

**S&P Daily Risk Control  
Covered Call Index Series  
*Methodology***

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# Introduction

## Index Objective & Highlights

Each overlay index in the S&P Daily Risk Control Covered Call Index Series measures the performance of writing short-term, synthetic call options on an underlying S&P Daily Risk Control Index for a daily premium. These indices are combined with the underlying risk control index to calculate the covered call indices.

The primary parameters that define the covered call strategy for each index in the series are the underlying index, the daily risk control target volatility and the daily strike ratio.

The index series consists of Overlay Indices and Covered Call Indices, as defined below:

Overlay Index Name	Index Type	Underlying S&P Daily Risk Control Index	Underlying Risk Control Target Volatility <sup>1</sup>	Daily Strike Ratio <sup>2</sup>
S&P 500 15% Daily Risk Control Covered Call 102% Strike Overlay Index (USD) NTR	Overlay Index	S&P 500 15% Daily Risk Control Index (NTR)	15%	102%
S&P 500 18% Daily Risk Control Covered Call 103% Strike Overlay Index (USD) NTR	Overlay Index	S&P 500 18% Daily Risk Control Index (NTR)	18%	103%
S&P Europe 350 18% Daily Risk Control Covered Call 103% Strike Overlay Index (EUR) NTR	Overlay Index	S&P Europe 350 18% Daily Risk Control Index (EUR) NTR	18%	103%

Covered Call Index Name	Index Type	Base Index	Base Index Return Type	Overlay Index Return Type <sup>3</sup>
S&P 500 15% Daily Risk Control Covered Call 102% Strike Index (USD)	Covered Call Index	S&P 500 15% Daily Risk Control Index	Price Return	Net Total Return
S&P 500 15% Daily Risk Control Covered Call 102% Strike Index (USD) NTR	Covered Call Index	S&P 500 15% Daily Risk Control Index (NTR)	Net Total Return	Net Total Return
S&P 500 18% Daily Risk Control Covered Call 103% Strike Index (USD)	Covered Call Index	S&P 500 18% Daily Risk Control Index	Price Return	Net Total Return
S&P 500 18% Daily Risk Control Covered Call 103% Strike Index (USD) NTR	Covered Call Index	S&P 500 18% Daily Risk Control Index (NTR)	Net Total Return	Net Total Return
S&P Europe 350 18% Daily Risk Control Covered Call 103% Strike Index (EUR) NTR	Covered Call Index	S&P Europe 350 18% Daily Risk Control Index (EUR) NTR	Net Total Return	Net Total Return

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

Please refer to Index Construction for details on the approach of each index and its calculation.

<sup>1</sup> Please refer to *S&P Dow Jones Indices' Index Mathematics Methodology* for details on the index series' calculation.

<sup>2</sup> The daily strike ratio is used to determine the strike price of each synthetic call option on sale date with respect to the prior day's value of the underlying S&P Daily Risk Control Index. For the avoidance of doubt, the daily strike ratio does not correspond to any guaranteed level of protection offered by the strategy. Market conditions, including interest rates and the trailing performance of the underlying index will affect the level of protection offered by the strategy at any given point.

<sup>3</sup> The same Overlay index may be used in multiple corresponding Covered Call Indices.

**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:

<b>Supporting Document</b>	<b>URL</b>
S&P Dow Jones Indices' S&P Dow Jones Indices' Options Indices Policies & Procedures.	<a href="#">Options Indices Policies &amp; Procedures</a>
S&P Dow Jones Indices' 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.

# Index Construction

## Approach

Each index in the S&P Daily Risk Control Covered Call Index Series measures the hypothetical performance from writing a fixed number of short-term, synthetic call options on the underlying S&P Risk Control Index (see *Index Series Parameters* table for details). The expiration date of the new written synthetic option contract is 20 index business days from the day written.

The daily performance of the covered call overlay index is determined by the difference in value between the premium received from the newly written synthetic option each day and the expired synthetic option's intrinsic value, minus the change in value of all the non-expiring synthetic options that have already been written.

The strike level for each synthetic call option is determined by using a fixed percentage of the underlying Risk Control Index level (see *Index Series Parameters* table for details). The daily quantity of each synthetic call option is scaled on the sale date in order to ensure that all non-expiring call options collectively reflect the intended call position with respect to the underlying S&P Daily Risk Control Index.<sup>4</sup>

Each synthetic option is theoretically valued using the standard Black-Scholes formula according to the respective level of the underlying Risk Control index. As the existing S&P Risk Control indices dynamically adjust exposure on a daily basis to an underlying index in an attempt to control the level of volatility, then each synthetic call option can be priced with an assumed implied volatility corresponding to the underlying's target level.<sup>5</sup>

## Index Level Calculations

On any business day  $t$  when an index in the series is calculated, the index values are calculated using the following formulas:

$$\text{Covered Call Index}_t = \text{Covered Call Index}_{t-1} \times \left[ 1 + \left( \frac{\text{Overlay Index}_t}{\text{Overlay Index}_{t-1}} - 1 \right) + \left( \frac{\text{Base Index}_t}{\text{Base Index}_{t-1}} - 1 \right) \right]$$

$$\text{Covered Call Index}_{t=0} = 100$$

$$\text{Overlay Index}_t = \text{Overlay Index}_{t-1} + \text{New Option Value}_t - \text{Expiring Option Value}_t - \Delta \text{Written Options Value}_t$$

$$\text{Overlay Index}_{t=0} = 100$$

Where the Overlay Index is calculated according to its corresponding underlying index:

$$\begin{aligned} \text{Underlying RCIndex}_t \\ = \text{Level of the underlying S\&P Daily Risk Control Index with target volatility, } \sigma, \text{ at business day, } t \end{aligned}$$

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<sup>4</sup> For the avoidance of doubt, the daily strike ratio does not correspond to any guaranteed level of protection offered by the strategy. Market conditions, including interest rates and the trailing performance of the underlying index will affect the level of protection offered by the strategy at any given point.

<sup>5</sup> With the exception of the transaction volatility cost applied only on each option sale date. Transaction volatility cost refers to the decrease in volatility used to calculate the daily synthetic option premium on sale date only. See *Index Series Parameters* table for more information.

## Hypothetical Written Options Value and Option Quantity Calculations

On any business day  $t$  when an index in the series is calculated, the theoretical value of the written synthetic call options, the expiring option value and the new option value and quantity is calculated as follows:

$\Delta$ Written Options Value $_t$  = The change over the past business day in the theoretical value of all written unexpired call options, at time  $t$ , is calculated as:

$$\Delta \text{Written Options Value}_t = \text{Written Options Value}_t - \text{Written Options Value}_{t-1}$$

where:

Written Options Value $_t$  = The sum of the theoretical value of all written unexpired call options, at time  $t$ , and is calculated as:

$$\text{Written Options Value}_t = \sum_{d=t-M-1}^t Q_d \times \text{Price}_t(\text{Call Option}_d)$$

where:

$M$  = The number of unexpired synthetic call options at any given time (equivalent to the maturity of each new synthetic call option, expressed in index calculation days)

$\text{Price}_t(\text{Call Option}_d)$  = The theoretical price, on business day  $t$ , of the synthetic call option written on business day  $d \leq t$

Option Quantity,  $Q_d$  = The quantity of the synthetic call option written on business day  $d$  is calculated as:

$$\text{Option Quantity}, Q_d = \frac{\text{Overlay Index}_{d-1}}{M \times \text{Underlying RCIndex}_d}$$

Expiring Option Value $_t$  = The intrinsic value of the synthetic call option written on day  $d$  is calculated as:

$$\text{Expiring Option Value}_t = Q_{t-M} \times \text{Maximum}\{0, \text{Underlying RCIndex}_t - \text{Strike}_{t-M}\}$$

where:

Strike $_d$  = The strike price of the synthetic call option written on business day  $d$ , and is calculated as:

$$\text{Strike}_d = \text{Daily Strike Ratio} \times \text{Underlying RCIndex}_d$$

where:

Daily Strike Ratio = A fixed percentage (see *Index Series Parameters* table) used to determine the strike price of each synthetic called option

New Option Value $_t$  = The value of the synthetic call option written on business day,  $t$ , is calculated as follows:

$$\text{New Option Value}_t = Q_t \times \text{Price}_t(\text{Call Option}_t)$$

## Theoretical Option Pricing Calculations

On any business day  $t$  when an index in the series is calculated, the theoretical price of each unexpired synthetic call option written on their respective business day  $d$  is calculated using the standard Black-Scholes as follows:

$$Price_t(Call Option_d) = Underlying RCIndex_t \times N(d1_{t,d}) - Strike_d \times e^{-r_t T_t(Put Option_d)} \times N(d2_{t,d})$$

where:

$$d1_{t,d} = \frac{1}{\sigma \sqrt{T_t(Call Option_d)}} \left[ \ln \left( \frac{Underlying RCIndex_t}{Strike_d} \right) + (r_t + \sigma^2/2) \times T_t(Call Option_d) \right]$$

$$d2_{t,d} = d1_{t,d} - \sigma \sqrt{T_t(Call Option_d)}$$

$N(x)$  = the cumulative distribution function for a standard normal distribution with mean 0 and standard deviation of 1 at  $x$ .

$r_t$  = continuously compounded annualized 1-month interest rate at business day,  $t$

$$\sigma = \begin{cases} \text{underlying index risk control target volatility} - \text{transaction volatility cost}, & \text{if } t = d \\ \text{underlying index risk control target volatility}, & \text{if } t > d \end{cases}$$

$T_t(Call Option_d)$  = Time to maturity, expressed in years, for the synthetic call option written on business day,  $d$ , as of business day,  $t$ , is calculated as:

$$T_t(Call Option_d) = \frac{\text{Calendar days from and excluding business day, } t, \text{ to and including business day, } d + M}{\text{Calendar days in one year following business day, } t}$$

## Index Series Parameters

The index series consists of the following Overlay Indices with their corresponding parameters:<sup>6</sup>

Index Name <sup>7</sup>	Index Type	Underlying S&P Daily Risk Control Index	Underlying Risk Control Target Volatility, $\sigma$	Number of unexpired synthetic call options, M	Daily Strike Ratio	Annualized 1 Month Rate, $r$ (for option pricing)	Transaction Volatility Cost <sup>8</sup>
S&P 500 15% Daily Risk Control Covered Call 102% Strike Overlay Index (NTR)	Overlay Index	S&P 500 15% Daily Risk Control Index (NTR)	15%	20	102%	1 month USD LIBOR	150bps
S&P 500 18% Daily Risk Control Covered Call 103% Strike Overlay Index (NTR)	Overlay Index	S&P 500 18% Daily Risk Control Index (NTR)	18%	20	103%	1 month USD LIBOR	150bps
S&P Europe 350 18% Daily Risk Control Covered Call 103% Strike Overlay Index (NTR)	Overlay Index	S&P Europe 350 18% Daily Risk Control Index (EUR) NTR	18%	20	103%	1 month EURIBOR	150bps

<sup>6</sup> Please refer to *Introduction* and *Index Construction* for details on the approach of each corresponding Covered Call index and its calculation.

<sup>7</sup> The same Overlay may be used in multiple corresponding Covered Call Indices.

<sup>8</sup> Transaction volatility cost refers to the decrease in volatility used to calculate the daily synthetic option premium on sale date only. Transaction volatility cost accounts for a hypothetical transaction cost that typically would be paid to execute such an over-the-counter option.

# Index Maintenance

## Rebalancing

The indices rebalance daily.

## Currency of Calculation and Additional Index Return Series

Indices based on the S&P 500 are calculated in U.S. dollars. Indices based on the S&P Europe 350 are calculated in euros and 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's All Indices by Methodology Report](#).

*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.spdji.com](http://www.spdji.com).*

## Base Date and History Availability

Index history availability, base dates, and base values are shown in the table below.

Index	Launch Date	First Value Date	Base Date	Base Value
S&P 500 15% Daily Risk Control Covered Call 102% Strike Overlay Index (USD) NTR	11/13/2019	06/28/1999	06/28/1999	100
S&P 500 15% Daily Risk Control Covered Call 102% Strike Index (USD) NTR	11/13/2019	06/28/1999	06/28/1999	100
S&P 500 15% Daily Risk Control Covered Call 102% Strike Index (USD)	11/13/2019	06/28/1999	06/28/1999	100
S&P 500 18% Daily Risk Control Covered Call 103% Strike Overlay Index (USD) NTR	11/13/2019	06/28/1999	06/28/1999	100
S&P 500 18% Daily Risk Control Covered Call 103% Strike Index (USD) NTR	11/13/2019	06/28/1999	06/28/1999	100
S&P 500 18% Daily Risk Control Covered Call 103% Strike Index (USD)	11/13/2019	06/28/1999	06/28/1999	100
S&P Europe 350 18% Daily Risk Control Covered Call 103% Strike Overlay Index (EUR) NTR	11/13/2019	06/28/1999	06/28/1999	100
S&P Europe 350 18% Daily Risk Control Covered Call 103% Strike Index (EUR) NTR	11/13/2019	06/28/1999	06/28/1999	100



# Index Governance

## Index Committee

An S&P Dow Jones Indices' Index Committee maintains the indices. 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' Options Indices Policies & Procedures Methodology.*

# Index Policy

## **Holiday Schedule**

The indices are calculated on all equity market business days for the corresponding underlying index.

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

## **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' Options Indices Policies & Procedures Methodology.

## **Recalculation Policy**

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

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

## **Theoretical Options Calculation**

For further information on theoretical options calculation, please refer to S&P Dow Jones Indices' Options Indices Policies & Procedures 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.spdji.com](http://www.spdji.com), 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's All Indices by Methodology Report](#) for a complete list of indices covered by this document.

Index	BBG	RIC
S&P 500 15% Daily Risk Control Covered Call 102% Strike Index (NTR)	SPER15N2	.SPER15N2
S&P 500 15% Daily Risk Control Covered Call 102% Strike Overlay Index (NTR)	SPXR15N2	.SPXR15N2
S&P 500 15% Daily Risk Control Covered Call 102% Strike Index	SPER15P2	.SPER15P2
S&P 500 18% Daily Risk Control Covered Call 103% Strike Index (NTR)	SPER18N3	.SPER18N3
S&P 500 18% Daily Risk Control Covered Call 103% Strike Overlay Index (NTR)	SPXR18N3	.SPXR18N3
S&P Europe 350 18% Daily Risk Control Covered Call 103% Strike Overlay Index (EUR) NTR	SECO18N3	.SECO18N3
S&P Europe 350 18% Daily Risk Control Covered Call 103% Strike Index (EUR) NTR	SECC18N3	.SECC18N3

## Index Data

Daily constituent and index level data are available via subscription.

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

## Web site

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

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