

## Nomura Robot Companies 70 index rulebook

EQUITY QUANTITATIVE RESEARCH (INDEX)

### Global Markets Research

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[Japan index products](#)

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### Nomura Robot Companies 70

The Nomura Robot Companies 70 is an equally weighted index made up of 70 stocks of companies covered by the media in connection with business related to robots.

Stocks for inclusion in the index are selected from all common stocks listed on exchanges in Japan using quantitative valuation indicators based on the results of searches for articles/reports in TV news, magazines, newspapers, and other media. "Robot" and several related keywords selected through the use of AI are employed in the search for articles.

### Index characteristics

- 70 stocks are selected with quantitative valuation indicators based on the results of searches for articles/reports in TV news, magazines, newspapers, and other media.
- Because it is an equally weighted index, a flat rate of investment is made in both large-cap and small-cap robot-related stocks.
- Stocks with an excessively small market cap or low liquidity are excluded from the stock selection universe in view of investability.
- Constituent stocks and the robot-related keywords used to search for articles are each reviewed once a year.
- The rebalancing band method is used to limit frequent replacements of stocks in periodic reconfigurations of the index

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# 1. Periodic reconfigurations

## 1.1 Periodic reconfiguration date

The periodic reconfiguration date is the first business day of December every year, and reconfiguration is 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 15th day of the month that is two months before the month of the periodic reconfiguration date<sup>1</sup> (or the preceding business day if the 15th is a non-business day). 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 reconfigurations

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.

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<sup>1</sup> This rule was adopted starting with December 2009 periodic reconfigurations. Periodic reconfigurations for December 2008 and before were performed using data from the last day of the month preceding the periodic reconfiguration date (or the preceding business day if the last day of the month was a non-business day).

## 2. Stock selection and index construction method

### 2.1 Stock selection universe

The stock selection universe includes, out of all stocks listed on Japanese stock exchanges as of the end-March preceding the periodic reconfiguration base date, the top 98% of stocks in terms of free-float-adjusted market cap as of the periodic reconfiguration base date. Of the stocks that were listed in or after April and before the end of September preceding the periodic reconfiguration base date, those in approximately the top 85% in terms of free-float-adjusted market cap and newly merged stocks are also included in the stock selection universe.

The stock selection universe excludes stocks that meet the following criteria as of the periodic reconfiguration base date.

- **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 stock selection universe.

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

Stocks under supervision (examination) and stocks under supervision (confirmation) that are not included in the index immediately before the periodic reconfiguration are not included in the stock selection universe.

- **TOB target companies<sup>2</sup>**

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

- (1) the tender offer close date falls between the stock selection universe determination date (the periodic reconfiguration base date) and the periodic reconfiguration date;
- (2) the company conducting the tender offer plans to acquire all the outstanding shares in the target company; and
- (3) 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.

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<sup>2</sup> This rule will apply from the December 2018 periodic reconfiguration.

## 2.2 Score calculation universe

Using data as of the periodic reconfiguration base date, stocks in the stock selection universe (see 2.1 Stock selection universe) that meet the following criteria are eligible for inclusion in the score calculation universe.

(1) Sector-based screening

Stocks in the stock selection universe that come under the "banks", "securities and commodities futures", "insurance", and "other financing business" sectors (based on the Tokyo Stock Exchange's 33 sector classifications) are excluded.

(2) Screening based on liquidity criteria

Following the sector-based screening, stocks that meet the criteria of being in the top 90% of stocks in terms of average market turnover over the past 60 days are included in the score calculation universe.

## 2.3 Stock selection method

### Robot ranking score

- (1) Searches for articles containing the word "robot" are conducted for stocks in the score calculation universe. Searches target articles including both the stock's ticker code and the word "robot," using the search parameter below.

Parameter for robot article searches: [stock ticker code] AND "robot"

- (2) We determine the robot article score for the most recent year for stocks in the score calculation universe based on the number of articles containing the word "robot" in the search results over the year up to the day before the periodic reconfiguration base date. We then determine the robot article score for one year earlier based on the number of articles containing the word "robot" in the search results over the year from the periodic reconfiguration base date two years earlier through the day before the periodic reconfiguration base date one year earlier.
- (3) We determine the robot ranking score by ranking the stocks in the score calculation universe (in ascending order) based on a weighted score calculated as (robot article score for the most recent year x 2) + (robot score for one year earlier).

### Related keyword ranking score

- (1) We also conduct searches for articles containing related keywords for stocks in the score calculation universe. Searches target articles that include both the stock's ticker code and a related keyword, but that do not include the word "robot," using the search parameter below. We search for articles containing any of the keywords in the list of related keywords (combining all the keywords in the set using OR).

Parameter for related keyword searches:

[stock ticker code] AND [any keyword on the list of related keywords] NOT "robot"

- (2) We determine the related keyword article score for the most recent year for stocks in the score calculation universe based on the number of articles containing related keywords in the search results over the year up to the day before the periodic reconfiguration base date. We then determine the related keyword article score for one year earlier based on the number of articles including related keywords in the search results over the year from the periodic reconfiguration base date two years earlier through the day before the periodic reconfiguration base date one year earlier.
- (3) We determine the related keyword ranking score by ranking the stocks in the score calculation universe (in ascending order) based on a weighted score calculated as (related keyword article score for the most recent year x 2) + (related keyword article score for one year earlier).

**Stock selection<sup>3</sup>**

- (1) We select the top 10 stocks based on robot ranking score. If there are multiple stocks with scores putting them in the top 10, we select up to 150 stocks at those scores in order of average market turnover over the past 60 days.
- (2) If the number of stocks selected in (1) does not reach 150, we select the remainder from stocks not already selected as candidates, in order of the average of the robot ranking score and the related keyword ranking score, starting with the lowest, to bring the total number of stocks selected as candidates to 150. If there are multiple stocks with average ranking scores putting them in the top 150, we select the top stocks based on robot ranking score. If the above criteria still yield multiple stocks with robot ranking scores putting them in the top 150, we select the top 150 stocks in order of average daily market turnover over the past 60 days. Average ranking scores are determined using the following formula.

$$\text{Average ranking score} = (\text{robot ranking score} + \text{relevant keyword ranking score}) / 2$$

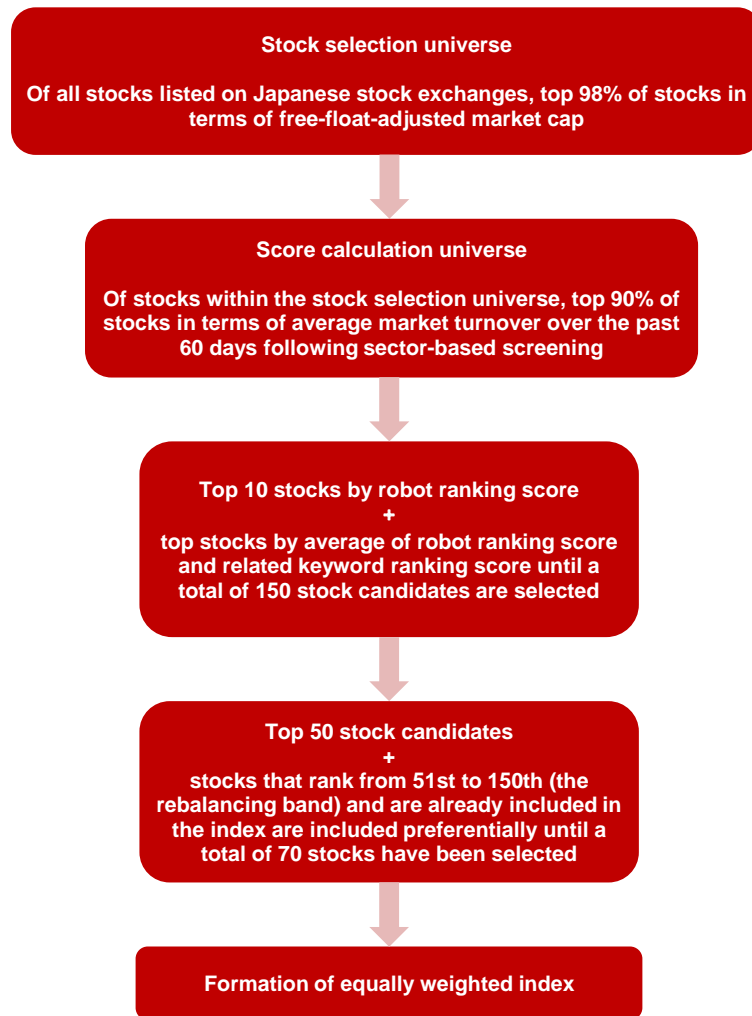
- (3) The top 50 stock candidates in terms of criteria (1) and (2) are then selected unconditionally.
- (4) Stock candidates that rank from 51st to 150th in terms of criteria (1) and (2) (the rebalancing band) and are already included in the index are then selected until a total of 70 stocks have been selected.
- (5) If the total number of stocks selected in (3) and (4) above is less than 70, the shortfall is made up by selecting stocks ranked from 51st onward that are not currently included in the index, in order of ranking.

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<sup>3</sup> Stock selection taking into account the rebalancing band as specified in (3) to (5) will be adopted starting with the December 2018 periodic reconfiguration.

The following method of inclusion was employed until December 2017.

- (1) The top 10 stocks based on robot ranking score are first selected. If there are multiple stocks with a score putting them in the top 10, we select up to 70 stocks at those scores in order of average market turnover over the past 60 days.
- (2) If the number of stocks selected by method (1) does not reach 70, we select the remainder from stocks not already selected, in order of the average of the robot ranking score and the related keyword ranking score, to bring the total number of selected stocks to 70. If there are multiple stocks with average ranking scores putting them in the top 70, we select the top stocks based on robot ranking score. If the above criteria still yield multiple stocks with robot ranking scores putting them in the top 70, we select the top 70 stocks in terms of average daily market turnover over the past 60 days.

**Fig. 1: Composition of the Nomura Robot Companies 70**

Note: See the body text for details on exception handling and index construction methods.

Source: Nomura

## 2.4 Weighting of constituent stocks and number of shares per stock

On the periodic reconfiguration base date as set out in 1.2 Periodic reconfiguration base date, the 70 constituent stocks selected as set out in 2.3 Stock selection method are weighted equally. The number of shares per stock on that day is calculated by dividing the market capitalization of the index on that day by the number of constituent stocks (ie, 70) and then dividing that amount by the Nomura composite share price for each stock at the close of trading. Adjustments to the number of shares per stock are made in accordance with 4.4 Index maintenance until the next periodic reconfiguration date.

- Nomura composite share price

The Nomura composite share price is the name given to the share price on the stock exchange selected for each stock on the basis of trading frequency and volume over the preceding 60 trading 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:

Special quotation price or continuous confirmed quote on selected exchange > trade price on selected exchange > standard quotation on selected exchange > Nomura composite share price on previous business day

## 2.5. Article search criteria

Articles are searched using Nikkei Telecom according to the following criteria:

- (1) Search mode (include all words)
- (2) Match mode (exact match)
- (3) Search range (headlines, text, keywords, categories)
- (4) Synonymous expansion, no thesaurus expansion
- (5) Exclude obituaries and articles on personnel matters (Nikkei publications), articles consisting solely of numerical tables (Nikkei publications), and articles from the sports section (Nikkei publications)
- (6) The category "newsflash" is excluded from the articles to be searched.

## 2.6. Reviewing and announcing related keywords

Related keywords will be reviewed annually on 15 June (or the preceding business day if the 15th is a non-business day). As a rule, the results will be announced on Nomura's website on 15 August (or the preceding day if the 15th is a non-business day). However, this will not apply in the event of unforeseen circumstances or when information cannot be confirmed.

Related keywords for possible addition or revision are selected once a year.

Keywords are selected for their relevance to robots on the basis of (1) material on robots published by government departments and research organizations from 1 April in the year five years previously until 31 March of the current year and (2) internal criteria.

The following examples are related keywords selected in 2017 (Figure 2).

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**Fig. 2: Related keywords selected in 2017**

- Robo
- System integrator
- Muscle suit
- Assist suit
- Power assist
- Humanoid
- Manipulation
- Ubiquitous network
- Manipulator
- Personal mobility
- Actuator
- Robotics

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Note: Allowance is made for minor variations in how the Japanese equivalents of some of the above terms written in katakana are spelled.

Source: Nomura



## 3. Unscheduled reconfigurations

### 3.1. Response to stock swaps, stock transfers, mergers, etc<sup>4</sup>

Temporary exclusions of stocks from the index are avoided and the consistency of index constituents is maintained by adherence to 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 (hereafter, merged company), it is included in the index after delisting but removed from the index on the listing change date (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 is based on the market value of the company that will become the parent company or the surviving company multiplied by the exchange or merger ratio. Also, the index inclusion ratio of the parent company or surviving company is changed on the listing change date (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 (hereafter, 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, it can be removed from the index on the delisting date.

## 3.2. Removal of stocks

#### 3.2.1. Designation as securities to be delisted

Stocks designated as securities to be delisted are 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 delisted for reasons other than those cited in 3.1 Response to stock swaps, stock transfers, mergers, etc are removed from the index on the delisting date.

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

In the case of an event that is regarded as having seriously damaged a constituent stock's eligibility for inclusion in the stock selection universe as defined in 2.1 Stock selection universe, the stock 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 the reason for the stock's removal from the index no longer applies at a later date, it will stop being regarded as ineligible for inclusion in the stock selection universe at the time of the next periodic reconfiguration.

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<sup>4</sup> This rule applied from April 2002.

## 4. Index calculation

### 4.1. Index base date, base value, announcement date

The base date for the Nomura Robot Companies 70 is 30 November 2001 and the value of the index on the base date (base value) is 10,000. Publication of index values starts on 14 June 2018.

### 4.2. Calculation of index values

To prevent index values from being affected by changes in market capitalization not related to market fluctuations, eg, changes in capital structure and index constituents, the index is calculated as follows using base market capitalization<sup>5</sup>. Subscript t indicates the current day and t-1 indicates the preceding business day.

#### Calculation of yen-denominated index values

- Index excluding dividends

Base market cap<sub>t</sub> = index market cap<sub>t-1</sub> + adjusted market cap<sub>t</sub>

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

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

- Index including dividends

Base market cap<sub>t</sub>  
= index market cap<sub>t-1</sub> + adjusted market cap<sub>t</sub>  
– adjusted total dividends<sub>t</sub>

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

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

- Method for reflecting dividends

For the index including dividends, dividend data is reflected on the ex-dividend date. However, as the value of the dividend has not yet been determined on the ex-dividend date, the company's dividend forecast is used (if this is not available, the Toyo Keizai dividend forecast is used)<sup>6</sup>. In the event of a difference between the dividend forecast and the actual dividend, the base market capitalization is adjusted on the last business day of the month of the company's earnings announcement (if the company announces its earnings on the last business day of the month, the adjustment is made on the last business day of the following month). Also, if a dividend adjustment is required, the base market capitalization is adjusted on the last business day of the month when this becomes known (if this becomes known on the last business day of the month, the adjustment is made on the last business day of the following month).

<sup>5</sup> In 4.2 Calculation of index values, adjusted market capitalization is calculated to reflect changes in market capitalization resulting from changes in the capital structure of index constituents or changes in market capitalization resulting from changes in the index constituents. Also, adjusted total dividends are calculated to reflect any differences between forecast and actual dividends that may occur.

<sup>6</sup> This rule applies starting from accounting periods ending end-December 2011. Actual dividends on ex-rights dates are used prior to this time.

### 4.3. Adjustment of base market capitalization

Base market capitalization is adjusted as follows if there are any changes in capital structure or index constituents (Figure 3). However, base market capitalization is not adjusted 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 capitalization.

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

|                   | Type of change in capital structure                      | Adjustment date   | Share price used        |
|-------------------|--|---|-------------------------|
| Stock replacement | Stock transfer, stock swap, merger                       | Date of listing change  | Previous day's price    |
|                   | Corporate divestiture (company/division spinoff)         | Ex-rights date  | (Not used) <sup>7</sup> |
|                   | 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 into common stock          | Last business day of month in which number of converted shares becomes known  | Previous day's price    |
|                   | Conversion of CBs  | Last business day of month in which number of new shares for which rights were exercised becomes known  | Previous day's price    |
|                   | 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    |
| Capital decrease  | Corporate divestiture (new shares in continuing company) | Date of listing change  | Previous day's price    |
|                   | Retirement of treasury stock                             | Last business day of month following month in which shares are retired  | Previous day's price    |
|                   | Rights offering refusal                                  | Last business day of 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    |
| Other             | Capital reduction with compensation                      | Effective date  | Previous day's price    |
|                   | Other adjustments  | Other adjustments to the base market capitalization, if required, are made on the last business day of the month of the announcement of the relevant report (or the last business day of the following month if the announcement is within five business days of month-end) | Previous day's price    |

Source: Nomura

<sup>7</sup> 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.

## 4.4. 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 the number of shares in the stock that are included in the index does not change.

- Stock transfer, stock swap, merger<sup>8</sup>
- Rights offering
- Gratis allocation of stock acquisition rights
- Public offering
- Private placement
- Conversion of preferred stock
- Conversion of convertible bonds, exercise of stock acquisition rights
- Corporate divestiture (new stock in surviving company)
- Retirement of shares
- Rights offering refusal
- Capital reduction with compensation
- Other adjustments

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<sup>8</sup> 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 Nomura Robot Companies 70 can be obtained via the following channels.

Index values will be published in the following media.

Bloomberg:

NMRIJORB<index> (index excluding dividends, yen-denominated)

NMRIJIRB<index> (index including dividends, yen-denominated)

QUICK:

NRIJ@

Reuters:

.NROBO (index excluding dividends, yen-denominated)

.NROBOTR (index including dividends, yen-denominated)

Website:

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

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Nikkei Telecom-related disclaimer

The index is not related to Nikkei Inc. and is not endorsed or guaranteed by Nikkei Inc.

# Appendix A-1

## Analyst Certification

We, Quantitative Research Dept. and Index Operations Dept., hereby certify (1) that the views expressed in this Research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this Research report, (2) no part of our 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 our 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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The distribution of all ratings published by Nomura Group Global Equity Research is as follows:

51% have been assigned a Buy rating which, for purposes of mandatory disclosures, are classified as a Buy rating; 42% of companies with this rating are investment banking clients of the Nomura Group\*. 0% of companies (which are admitted to trading on a regulated market in the EEA) with this rating were supplied material services\*\* by the Nomura Group.

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As at 31 March 2018.

\*The Nomura Group as defined in the Disclaimer section at the end of this report.

\*\* As defined by the EU Market Abuse Regulation

## Distribution of ratings (Instinet, LLC)

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## Definition of Nomura Group's equity research rating system and sectors

The rating system is a relative system, indicating expected performance against a specific benchmark identified for each individual stock, subject to limited management discretion. An analyst's target price is an assessment of the current intrinsic fair value of the stock based on an appropriate valuation methodology determined by the analyst. Valuation methodologies include, but are not limited to, discounted cash flow analysis, expected return on equity and multiple analysis. Analysts may also indicate expected absolute upside/downside relative to the stated target price, defined as (target price - current price)/current price.

## STOCKS

A rating of '**Buy**', indicates that the analyst expects the stock to outperform the Benchmark over the next 12 months. A rating of '**Neutral**', indicates that the analyst expects the stock to perform in line with the Benchmark over the next 12 months. A rating of '**Reduce**', indicates that the analyst expects the stock to underperform the Benchmark over the next 12 months. A rating of '**Suspended**', indicates that the rating, target price and estimates have been suspended temporarily to comply with applicable regulations and/or firm policies. Securities and/or companies that are labelled as '**Not rated**' or shown as '**No rating**' are not in regular research coverage. Investors should not expect continuing or

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When Japanese government bonds (JGBs) for individual investors are purchased via public offerings, only the purchase price shall be paid, with no sales commission charged. As a rule, JGBs for individual investors may not be sold in the first 12 months after issuance. When JGBs for individual investors are sold before maturity, an amount calculated via the following formula will be subtracted from the par value of the bond plus accrued interest: (1) for 10-year variable rate bonds, an amount equal to the two preceding coupon payments (before tax) x 0.79685 will be used, (2) for 5-year and 3-year fixed rate bonds, an amount equal to the two preceding coupon payments (before tax) x 0.79685 will be used.

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