

(Reference Translation)

Tokyo Stock Exchange Currency Hedged Index Guidebook

March 31, 2020

Tokyo Stock Exchange, Inc.

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Table of Contents

1 . Introduction	3
2 . Outline.....	4
(1) Outline	4
(2) Target indices used for calculating Currency Hedged Indices.....	4
3 . Calculation Method	5
4 . Others	7
(1) Publication	7
(2) Licensing	7
(3) Contact	7

Record of Changes

Date	Changes
March 25, 2014	<ul style="list-style-type: none"> • Modification of the contact details, etc.
Feb 9, 2015	<ul style="list-style-type: none"> • Revised the calculation methodology to determine the amount of foreign exchange forward contracts based on the index level one business day prior to the month-end rebalance, whereas it is currently determined based on the index level at the end of the month (This revision has been effective since March 2, 2015)
Sep 24, 2015	<ul style="list-style-type: none"> • “TOPIX Total Return GBP Daily Hedged Index” and “TOPIX Total Return US Dollar Daily Hedged Index” are added.
Apr 12, 2016	<ul style="list-style-type: none"> • “TOPIX Total Return CHF Daily Hedged Index” is added.
July 1, 2016	<ul style="list-style-type: none"> • “TOPIX Total Return SGD Hedged Index” is added.
Oct 19, 2016	<ul style="list-style-type: none"> • “Tokyo Stock Exchange REIT Net Total Return US Dollar Hedged Index” is added.
July 23, 2018	<ul style="list-style-type: none"> • Addition of a description about disclaimers
March 31, 2020	<ul style="list-style-type: none"> • Modification of the “Introduction”

1 . Introduction

- Based on the stock indices calculated by the Tokyo Stock Exchange, Inc. (hereafter "TSE"), the TSE calculates indices that hedge currency risks (hereafter "Currency Hedged Indices") in accordance with, as a rule, the methods described in this document. When an event that is not specified in this document occurs, or if the TSE decides it is difficult to use the methods described in this document, the TSE may use an alternative method of index calculation as it deems appropriate.
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2 . Outline

(1) Outline

- The Currency Hedged Indices are designed to represent returns for those global index investment strategies that involve hedging currency risk, but not the underlying constituent risk.
- The Currency Hedged Indices are calculated by hedging the index portfolio using rolling one-month forward contracts. The hedge ratio is the proportion of the portfolio's currency exposure that is hedged. Currency Hedged Indices use a hedge ratio of 100%, thus removing the currency risk of the index portfolio. Note that since only balances on the certain date are hedged, the index does not assume a perfect hedging of currency movements.
- The indices with daily currency hedging differ from the standard currency hedged indices in that the amount of the forward contracts maturing at the end of month is adjusted on a daily basis according to the performance of the underlying index.

(2) Target indices used for calculating Currency Hedged Indices

- The following indices are used for calculating Currency Hedged Indices.

Target Indices	Currency
TOPIX (Total return)	Euro
TOPIX (Total return)	GB Pound
TOPIX (Total return)	US Dollar
TOPIX (Total return)	Singapore Dollar
TOPIX Net Total Return	Euro
TOPIX Net Total Return	GB Pound
TOPIX Net Total Return	US Dollar
Tokyo Stock Exchange REIT Net Total Return	US Dollar

- The following indices are used for calculating Daily Currency Hedged Indices.

Target Indices	Currency
TOPIX (Total return)	Euro
TOPIX (Total return)	GB Pound
TOPIX (Total return)	US Dollar
TOPIX (Total return)	Swiss Franc

3 . Calculation Method

- The Currency Hedged Indices assume hedging of 100% of the index portfolio using one-month currency forwards at the end of each month.
- Daily index return (ie. the index value) is calculated by the combination of the following two returns:
 1. Target index return in the foreign currency, which is the return accruing from an unhedged Target index investment to an investor whose home currency is not Japanese Yen.
 2. The return from the hedge, calculated by a linear interpolation of spot and forward prices.
- For the changes of the Number of shares for index calculation and Base Market Value, the “Tokyo Stock Exchange Index Guidebook” is applied and uses the same data for Target indices. The same is also applied to the prices for index calculation
- Based on the index level on the index rebalance reference date¹, which occurs on the business day prior to the end of the month, the rebalance forward amounts are determined.
- The base point and base date of indices are following.

Index	Base Date	Base Point
TOPIX Total Return Euro Hedged Index	2005/8/31	1463.56
TOPIX Total Return Euro Daily Hedged Index	2005/8/31	1463.56
TOPIX Total Return GBP Hedged Index	2005/8/31	1463.56
TOPIX Total Return GBP Daily Hedged Index	2005/8/31	1463.56
TOPIX Total Return US Dollar Hedged Index	2005/8/31	1463.56
TOPIX Total Return US Dollar Daily Hedged Index	2005/8/31	1463.56
TOPIX Total Return CHF Daily Hedged Index	2005/8/31	1463.56
TOPIX Total Return SGD Hedged Index	2005/8/31	1463.56
TOPIX Net Total Return Euro Hedged Index	2005/8/31	1426.88
TOPIX Net Total Return Pound Hedged Index	2005/8/31	1426.88
TOPIX Net Total Return US Dollar Hedged Index	2005/8/31	1426.88
Tokyo Stock Exchange REIT Net Total Return US Dollar Hedged Index	2003/3/31	1000.00

- TSE uses WM Reuter 4 p.m. UK time for Currency Hedged Index calculation.
- Index Computation as follows:

For each month m , there are $d = 1,2,3...D$ calendar days. md is day d for month m and $m0$ is the last day of the month $m-1$. $mr0$ is one business day prior to the last day of the month $m-1$, i.e. the index rebalance reference date.

EH = the Currency-Hedged Index level

MAF $_m$ = Monthly Index Adjustment Factor for month m to account for the index performance

¹ The end of month is used as the index rebalance reference date through to index calculation for the end of February 2015.

of the Currency-Hedged Index

$$MAF_m = \left(\frac{EH_{mr0}}{EH_{m0}} \right)$$

E = the TSE index level, in foreign currency

EL = the TSE index level, in JPY

HR = hedge return (%)

S = spot rate in JPY per foreign currency

F = forward rate in JPY per foreign currency

$F_{I_{md}}$ = the interpolated forward rate as of day d of month m

$$F_{I_{md}} = S_{md} + \left(\frac{D-d}{D} \right) * (F_{md} - S_{md})$$

AF_{md} = the adjustment factor for daily hedged indices as of day d of month m

$$AF_{md} = \frac{EL_{md-1}}{EL_{m0}}$$

For the day d of month m

$$EH_{md} = EH_{m0} * \left[\frac{E_{md}}{E_{m0}} + HR_{md} \right]$$

where

$$E_{md} = \frac{EL_{md}}{S_{md}}$$

$$HR_{md} = \left(\frac{\frac{S_{mr0}}{F_{m0}} - \frac{S_{mr0}}{S_{md} + \left(\frac{D-d}{D} \right) * (F_{md} - S_{md})}}{\frac{S_{mr0}}{F_{m0}} - \frac{S_{mr0}}{F_{I_{md}}}} \right) * MAF_m = \left(\frac{S_{mr0}}{F_{m0}} - \frac{S_{mr0}}{F_{I_{md}}} \right) * MAF_m$$

The hedge return for indices with daily currency hedging is calculated as follows:

when day d is not the last business day of month m ,

$$HR_{md} = \sum_{i=1}^d AF_{mi} \times \left(\frac{S_{m0}}{F_{I_{mi-1}}} - \frac{S_{m0}}{F_{I_{mi}}} \right)$$

when day d is the last business day of month m ,

$$HR_{md} = \sum_{i=1}^{d-1} AF_{mi} \times \left(\frac{S_{m0}}{F_{I_{mi-1}}} - \frac{S_{m0}}{F_{I_{mi}}} \right) + AF_{md} \times \left(\frac{S_{m0}}{F_{I_{md-1}}} - \frac{S_{m0}}{S_{md}} \right)$$

4 . Others

(1) Publication

- Currency Hedged Indices are published on the information vendors, etc.
- Index value is offered once a trading day

(2) License agreement

- Currency Hedged Indices calculated and published by the TSE are the intellectual property of the TSE. All rights regarding such indices including but not limited to calculation, publication, dissemination, and use of Currency Hedged Indices are reserved by the TSE.
- A license agreement is required when using the indices to create or sell financial products such as funds and linked bonds (including OTC derivatives such as options, swaps, warrants, etc.). Such agreement is also required when using the indices for commercial purposes such as dissemination to third parties.

(3) Contact

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