

Nomura Japan Equity Beta Select indices

EQUITY QUANTITATIVE RESEARCH (INDEX)

Index rulebook

Nomura Japan Equity Beta Select indices

Nomura Japan Equity Beta Select indices refer to the following two indices drawn from a universe of all common stocks listed on Japanese stock exchanges: the Nomura Japan Equity High Beta Select 30 and the Nomura Japan Equity Low Beta Select 50, which comprise the top 30 and the bottom 50 stocks respectively in terms of a quantitative indicator based on beta (sensitivity) versus Japanese equity market returns and USD/JPY returns. These indices are weighted by free-float-adjusted market capitalization (individual stock weights are capped at 5%).

Index characteristics

- The Nomura Japan Equity High Beta Select 30 comprises the top 30 stocks in terms of a quantitative indicator based on three scores that show market correlation (market beta, forex beta, momentum).
- The Nomura Japan Equity Low Beta Select 50 comprises the bottom 50 stocks in terms of a quantitative indicator based on three scores that show market correlation (market beta, forex beta, stock-specific risk).
- Indices are reconfigured twice a year, as a general rule.
- While the indices are weighted by market cap, individual stock weights are capped at 5% to prevent the indices from being excessively weighted toward large caps.
- To take investability into account, we also screen for free-float-adjusted market cap and average daily turnover.

Primary change: Added further details to Section 5. Data publication services

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Contents

1. Periodic reconfigurations	3
1.1 Periodic reconfiguration date	3
1.2 Periodic reconfiguration base date	3
1.3 Announcement of periodic reconfiguration data	3
2. Stock selection and index construction method	4
2.1 Stock selection universe	4
2.2 Composite score calculation method	5
2.3 Selection method for index constituents	8
2.4 Weighting of constituent stocks	9
3. Unscheduled reconfigurations	10
3.1. Response to stock swaps, stock transfers, mergers, etc	10
3.2 Removal of stocks	11
4. Index calculation	12
4.1 Index calculation method	12
4.2 Adjusting base market capitalization	14
4.3 Index maintenance	15
5. Data publication services	16
Policies with regard to NSC's indices	17
Appendix A-1	18

1. Periodic reconfigurations

1.1 Periodic reconfiguration date

Periodic reconfigurations take place twice a year, on the first business day of June and the first business day of December, and the reconfigurations are carried out after the close of trading on the business day preceding the periodic reconfiguration date.

1.2 Periodic reconfiguration base date

The reconfiguration base date is the fifth business day of the month preceding the periodic reconfiguration date. Constituent stocks and the number of shares in each constituent stock to be included in the index following its periodic reconfiguration are determined on the basis of calculations using data as of the reconfiguration base date.

1.3 Announcement of periodic reconfiguration data

As a general rule, an announcement will appear on our website 10 business days before a periodic reconfiguration around 16:00 (JST), except in cases of unforeseen circumstances or when information cannot be confirmed.

2. Stock selection and index construction method

2.1 Stock selection universe

The stock selection universe includes the top 98% of all stocks listed on Japanese stock exchanges¹ in terms of free-float-adjusted market cap as of 15 October in the year before the periodic reconfiguration base date (or the business day before this if 15 October is a non-business day; this is called the stock selection universe fixing date), out of all stocks listed on Japanese stock exchanges as of the end of March in the year before the periodic reconfiguration base date in December. The stock selection universe also includes newly merged stocks and those in approximately the top 85% in terms of free-float-adjusted market cap out of the stocks² that were listed in or after April and before the last day of the month three months prior to the periodic reconfiguration base date. Stocks that meet the following criteria as of the reconfiguration base date are excluded.

- **Equities other than common stock**

As a general rule, only common stock is included in the stock selection universe. However, exceptions to this rule will be made if necessary.

- **Stocks assigned for delisting**

Stocks assigned for delisting are not included in the universe.

- **Stocks under supervision (examination) and stocks under supervision (confirmation)**

Stocks under supervision (examination) and stocks under supervision (confirmation) that are not part of the index composition immediately prior to regularly scheduled reconfigurations are not included in the universe.

- **TOB target companies³**

Stocks that are the targets of tender offers (ie, TOBs) may be excluded from the universe of stock selection only if all of the following requirements are met:

(1) the company conducting the tender offer plans to acquire all the outstanding shares in the target company; and

(2) the company conducting the tender offer is planning to acquire all of the stock of the target company in exchange either for money or its own stock, and the target company agrees to the offer.

- **Listed investment trusts/REITs**

- **Foreign stocks**

Stocks listed on foreign sections of Japanese exchanges or stocks regarded as overseas companies are excluded, even if these stocks are traded in the Japanese market.

- **Others**

Latent stock, warrants, and rights on them are excluded. The Bank of Japan is also excluded.

¹ Tokyo Stock Exchange (1st Section, 2nd Section, Mothers, JASDAQ, TOKYO PRO Market), Nagoya Stock Exchange, Sapporo Securities Exchange, and Fukuoka Stock Exchange.

² This applies to stocks listed between April and the end of September for the December reconfiguration and to stocks listed between the previous April and the end of March for the June reconfiguration.

³ This rule will apply to periodic reconfigurations from December 2016.

2.2 Composite score calculation method

Index constituents are selected on the basis of the value of a quantitative indicator (the composite score) that reflects beta (sensitivity) versus Japanese equity market returns and USD/JPY returns. The procedure set out below is used to calculate the composite score.

Composite score calculation procedure

- 1) For the stocks included in the composite score calculation universe (2.2.1), four scores (2.2.3) are calculated on the basis of data covering a specified historical period (2.2.2) as of the periodic reconfiguration base date.
- 2) For each of these four scores, a standardized score (2.2.3) is calculated by adjusting the scores so that the average for the composite score calculation universe is zero and the standard deviation is one.
- 3) The composite score (2.2.4) is calculated by taking the average of the standardized scores.

2.2.1 Composite score calculation universe

Using data as of the periodic index reconfiguration base date, stocks within the stock selection universe (2.1) that meet the following market cap and liquidity criteria are eligible for inclusion in the composite score calculation universe.

Market cap and liquidity criteria

- Top 85% of the stock selection universe in terms of free-float-adjusted market cap
- Top 500 stocks in terms of average daily turnover over the past 60 days

2.2.2 Data used for composite score calculation

Macroeconomic data (market return, USD/JPY return) and share price return data for individual stocks available as of the periodic reconfiguration base date are used to calculate the composite score.

• Market return

Average monthly return on the stock selection universe, weighted by free-float adjusted market cap⁴

• USD/JPY return

Average monthly return on the USD/JPY middle rate as announced by the BOJ

• Share price return on individual stocks

Monthly return on individual stocks

2.2.3 Composite score calculation method

The following four scores are calculated for each stock using data covering a specified historical period as of the periodic reconfiguration base date. For each of these four scores, a standardized score is calculated by adjusting the scores so that the average for the composite score calculation universe is zero and the standard deviation is one.

• Market beta

The market beta score is the regression coefficient obtained through a linear regression of the monthly share price return on the individual stock versus the monthly market return over the 60 months preceding the periodic reconfiguration base date. When less than 12 months' worth of historical data is available, this is treated as a case in which

⁴ Monthly returns on individual stocks are calculated using the month-end Nomura composite share price (see below). Same hereafter.

data is not available⁵, but when 12 months or more of historical data is available all usable data is used.

- **Forex beta**

The forex beta score is the regression coefficient obtained through a linear regression of the monthly share price return on the individual stock versus the monthly USD/JPY return over the 60 months preceding the periodic reconfiguration base date. When less than 12 months' worth of historical data is available, this is treated as a case in which data is not available, but when 12 months or more of historical data is available all usable data is used.

- **Momentum**

The momentum score is the intercept in a linear regression of the monthly share price return on the individual stock versus the monthly market return over the 11 months preceding the periodic reconfiguration base date. When less than 11 months' worth of historical data is available, this is treated as a case in which data is not available.

- **Stock-specific risk**

The stock-specific risk score is the standard deviation of the residual in a linear regression of the monthly share price return on the individual stock versus the monthly market return over the 60 months preceding the periodic reconfiguration base date. When less than 12 months' worth of historical data is available, this is treated as a case in which data is not available, but when 12 months or more of historical data is available all usable data is used.

Linear regression method

For each individual stock, the value of the regression coefficient and intercept are calculated using the least sum of squares method, where the sum of the squares of the residuals in the linear regression set out below is minimized. The dependent variable in the linear regression is the monthly share price return on the individual stock and the independent variable is macroeconomic data (monthly market return or monthly USD/JPY return).

$$\begin{aligned} & \text{Monthly share price return on stock } i_t \\ &= \text{regression coefficient for stock } i \times \text{independent variable } t \\ & \quad + \text{intercept for stock } i + \text{residual for stock } i_t \\ & t = \text{month-end} \end{aligned}$$

Calculation of standardized score

The following method is used to calculate a standardized score for each of the four scores set out above⁶. When data is not available for a particular stock, the standardized score for the stock is also treated as not available and this is not included in the calculation of the average and standard deviation for the composite score calculation universe.

$$\begin{aligned} & \text{Standardized score for stock } i \\ &= \frac{(\text{score for stock } i - \text{average score for composite score calculation universe})}{\text{standard deviation of scores in composite score calculation universe}} \end{aligned}$$

⁵ See 2.2.4 for treatment when data is not available.

⁶ Adjusted so that standardized scores are between -3 and +3, with standardized scores of more than 3 adjusted to 3 and standardized scores of less than -3 adjusted to -3.

2.2.4 Calculation of composite score

For the Nomura Japan Equity High Beta Select 30, a standardized score is calculated for three of the four scores set out in 2.2.3—market beta, forex beta, and momentum—and the average of these three standardized scores is treated as the composite score for the purpose of selecting the 30 stocks for the index. For the Nomura Japan Equity Low Beta Select 50, a standardized score is calculated based on three of the four scores set out in 2.2.3—market beta, forex beta, and stock-specific risk—and the average of these three standardized scores is treated as the composite score for the purpose of selecting the 50 stocks for the index. When calculating the average of the standardized scores, if data is not available the value is taken to be zero.

Fig. 1: Scores used in calculation of composite score

Score	Details	Nomura Japan Equity High Beta Select 30	Nomura Japan Equity Low Beta Select 50
Market beta	Market beta over past 60 months	○	○
Forex beta	USD/JPY beta over past 60 months	○	○
Momentum	Share price return over past 11 months adjusted for market beta	○	-
Stock-specific risk	Standard deviation of share price return over past 60 months adjusted for market beta	-	○

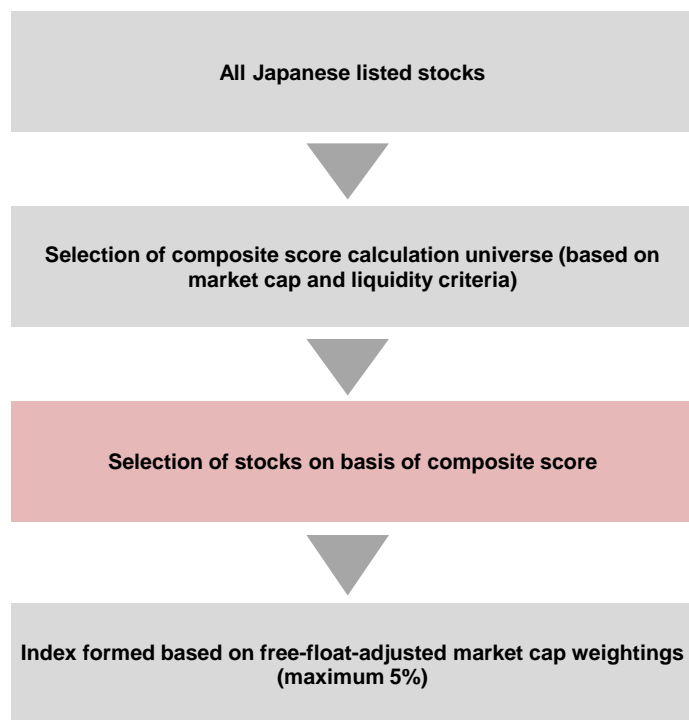
Source: Nomura

2.3 Selection method for index constituents

Index constituents are selected using the following method:

- 1) The stock selection universe (2.1) is selected from all stocks listed on Japanese stock exchanges.
- 2) From the stock selection universe, stocks that meet the market cap and liquidity criteria set out in 2.2.1 are selected for the composite score calculation universe.
- 3) The Nomura Japan Equity High Beta Select 30 comprises the 30 stocks with the highest composite scores for the selection of the Nomura Japan Equity High Beta Select 30, as set out in 2.2.4. The Nomura Japan Equity Low Beta Select 50 comprises the 50 stocks with the lowest composite scores for the selection of the Nomura Japan Equity Low Beta Select 50, as set out in 2.2.4⁷.

Fig. 2: Index construction method



Source: Nomura

⁷ If the number of stocks selected exceeds the required number (30 stocks in the case of the Nomura Japan Equity High Beta Select 30 and 50 stocks in the case of the Nomura Japan Equity Low Beta Select 50), stocks are selected in descending order of their free-float-adjusted market cap up to the required number.

2.4 Weighting of constituent stocks

2.4.1 Constituent stock weight and weight limit

Weights for each constituent stock are calculated using the free-float-adjusted market cap⁸ as of the reconfiguration base date. The maximum weight for each constituent stock is 5%. The weight of stocks exceeding the limit is allocated among other constituent stocks in proportion to their free-float-adjusted market cap.

2.4.2 Number of shares included in index for each constituent stock and index inclusion ratio

The number of shares included in the index and the weight for each constituent stock are calculated using data as of the reconfiguration base date so that the weight is equal to the constituent stock weight set out in 2.4.1.

Market cap of stock i included in index = weight of stock i included in index $\times \sum j$ (free-float adjusted market cap j)

No. of shares in stock i included in index = market cap of stock i included in index \div Nomura composite share price for stock i

Weight of stock i included in index = no. of shares in stock i included in index \div no. of shares outstanding in stock i for index calculation purposes

i indicates constituent stock number i and $\sum i$ indicates the sum of all index constituents.

• Nomura composite share price

The Nomura composite price is the price on the exchange that is judged to have the most accurate price for the stock, based on the percentage of days traded and trading volume over the previous 60 business days. As a general rule, the exchange is selected on a daily basis. The share price is selected according to the following order of precedence:

Contract price on selected exchange (see note) > standard price on selected exchange > Nomura composite share price on previous business day

Note: Priority is given to the special quotation price or continuous confirmed quotation price on the selected exchange if these are available.

⁸ Free-float-adjusted market cap = number of shares outstanding for index calculation purposes \times Nomura composite share price \times (1 - stable shareholding ratio). The stable shareholding ratio (based on the number of shares considered to be held on a stable basis) is estimated based on major shareholder data, declarations of marketable securities holdings contained in securities filings, and public information such as company prospectuses and stock exchange releases. The number of shares outstanding for index calculation purposes refers to the number of shares outstanding after reflecting changes in the number of shares in line with the timing of changes in capital structure as set out in 4.2. Adjusting base market capitalization.

3. Unscheduled reconfigurations

3.1. Response to stock swaps, stock transfers, mergers, etc⁹

Temporary exclusions of stocks from the index are avoided and the consistency of the stocks included in the index is maintained, based on the following rules.

3.1.1. Stock swaps and absorption-type mergers

When a stock is delisted because it is about to become a wholly owned subsidiary or be merged into another company (hereinafter, merged company), it may be included in the index after its delisting but is removed from the index on the day of the listing change (or on the following business day if this is a non-business day). Following its delisting, and until its removal from the index, the merged company's valuation will be based on the market value of the company that will become the parent or the surviving company multiplied by the exchange or merger ratio. Also, the index weighting of the parent company or surviving company is changed on the day of the listing change (or on the following business day if this is a non-business day) based on the exchange or merger ratio.

3.1.2. Stock transfers and consolidation mergers

When an unlisted parent company or surviving company in a merger (hereinafter, surviving company) assumes the operations of another company and becomes listed after a short period of time, the merged company is removed from the index on the new listing date of the surviving company (or on the following business day if this is a non-business day). The price used for the delisted merged company is the price on the day before its delisting. Also, the price used for the surviving company is the price on its new listing date. However, if the surviving company will not be included in the index after periodic reconfiguration, the merged company is removed from the index on the delisting date.

⁹ This rule applied beginning with April 2002 changes in capital structure.

3.2 Removal of stocks

3.2.1. Designation as securities to be delisted

Stocks designated as securities to be delisted will be removed from the index four business days later (or on the following business day if this is a non-business day). However, stocks that are listed on more than one market and have not been designated for delisting on one or more of the markets will not be removed.

3.2.2. Delisting

Stocks that are delisted for reasons other than those stated in 3.1. Response to stock swaps, stock transfers, mergers, etc are removed from the index on the day of their delisting.

3.2.3. Marked loss of eligibility for inclusion in stock selection universe

If a constituent stock shows a marked loss of eligibility for inclusion in the stock selection universe for one of the reasons given in 2.1. Stock selection universe, it may be removed from the index following an official announcement by the company in question, the stock exchange, or a government/regulatory agency. However, if that reason ceases to exist after the stock has been removed from the index, its ineligibility will cease to apply from the next periodic reconfiguration.

4. Index calculation

4.1 Index calculation method

4.1.1 Index base date, index base value, index publication start date

The base date for the Nomura Japan Equity High Beta Select 30 and the Nomura Japan Equity Low Beta Select 50 is 29 December 2000 and the value of the indices on the base date (base value) is 10,000. Publication of index values will start on 18 January 2017.

4.1.2 Calculation of index market cap

Index market cap = $\sum i$ (market cap of constituent stock i)

4.1.3 Calculation of index values

Calculation of yen-based index values

To prevent index values from being affected by changes in market capitalization that are not related to market fluctuations, eg, changes in capital structure and index constituents, the indices are calculated as follows using base market capitalization.

- **Indices excluding dividends**

Base market cap _{t} = index market cap _{$t-1$} + adjusted market cap _{t}

$$\text{Return}_t = \frac{\text{index market cap}_t}{\text{base market cap}_t} - 1$$

Index value _{t} = index value _{$t-1$} × (1 + return _{t})

- **Indices including dividends**

Base market cap _{t} = index market cap _{$t-1$} + adjusted market cap _{t} – adjusted total dividends _{t}

$$\text{Return}_t = \frac{\text{index market cap}_t + \text{total dividends}_t}{\text{base market cap}_t} - 1$$

Index value _{t} = index value _{$t-1$} × (1 + return _{t})

Method for reflecting dividends

For the indices including dividends, dividends are reflected in index values on the ex-dividend date. However, as the value of the dividend has not yet been determined as of the ex-dividend date, the stock issuer's dividend forecast is used (if this is unavailable, the Toyo Keizai dividend forecast is used)¹⁰. In the event that a difference subsequently arises between the dividend forecast and the actual dividend, the base market capitalization is adjusted on the last business day of the month of the earnings announcement (if the earnings announcement is made on the last business day of the month, the base market capitalization is adjusted on the last business day of the following month). In addition, if dividend adjustment is required, the base market capitalization is adjusted on the last business day of the month in which this became clear (if the day in which this became clear is the last business day of the month, the base market capitalization is adjusted on the last business day of the following month).

¹⁰ This rule applies to accounting periods ending end-December 2011 onward. For periods before this, the actual dividend as of the ex-dividend date is used.

- **Indices based on dividends after tax**

Because dividends are subject to taxation, index values based on total dividends after taking dividend taxation into account are calculated using the following formula. Index values are calculated using the tax rate for Japanese residents¹¹.

Tax adjusted base market cap_t = index market cap_{t-1} + adjusted market cap_t – adjusted tax adjusted total dividends_t

$$\text{Return}_t = \frac{\text{index market cap}_t + \text{tax adjusted total dividends}_t}{\text{tax adjusted base market cap}_t} - 1$$

$$\text{Index value}_t = \text{index value}_{t-1} \times (1 + \text{return}_t)$$

Calculation of US dollar-based index values

US dollar-denominated index values are calculated using yen-denominated index values and the forex rate on the index base date, using the formula below. Index values excluding dividends and index values including dividends are calculated separately. The forex rate used is the USD/JPY middle rate announced by the BOJ (at 17:00).

$$\begin{aligned} \text{US dollar denominated index value} \\ = \frac{\text{yen based index value} \times \text{forex rate on index base date}}{\text{forex rate}} \end{aligned}$$

¹¹ The tax rate for Japanese residents is 15.315% as of January 2017. Total dividends after tax are calculated by applying the tax rate on the business day before the ex-dividend date. The tax rate is revised on a quarterly basis (in January, April, July, and October).

4.2 Adjusting base market capitalization

Base market capitalization is adjusted in the following way if there is a change in capital structure or in index constituent stocks. However, no adjustment is made to base market capitalization to reflect changes in capital structure that do not involve payment, such as stock splits, reverse stock splits, and changes in face value, as these do not affect market cap.

Fig. 3: Timing of adjustments resulting from changes in capital structure

	Type of change in capital structure	Adjustment date	Share price used
Stock replace- ment	Stock transfer, stock swap, merger	Date of listing change	Previous day's price
	Corporate divestiture (company/division spinoff)	Ex-rights date	Not used ¹²
	Stock replacement	Replacement date	Previous day's price
Capital increase	Rights offering	Ex-rights date	Issue price
	Gratis allocation of stock acquisition rights	Ex-rights date	Exercise price
	Gratis allocation of treasury stock	Ex-rights date	Previous day's price
	Public offering	Business day following payment date (listing date of new shares when settlement is on issuance date)	Previous day's price
	Capital increase via third-party placement	Five business days after date of listing change	Previous day's price
	Conversion of preferred stock	Last business day of month in which number of converted shares becomes known	Previous day's price
	Conversion of CBs Exercise of stock acquisition rights	Last business day of month in which number of new shares for which rights were exercised becomes known	Previous day's price
	Corporate divestiture (new stock in continuing company)	Date of listing change	Previous day's price
Capital reduction	Retirement of treasury stock	Last business day of month following month of treasury stock retirement	Previous day's price
	Rights offering refusal	Last business day of month following month in which rights offering refusal is announced (or last business day of following month if announcement is within five business days of month-end)	Previous day's price
	Capital reduction with compensation	Effective date	Previous day's price
Other	Other adjustments	Other adjustments to base market capitalization, if required, are made on the last business day of the month of the disclosure of the relevant information (or the last business day of the following month if the disclosure is made within five business days of the month-end)	Previous day's price

Source: Nomura

¹² In the case of a corporate divestiture (company/division spinoff), the base market capitalization is adjusted for the reduction in capital. The reduction in capital is defined as follows: (1) when the divesting entity does not announce the value of the divested division or of the shares of the divested (spun-off) company, capital is reduced by the amount by which the divesting entity's shareholders' equity is expected to be reduced and (2) when the divesting entity does announce the value of the divested division or of the shares of the divested (spun-off) company, capital is reduced by the value of the division or the value of the divested company's shares multiplied by the total number of shares.

4.3 Index maintenance

Constituent stocks are replaced in periodic and unscheduled reconfigurations and when necessary for other reasons. In addition, when the following changes in capital structure result in a change in the number of shares outstanding for index calculation purposes, the index inclusion ratio is changed so that number of shares in the stock that are included in the index does not change.

- Stock transfer, stock swap, merger¹³
- Rights offering
- Gratis allocation of stock acquisition rights
- Public offering
- Capital increase via third-party placement
- Conversion of preferred shares
- Conversion of CBs, exercise of stock acquisition rights
- Corporate divestiture (new stock in surviving company)
- Retirement of treasury stock
- Rights offering refusal
- Capital reduction with compensation
- Other adjustments

¹³ When an index constituent becomes a wholly owned subsidiary (or merged company), the index inclusion ratio of the parent (or surviving company) is changed so that the total number of shares in the index remains the same as it was before, taking the exchange ratio (or merger ratio) into account.

5. Data publication services

Data for the indices can be obtained via the following channels¹⁴.

Index values will be published in the following media:

Bloomberg: Nomura Japan Equity High Beta Select 30

NMRCJOHB (yen-denominated index excluding dividends)

NMRCJIHB (yen-denominated index including dividends)

NMRCNRHB (yen-denominated index adjusted for tax on dividends (Net Total Return))

Nomura Japan Equity Low Beta Select 50

NMRCJOLB (yen-denominated index excluding dividends)

NMRCJILB (yen-denominated index including dividends)

NMRCNRLB (yen-denominated index adjusted for tax on dividends (Net Total Return))

QUICK: NRIJ@

REUTERS: Nomura Japan Equity High Beta Select 30

.NHB30 (yen-denominated index excluding dividends)

.NHB30TR (yen-denominated index including dividends)

.NHB30NR (yen-denominated index adjusted for tax on dividends (Net Total Return))

Nomura Japan Equity Low Beta Select 50

.NLB50 (yen-denominated index excluding dividends)

.NLB50TR (yen-denominated index including dividends)

.NLB50NR (yen-denominated index adjusted for tax on dividends (Net Total Return))

Our website: <http://qr.nomura.co.jp/jp/nmbs/index.html> (Japanese only)

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In the case of an unavoidable event such as computer breakdown or natural disaster, calculation of the indices may be delayed or suspended.

While every effort is made to ensure that the information used in this report and all published information is based on reliable data, it should be noted that data may be changed or amended when necessary.

¹⁴ Published data are all for reference only.

Policies with regard to NSC's indices

The below index-related policies are published on our website.

See the following link for details:

<http://qr.nomura.co.jp/en/guides/index.html>

- Index Calculation Policy
- Complaints Handling Policy
- Glossary (Equity)
- Index Governance Framework
- Conflicts of Interest Policy

Appendix A-1

Analyst Certification

I, Index Operations Dept., hereby certify (1) that the views expressed in this Research report accurately reflect my personal views about any or all of the subject securities or issuers referred to in this Research report, (2) no part of my compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this Research report and (3) no part of my compensation is tied to any specific investment banking transactions performed by Nomura Securities International, Inc., Nomura International plc or any other Nomura Group company.

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As at 31 December 2018.

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