

**S&P 500 KRW Daily Cash  
Reinvestment Long Call Index**  
*Methodology*

April 2025

# Table of Contents

Introduction	2
<b>Index Objectives and Highlights</b>	<b>2</b>
<b>Supporting Documents</b>	<b>2</b>
Index Construction	3
<b>Index Calculation</b>	<b>3</b>
Index Maintenance	7
Index Governance	8
<b>Index Committee</b>	<b>8</b>
Index Policy	9
<b>Announcements</b>	<b>9</b>
<b>Holiday Schedule</b>	<b>9</b>
<b>Unexpected Exchange Closures</b>	<b>9</b>
<b>Recalculation Policy</b>	<b>9</b>
<b>Contact Information</b>	<b>9</b>
Index Dissemination	10
<b>Tickers</b>	<b>10</b>
<b>Index Data</b>	<b>10</b>
<b>Web site</b>	<b>10</b>
Disclaimer	11
<b>Performance Disclosure/Back-Tested Data</b>	<b>11</b>
<b>Intellectual Property Notices/Disclaimer</b>	<b>12</b>
<b>ESG Indices Disclaimer</b>	<b>14</b>

# Introduction

## Index Objectives and Highlights

The S&P 500 KRW Daily Cash Reinvestment Long Call Index measures the performance of a daily call option buying strategy using listed S&P 500 options (SPX), combined with interest accruing at the South Korean Won (KRW) three-month certificate of deposit rate. The index consists of a long position in KRW-denominated cash and long positions in listed S&P 500 Index Monthly Call options expiring on the third Friday of June.

The index selects the strike of the call option purchased on a given day closest to a TWAP of the S&P 500 level on that day. The index holds option positions to maturity, after which the payoff from the expiring options is distributed. The index then accumulates new option positions expiring on the next roll day, i.e., the third Friday of June of the following year.

For information on the S&P 500, please refer to the S&P U.S. Indices Methodology, available at [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:

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' Options Indices Policies and Practices Methodology	<a href="#">Options Indices Policies &amp; Practices 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

## Index Calculation

On any day  $t$ , the index level calculates as:

$$Index_t = Cash_t + \sum_s Num_{s,t} \times USDKRW_t \times Mid_{s,t}^{twap,eod}$$

where:

$Num_{s,t}$	= Number of call options (share-equivalent quantity) of strike $s$ held on day $t$
$USDKRW_t$	= FX rate <sup>1</sup> as of the close of day $t$
$Mid_{s,t}^{twap,eod}$	= TWAP of mid price of the strike $s$ call option at the end of day $t$ (if day $t$ is a U.S. holiday, the mid price TWAP from the previous business day is used) <sup>2</sup>

## If $t$ is a Roll Day

The payoff from the expiring options is distributed along with the interest accrued from  $t'$  to  $t$ , where  $t'$  is the last U.S. business day prior to  $t$ .

The payoff from expiring options calculates as:

$$Payoff_t = \sum_s Num_{s,t-1} \times USDKRW_t \times \max(0, SET_t - s)$$

where:

$SET_t$	= The settlement price of S&P 500 on day $t$
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The interest accrued from  $t'$  to  $t$  calculates as:

$$InterestAccrual_{t',t} = \sum_{d=t'+1}^{d=t} InterestAccrual_{d-1,d}$$

where:

$InterestAccrual_{d-1,d}$	= $Cash_{d-1} \times R_{d-1} \times \frac{Days_{d-1,d}}{365}$
$Cash_d$	= $Cash_{d-1} + InterestAccrual_{d-1,d}$
$R_{d-1}$	= South Korean Won three-month certificate of deposit rate <sup>3</sup> on day $d - 1$
$Days_{d-1,d}$	= Number of calendar days between $d - 1$ and $d$

The total distribution amount calculates as:

$$Distribution_t = Payoff_t + Cash_{t'} + InterestAccrual_{t',t} - 100$$

The cash value resets to the initial level:

<sup>1</sup> The South Korean Won to U.S. Dollar exchange rate uses WMR Forex Spot (RIC: USDKRWFIXM=WM).

<sup>2</sup> For the duration of the back test, the closing mid price  $Mid_{s,t}$  is used instead of the TWAP price.

<sup>3</sup> The South Korean Won three-month certificate of deposit rate is sourced from ECOS (Bank of Korea, Balance of Payments) at <https://ecos.bok.or.kr/#/SearchStat>.

$$Cash_t = 100$$

The number of call options is set to zero, i.e.,  $Num_{s,t} = 0$  for every strike  $s$ . There are no new options positions created on the roll day.

**If  $t$  is not a Roll Day and is a U.S. business day**

The KRW cash interest accrual from day  $t'$  to day  $t$  is used to purchase the new call option, where  $t'$  is the last U.S. business day prior to  $t$ . If the interest accrual is negative, then no call option is purchased.

Among SPX call options listed on the previous U.S. business day that are expiring on the next roll day, the index selects the strike  $s^*$  that is closest to “at the money” (ATM) based on  $SPX_{TWAP,t}$ . If two strikes are equidistant to  $SPX_{TWAP,t}$ , then the index selects the higher among them.

$SPX_{TWAP,t}$  = TWAP of S&P 500 calculated during 12:00-12:10 PM on day  $t$  (Index TWAP Window for Strike Selection)

The number of call options purchased (share-equivalent quantity) calculates as:

$$Num_{s^*,t}^{new} = \frac{\max(0, InterestAccrual_{t',t})}{USDKRW_{t-1} \times Ask_{s^*,t}^{twap,qty}}$$

where:

$Ask_{s^*,t}^{twap,qty}$  = TWAP of the ask price of the selected ATM strike  $s^*$  call option during 12:00-12:10 PM on day  $t$ <sup>4</sup>. (Option Ask Price TWAP Window for Call Options Quantity)

If strike  $s^*$  was held on day  $t - 1$ , the number of call options updates to:

$$Num_{s^*,t} = Num_{s^*,t-1} + Num_{s^*,t}^{new}$$

If strike  $s^*$  was not held on day  $t - 1$ , the number of call options is set at the number of call options purchased:

$$Num_{s^*,t} = Num_{s^*,t}^{new}$$

For all other strikes, the quantity stays the same as on the previous day:

$$Num_{s,t} = Num_{s,t-1} \text{ for } s \neq s^*$$

Any option that is more than 10% in-the-money sells at the bid price at market close, and the received amount adds to the cash account:

$$Cash_t = Cash_{t-1} + InterestAccrual_{t-1,t} + \sum_{s \neq s^*} Num_{s,t-1} \times USDKRW_t \times Bid_{s,t}^{twap,eod} - Num_{s^*,t}^{new} \times USDKRW_t \times Ask_{s^*,t}^{twap,eod}$$

where strike  $s$  is such that  $\frac{SPX_{TWAP,t-s}}{s} > 0.1$ . Note that  $Bid_{s,t}^{twap,eod}$  and  $Ask_{s^*,t}^{twap,eod}$  are calculated over the end-of-day window<sup>5</sup>.

For those in-the-money options sold, the quantity sets to zero, i.e.,  $Num_{s,t} = 0$ .

**If  $t$  is not a roll day and is not a U.S. business day**

<sup>4</sup> For the duration of the back test, the index uses the ask price from the previous U.S. business day, i.e.  $Ask_{s^*,t'}$ , instead of the TWAP price.

<sup>5</sup> For the duration of the back test, the index uses closing bid and ask prices instead of TWAP prices.

The quantity of all strikes is set to the same as on the previous day, i.e.,  $Num_{s,t} = Num_{s,t-1}$  for all  $s$ .

The accrued interest is added into the cash account, i.e.,  $Cash_t = Cash_{t-1} + InterestAccrual_{t-1,t}$

## Rebalancing

The index calculates on every day of the week, from Monday to Friday. Call options are bought on days when U.S. markets are open.

## Market Disruptions

- If there is a market disruption during the designated Index TWAP Window or the Option Ask Price TWAP Window, the respective TWAP calculates over the first 10-minute window following resumption of activity on the same day (rounded to the nearest 10-minute boundary).
- If a disruption prevents the identification of S&P 500 Index TWAP on a given day, no new long call option is purchased, and no changes are made to the existing options quantities.
- If there is no option tick data pricing available during the end-of-day window, the end-of-day option price is used for the calculation.
- For any disruption event that causes there to be no end-of-day and no TWAP pricing available for the identified Monthly Index Call options to buy and sell on that day, or any disruption event that halts the trading of those identified options prior to the option TWAP window, the index does not enter the new call option if it is affected by that disruption event and does not sell the call options which are identified to sell and affected by that disruption event.

## Index TWAP Calculation

The S&P 500 TWAP calculates for a given time-window  $h$  and interval  $k$  as follows:

$$SPX_{TWAP,t} = \frac{\sum_k (\delta_t^{h,k} \times SPX_t^{h,k})}{\sum_k \delta_t^{h,k}}$$

where:

$SPX_t^{h,k}$  = Last index level during interval  $k$  of time-window  $h$  on day  $t$

$\delta_t^{h,k}$  = 1 if  $SPX_t^{h,k}$  is available, 0 otherwise

## Option TWAP Calculation

The option price TWAP calculates calculated for a given time-window  $h$  and interval  $k$  as follows:

$$OptPrice_t^{twap} = \frac{\sum_k (\delta_t^{h,k} \times OptPrice_t^{h,k})}{\sum_k \delta_t^{h,k}}$$

where:

$OptPrice_t^{h,k}$  = Last quoted option price (bid / mid / ask) between the TWAP lookback time and the end of interval  $k$  of time-window  $h$  on day  $t$

$\delta_t^{h,k}$  = 1 if  $OptPrice_t^{h,k}$  is available, 0 otherwise

## TWAP Windows

The TWAP calculation windows on a regular trading day are defined as follows:

	<b>Lookback</b>	<b>Start time</b>	<b>End Time</b>	<b>Interval</b>	<b>Time Zone</b>
Index TWAP Window for Strike Selection		12:00:00	12:10:00	15 sec	U.S./Eastern
Option Ask Price TWAP Window for Call Options Quantity	09:30:00	12:00:00	12:10:00	15 sec	U.S./Eastern
Option Price TWAP Window for end-of-day calculation	09:30:00	15:59:30	16:00:00	1 sec	U.S./Eastern

For any trading day scheduled as an early market close day (13:00 ET), the TWAP calculation windows are defined as follows:

	<b>Lookback</b>	<b>Start time</b>	<b>End Time</b>	<b>Interval</b>	<b>Time Zone</b>
Index TWAP Window for Strike Selection		11:00:00	11:10:00	15 sec	U.S./Eastern
Option Ask Price TWAP Window for Call Options Quantity	09:30:00	11:00:00	11:10:00	15 sec	U.S./Eastern
Option Price TWAP Window for end-of-day calculation	09:30:00	12:59:30	13:00:00	1 sec	U.S./Eastern

# Index Maintenance

## Pricing

Options prices are provided via vendor feed after market close.

*For further information on pricing, please refer to S&P Dow Jones Indices' Options Indices Policies & Practices Methodology.*

## Currency of Calculation and Additional Index Return Series

The index calculates in South Korean Won (KRW).

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

The 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 500 KRW Daily Cash Reinvestment Long Call Index (KRW) PR	03/13/2025	06/17/2011	06/17/2011	100

# Index Governance

## **Index Committee**

An Index Committee maintains the index. All Committee members are full-time professional members of S&P Dow Jones Indices staff. The Index 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 rebalancing 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 and/or Options Indices Policies & Practices Methodology.*

# Index Policy

## **Announcements**

Announcements of the daily index values are made after the market close each day.

## **Holiday Schedule**

Each index is calculated daily when the underlying equity index is calculated.

*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.

## **Recalculation Policy**

For information on the recalculation policy, please refer to S&P Dow Jones Indices' Equity Indices Policies & Practices Methodology and Options Indices Policies & Practices Methodology for the underlying indices, respectively.

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

## **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	BBG	RIC
S&P 500 KRW Daily Cash Reinvestment Long Call Index (KRW) PR	SPXEIKRW	.SPXEIKRW

## 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/).

# 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 by 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. Also, the treatment of corporate actions in back-tested performance may differ from treatment for live indices due to limitations in replicating index management decisions. 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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