follows:

<table>
<thead>
<tr>
<th>Change</th>
<th>Effective Date (After Close)</th>
<th>Previous</th>
<th>Methodology</th>
<th>Updated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Funding Component</td>
<td>12/17/2021</td>
<td>Three-month USD LIBOR</td>
<td>SOFR overnight + 0.13088%</td>
<td></td>
</tr>
</tbody>
</table>
Appendix III

EU Required ESG Disclosures

| EXPLANATION OF HOW ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG) FACTORS ARE REFLECTED IN THE KEY ELEMENTS OF THE BENCHMARK METHODOLOGY² |
|---|---|
| 1. Name of the benchmark administrator. | S&P Dow Jones Indices LLC. |
| 2. Underlying asset class of the ESG benchmark.³ | N/A |
| 3. Name of the S&P Dow Jones Indices benchmark or family of benchmarks. | S&P DJI Equity Indices Benchmark Statement |
| 4. Do any of the indices maintained by this methodology take into account ESG factors? | No |

Appendix latest update: January 2021
Appendix first publication: January 2021

² 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.

³ 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 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).

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