

**S&P Dow Jones
Indices**

A Division of **S&P Global**

S&P/JPX Risk Control Indices *Methodology*

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Introduction

Index Objective

The S&P/JPX Risk Control Indices are designed to track the return of a strategy that applies dynamic exposure to the Tokyo Stock Price Index (TOPIX) in an attempt to control the level of volatility.¹

Highlights

The indices include a leverage factor that changes based on realized historical volatility. If realized volatility exceeds the target level of volatility, the leverage factor will be less than one; if realized volatility is lower than the target level, the leverage factor is set to one. The indices are calculated on a daily basis.

Index Family

The S&P/JPX Risk Control Indices are based on the TOPIX (Total Return).¹ Indices with three different target volatility levels are available in total return and excess return versions:

Index	Target Volatility Level
S&P/JPX Risk Control 5%	5%
S&P/JPX Risk Control 10%	10%
S&P/JPX Risk Control 15%	15%

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	Equity Indices Policies & Practices
S&P Dow Jones Indices' Index Mathematics Methodology	Index Mathematics Methodology

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.

¹ The TOPIX is calculated and published by the Tokyo Stock Exchange (TSE) and is a float-adjusted market capitalization weighted index that is calculated based on all the domestic common stocks listed on the First Section of the TSE. For more information on the TOPIX, please refer to the Japan Exchange Group (JPX) Web site at www.jpx.co.jp/english/.

Index Calculation

The daily index return is based on the following two components:

1. The return on the position in the underlying index – TOPIX (Total Return).²
2. The interest cost or gain.

Total Return Indices

Total return index series are calculated for the S&P/JPX Risk Control Indices. The formula for calculating index values is as follows:

$$\text{Risk Control Index Value}_t = \text{Risk Control Index Value}_{t-1} * \left[1 + \left[K_{t-1} * \left(\frac{\text{Underlying Index}_t}{\text{Underlying Index}_{t-1}} - 1 \right) + (1 - K_{t-1}) * (\text{InterestRate}_{t-1} * D_{t-1,t} / 365) \right] \right]$$

where:

- UnderlyingIndex_t* = The level of the underlying index on day *t*.
- UnderlyingIndex_{t-1}* = The level of the underlying index as of the previous trading date.
- Interest Rate_{t-1}* = The Domestic Interbank Unsecured Overnight Call Rate for the previous business day.
- D_{t-1,t}* = The number of calendar days between the previous business day and day *t*.
- K_{t-1}* = The leverage factor set for day *t* set on day *t-1*, calculated as:

$$\text{Min}(\text{Max } K, \text{Target Volatility}/\text{Realized Volatility}_{t-d})$$

where:

- Max K* = 1 (the maximum leverage factor allowed in each S&P/JPX Risk Control Index).
- d* = 3 (the number of days between when volatility is observed and day *t*). So the historical volatility of the underlying index as of the close three days prior to the index calculation date is used to calculate the leverage factor *K_t*.
- Target Volatility* = The target level of volatility set for the index.
- Realized Volatility_{t-d}* = The historical realized volatility of the underlying index as of the close of *d* trading days prior to day *t*, where a trading day is defined as a day on which the underlying index is calculated.

² The TOPIX is calculated and published by the Tokyo Stock Exchange (TSE) and is a float-adjusted market capitalization weighted index that is calculated based on all the domestic common stocks listed on the First Section of the TSE. For more information on the TOPIX, please refer to the Japan Exchange Group (JPX) Web site at www.jpjx.co.jp/english/.

Realized Volatility

The realized volatility is calculated as the simple weighted moving average.

$$\text{RealizedVolatility}_t = \sqrt{\frac{252}{n} * \text{Variance}_t}$$

$$\text{Variance}_t = 1/N * \sum_{i=t-N+1}^t * \left[\ln\left(\frac{\text{UnderlyingIndex}_i}{\text{UnderlyingIndex}_{i-n}}\right) \right]^2$$

where:

$n = 1$ (the number of days inherent in the return calculation used for determining volatility).

$N = 100$ (the number of trading days observed for calculating variance for the short term volatility measure).

Excess Return Indices

Excess return index series are calculated for the S&P/JPX Risk Control Indices to take interest costs into account if both positions in the underlying index and cash are sponsored by borrowing. The formula for calculating the risk control excess return is as follows:

*Risk Control Index Excess Return*_t =

$$\left[\left[K_{t-1} * \left(\frac{\text{Underlying Index}_t}{\text{Underlying Index}_{t-1}} - 1 \right) + K_{t-1} * (\text{InterestRate}_{t-1} * D_{t-1,t} / 365) \right] \right]$$

Index Maintenance

Rebalancing

The S&P/JPX Risk Control Indices are rebalanced daily. The exposure factors for the next business day are determined at market close based on the observed market volatility as of the close three business days prior the next day.

Currency, Currency Hedged, and Risk Control Indices

The S&P/JPX Risk Control Indices are calculated in Japanese yen.

Additional currency, currency hedged, and risk control versions of the indices may be available. For a list of available currency, currency hedged, and risk control indices, please contact Client Services at index_services@spglobal.com.

For more information on currency, currency hedged, and risk control indices, please refer to S&P Dow Jones Indices' Index Mathematics Methodology.

Index Governance

Index Committee

The S&P/JPX Risk Control Indices are maintained by the S&P/JPX Index Committee. S&P Dow Jones Indices chairs the Committee, which is comprised of members representing both S&P Dow Jones Indices and the Japan Exchange Group. The Committee meets regularly. At each meeting, the Committee reviews any significant market events. In addition, the Committee may revise index policies, including all matters relating to index construction, maintenance 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 document.

Index Policy

Announcements

All methodology changes are posted to the S&P Dow Jones Indices' Web site and announced via email to all clients. The latest available version is posted on the Web site at www.spdji.com.

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

Holiday Schedule

The indices are calculated daily, throughout the calendar year. The only days the indices are not calculated and files are not distributed are on days when the Tokyo Stock Exchange is officially closed.

A complete holiday schedule for the year is available at 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' Equity Indices Policies & Practices document.

Unforeseen Events

S&P Dow Jones Indices retains the sole authority and final discretion regarding all index activity. In all cases, the index treatment will be communicated to clients via email or ftp.

Recalculation Policy

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

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

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.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 currency, currency hedged, risk control, and return type versions of the below indices that may exist are also covered by this document. Please contact index_services@spglobal.com for a complete list of indices covered by this document.

Index	Return Type	Bloomberg
S&P/JPX Risk Control 5%	Total Return Excess Return	SJXDR5T SJXDR5E
S&P/JPX Risk Control 10%	Total Return Excess Return	SJXDR10T SJXDR10E
S&P/JPX Risk Control 15%	Total Return Excess Return	SJXDR15T SJXDR15E

FTP

Daily index level data are available via FTP subscription.

For product information, please contact S&P Dow Jones Indices, www.spdji.com/contact-us.

Web site

For further information, please refer to S&P Dow Jones Indices' Web site at www.spdji.com.

Appendix

Methodology Changes

Methodology changes since January 1, 2015 are as follows:

Change	Effective Date (After Close)	Previous	Methodology	Updated
Index Names	12/16/2015	TOPIX Daily Risk Control Indices: <ul style="list-style-type: none">• TOPIX Daily Risk Control 5%• TOPIX Daily Risk Control 10%• TOPIX Daily Risk Control 15%		S&P/JPX Risk Control Indices: <ul style="list-style-type: none">• S&P/JPX Risk Control 5%• S&P/JPX Risk Control 10%• S&P/JPX Risk Control 15%

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