NOMURA J-TIPS Index

Global Markets Research
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Cross-asset - Japan

Index rulebook

Research Analysts

Japan Bond Indices

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Key features of NOMURA J-TIPS Index

- NOMURA J-TIPS Index is an investment return index developed to reflect the performance of the entire secondary market of J-TIPS, inflation-indexed JGBs (JGBis), which have a different return and risk profile than nominal bonds.
- The index value calculation method and inclusion criteria of the NOMURA J-TIPS Index are based upon the NOMURA-BPI.
- The NOMURA J-TIPS Index includes JGBis with principal guaranteed (i.e., deflation floored), the issuance of which started in October 2013.
- Bonds included in the NOMURA J-TIPS Index are reviewed monthly.

1. Introduction

First released in 2004, the NOMURA J-TIPS Index is a bond performance index developed to reflect the performance of the entire secondary market for JGBis, which have a different return and risk profile than nominal bonds. The index value calculation method and inclusion criteria of the NOMURA J-TIPS Index are based upon the NOMURA-BPI[1].

The Index Operations Dept. (IOD) in Nomura Securities Co., Ltd. (NSC) is the Administrator of the NOMURA J-TIPS Index, and Nomura Research Institute, Ltd. (NRI) serves as the Calculation Agent.

The IOD assumes primary responsibility for the daily calculation of the bond performance index, its production and operation. Specifically, the IOD, in its role as operations manager:

- Maintains and records the index weightings of all constituents;
- Reviews the index portfolios according to the inclusion/exclusion criteria, and replaces securities in these portfolios as necessary, reflecting these changes in the performance and other indicators; and reviews the index portfolio inclusion criteria.
- Announces changes in the securities included in the index portfolios, which are determined as a result of daily operations management and scheduled reviews; and
- Distributes the index portfolio performances, either through NRI’s data delivery service or on its own.

The NOMURA J-TIPS Index is meant to be used as:

- A tool for determining investment policies (asset allocation strategies);
- A tool for determining investment manager structure;
- An investment management benchmark;
- A tool for portfolio management;
- An investment performance indicator; and
- A risk management tool.

1. NOMURA-BPI® is a registered trademark of Nomura Securities Co., Ltd. (Registered Number: 4991073)

2. Sub-indices

Beginning in October 2013, the principals of JGBis are guaranteed at maturity (i.e., deflation floored), and these bonds are also included in the NOMURA J-TIPS Index. In the NOMURA J-TIPS Index, the two types of JGBi are grouped differently, as follows:

- NOMURA J-TIPS Index – deflation floored
- NOMURA J-TIPS Index – non-floored

3. Scheduled portfolio reconstitution

The IOD reviews and reconstitutes NOMURA J-TIPS Index portfolios every month. Next month's portfolios are determined on the portfolio determination day of each month.

3.1 Scheduled reconstitution date

NOMURA J-TIPS Index portfolios are reconstituted on the first business day of the month (scheduled reconstitution date), with inclusion/exclusion implemented after the bond market closes on the business day before the scheduled reconstitution date.

3.2 Portfolio determination date

In principle, next month's portfolio determination date is the last business day of the month.

3.3 Scheduled reconstitution base date

Next month's portfolio base is determined on the portfolio determination date. The new portfolio structure is determined in principle on the portfolio determination date based on disclosed information available as of the scheduled reconstitution base date.

3.4 Portfolio reconstitution announcement

Information about the scheduled portfolio reconstitution of the NOMURA J-TIPS Index is announced by NRI.

4. Portfolio inclusion/exclusion method

4.1 Portfolio inclusion criteria for next month

The NOMURA J-TIPS Index incorporates all securities that meet the inclusion criteria as of the scheduled portfolio reconstitution base date into the index portfolios for the following month.

Fig. 1: NOMURA J-TIPS Index Inclusion Criteria

Inclusion candidate	Inflation-linked bonds issued by the Japanese government
Issuance process	Publicly-offered bonds issued in Japan
Currency denomination	JPY
Coupon	Fixed
Issue date	Issues until the last day of the month prior to the scheduled reconstitution date
Outstanding face value	JPY1bn or more which is unadjusted for inflation as of the last day of the month the portfolio reconstitution is implemented
Term to maturity	1 year or more

Note: NSC

4.1.1 Issuance process

The NOMURA J-TIPS Index incorporates publicly-offered bonds issued in Japan. JGBis not publicly offered in the market (i.e., JGBs tailored for retail investors and sold via the new OTC sales system and those issued for BOJ rollover) are excluded.

4.1.2 Term to maturity

The NOMURA J-TIPS Index only includes bonds that are dated 365 days or longer from the last day of the month following the scheduled reconstitution base date to the full redemption date. Inclusive of 29 February.

4.2 Face amount for inclusion

The NOMURA J-TIPS Index includes the amount equivalent to the issue amount publicly offered in the market.

4.3 Portfolio exclusion criteria for next month

Any JGBi that falls short of the inclusion criteria (Figure 1) as of the scheduled reconstitution base date will be excluded from the index portfolio in the following month.

4.3.1 Outstanding face value

JGBis for which the outstanding face value amount will decrease to levels below JPY1bn, unadjusted for inflation, on the last business day of the month following the scheduled reconstitution base date will be excluded from the index portfolio.

4.3.2 Term to maturity

The NOMURA J-TIPS Index excludes bonds that are dated less than one year (365 days) until maturity as of the last business day of the month following the scheduled reconstitution base date[2] .

2. In accordance with business practice, bonds with less than one year remaining to maturity factor in leap days, while bonds with more than one year to maturity do not factor in occurrences of 29 February in the interval.

5. Unscheduled portfolio reconstitution

In principle, index portfolios for the next month, as determined on the portfolio determination date, will remain unchanged. However, these planned portfolios may be subject to an unscheduled reconstitution, which will be implemented between the portfolio determination date and the last business day of the month, if the material event occurs in terms of any of the JGBis included.

5.1 Announcement of unscheduled portfolio reconstitution

Information about unscheduled portfolio reconstitution is announced by Nomura Securities, except in cases where definite information on such a change is unavailable until it actually takes place due to unexpected circumstances.

6. Definition of NOMURA J-TIPS Index indicators

6.1 Definition of issue-specific return-risk indicators

In the NOMURA J-TIPS Index, the issue-specific return-risk indicators are defined as described below.

Note that variables whose name begins with “*A*” represent inflation-adjusted numbers in each of the following equations. Otherwise, the variables are not adjusted for inflation.

- Face value unadjusted for inflation

Outstanding face value amount unadjusted for inflation. This should be equal to the issue amount publicly offered in the market unless the bond is not partially redeemed.

- Face value adjusted for inflation

Inflation-adjusted outstanding face value calculated by multiplying the inflation-unadjusted face value by the index ratio[3] , as indicated below:

$$AA = A \times IR$$

AA	:	Face value adjusted for inflation
A	:	Face value unadjusted for inflation
IR	:	Index ratio

- Clean price unadjusted for inflation

Clean price per JPY100 based on the face value unadjusted for inflation.

- Clean price adjusted for inflation

Inflation-adjusted clean price calculated by multiplying the inflation-unadjusted clean price by the index ratio, as indicated below:

$$ACP = CP \times IR$$

ACP	:	Clean price adjusted for inflation
CP	:	Clean price unadjusted for inflation
IR	:	Index ratio

3. The index ratio is calculated based on the Consumer Price Index. The definition of the index ratio ("Indexation Coefficient") is described in the Ministry of Finance website. https://www.mof.go.jp/english/jgbs/topics/bond/10year_inflation/coefficient.htm

- Accrued interest unadjusted for inflation

Inflation-unadjusted accrued interest incurred according to the number of days from the last interest payment date to the calculation date.

- Accrued interest adjusted for inflation

Inflation-adjusted accrued interest calculated by multiplying the inflation-unadjusted accrued interest by the index ratio, as indicated below:

$$Aac = ac \times IR$$

Aac	:	Accrued interest adjusted for inflation
ac	:	Accrued interest unadjusted for inflation
IR	:	Index ratio

- Dirty price unadjusted for inflation

$$DP = CP + ac$$

DP	:	Dirty price unadjusted for inflation
CP	:	Clean price unadjusted for inflation
ac	:	Accrued interest unadjusted for inflation

- Dirty price adjusted for inflation

$$ADP = ACP + Aac$$

ADP	:	Dirty price adjusted for inflation
ACP	:	Clean price adjusted for inflation
Aac	:	Accrued interest adjusted for inflation

- Market value adjusted for inflation

$$AMV = \frac{ACP \times A}{100}$$

AMV	:	Market value adjusted for inflation
ACP	:	Clean price adjusted for inflation
A	:	Face value unadjusted for inflation

- Total accrued interest adjusted for inflation

$$ACC = \frac{Aac \times A}{100}$$

ACC	:	Total accrued interest adjusted for inflation
Aac	:	Accrued interest adjusted for inflation
A	:	Face value unadjusted for inflation

- Coupon rate

Coupon rate of the JGBi.

- Break-even inflation rate π

Assuming the rate of inflation will remain unchanged at a certain level (π) until the bond's maturity, the nominal interest payments and redemption amount are determined. The present value of the inflation-unadjusted dirty price is equal to the total nominal interest payments and redemption amount multiplied by the nominal discount factor.

Given this, the break-even inflation rate π is defined as follows:

(For floored issues)

$$DP = \sum_i CF_i(1+\pi)^{t_i} DF(t_i) + max\left\{100 \times (1+\pi)^T, \frac{100}{IR_{(today)}}\right\} DF(T)$$

(For non-floored issues)

$$DP = \sum_i CF_i(1+\pi)^{t_i} DF(t_i) + 100 \times (1+\pi)^T DF(T)$$

DP	:	Dirty price unadjusted for inflation
π	:	Break-even inflation rate
t_i	:	Number of years until CF_i occurs
T	:	Number of years until redemption cash flow occurs
CF_i	:	Real cash flow for *i* th period
$DF(t_i)$	:	Discount factor (nominal) for period t_i
$IR_{(today)}$	:	Index ratio, as of today

- Nominal compound yield n

Based on the break-even inflation rate π, the nominal compound yield n is calculated in the following equation:

(For floored issues)

$$DP = \sum_i CF_i(1+\pi)^{t_i}(1+\frac{n}{2})^{-2t_i} + max\left\{100 \times (1+\pi)^T, \frac{100}{IR_{(today)}}\right\}(1+\frac{n}{2})^{-2T}$$

(For non-floored issues)

$$DP = \sum_i CF_i(1+\pi)^{t_i}(1+\frac{n}{2})^{-2t_i} + 100 \times (1+\pi)^T(1+\frac{n}{2})^{-2T}$$

DP	:	Dirty price unadjusted for inflation
π	:	Break-even inflation rate
t_i	:	Number of years until CF_i occurs
T	:	Number of years until redemption cash flow occurs
CF_i	:	Real cash flow for i th period
n	:	Nominal compound yield (semi-annual)
$IR_{(today)}$	:	Index ratio, as of today

- Real compound yield r

The real compound yield r is defined as follows:

$$DP = \sum \frac{Ct_i}{(1+\frac{r}{2})^{2t_i}}$$

DP	:	Dirty price unadjusted for inflation
r	:	Real compound yield
t_i	:	Number of years until Ct_i occurs
Ct_i	:	Real cash flow for i th period

- Duration

$$D = \frac{1}{DP} \sum \frac{Ct_i \times t_i}{(1 + \frac{r}{2})^{2t_i}}$$

D	:	Duration
r	:	Real compound yield
DP	:	Dirty price unadjusted for inflation
t_i	:	Number of years until Ct_i occurs
Ct_i	:	Real cash flow for i th period

- Modified duration

$$mD = \frac{D}{1 + \frac{r}{2}} \left(= -\frac{1}{DP} \frac{d}{dr} DP \right)$$

mD	:	Modified duration
D	:	Duration
r	:	Real compound yield
DP	:	Dirty price unadjusted for inflation

6.2 Definition of portfolio indicators

Portfolio indicators are calculated using the issue-specific indicators of all issues in the index portfolio. Basically, the inflation-adjusted weighted average is used in the calculation. Note, however, that the inflation-adjusted clean/dirty price is calculated using the weighted-average inflation-unadjusted face value amount.

Fig. 2: Portfolio Indicator Calculation Methods

Indicator	Calculation Method
Face value amount unadjusted for inflation Face value amount adjusted for inflation	Sum
Clean price adjusted for inflation Dirty price adjusted for inflation	Weighted average with face value amount unadjusted for inflation
Coupon rate Years until maturity Clean price unadjusted for inflation Dirty price adjusted for inflation	Weighted average with face value amount adjusted for inflation
Real compound yield Break-even inflation rate	Weighted average with market value amount adjusted for inflation
Duration Modified duration	Weighted average with market value amount (incl. accrued interest) adjusted for inflation

Source: NSC

7. Calculating index value

7.1 Method for calculating index

7.1.1 Total investment return index (total index)

This is an index of investment returns including capital and income gains. Assuming that the index portfolio was purchased on the last business day of the previous month at a value including accrued interest, coupon payments and redemptions are added to the market value amount (including accrued interest), which is announced as the index value for the day. All coupon payments and redemptions are assumed to be received in cash without interest on the day they are made, and reinvested at the following portfolio reconstitution. Coupon payments made on weekends and holidays are assumed to be made on the following business days.

$$TI_{(today)} = TI_{(e.l.m)} \times \frac{AMV_{(today)} + AAC_{(today)} + AIC_{(today)} + ARD_{(today)}}{AMV_{(e.l.m)} + AAC_{(today)}}$$

$TI_{(today)}$	:	Total index value for today
$TI_{(e.l.m)}$	:	Total index value for the last business day of the previous month
$AMV_{(today)}$	:	Market value amount adjusted for inflation for today
$AMV_{(e.l.m)}$	:	Market value amount adjusted for inflation for the last business day of the previous month
$AAC_{(today)}$	:	Accrued interest adjusted for inflation for today
$AAC_{(e.l.m)}$	:	Accrued interest adjusted for inflation for the last business day of the previous month
$AIC_{(today)}$	:	Income gains adjusted for inflation between the end of previous month and today
$ARD_{(today)}$	:	Redemptions adjusted for inflation between the end of previous month and today

7.1.2 Capital investment return index (Capital index)

This is an index of investment return in terms of capital gains. Assuming that the index portfolio was purchased on the last business day of the previous month at the dirty price, redemptions that have occurred through the valuation date are added to the market value amount (excluding accrued interest), which is announced as the index value for the day.

All redemptions are assumed to be received in cash without interest on the day they are made, and reinvested at the following portfolio reconstitution.

$$CI_{(today)} = CI_{(e.l.m)} \times \left(1 + \frac{AMV_{(today)} - AMV_{(e.l.m)} + ARD_{(today)}}{AMV_{(e.l.m)} + AAC_{(e.l.m)}}\right)$$

$CI_{(today)}$	:	Capital index value for today
$CI_{(e.l.m)}$	:	Capital index value for the last business day of the previous month
$AMV_{(today)}$	:	Market value amount adjusted for inflation for today
$AMV_{(e.l.m)}$	:	Market value amount adjusted for inflation for the last business day of the previous month
$AAC_{(e.l.m)}$	:	Income gains adjusted for inflation for the last business day of the previous month
$ARD_{(today)}$	:	Redemptions adjusted for inflation between the end of previous month and today

7.2 Return

7.2.1 Total return (annualized)

$$RT(m,n) = \left(\frac{TI(n)}{TI(m)} - 1\right) \times \frac{365}{\Delta t_D}$$

Period m is assumed to precede period n in a given timeline.

$RT(m,n)$	:	Total return from period m through period n
$TI(i)$	:	Index value at period i
$\Delta t_D (>0)$	:	Days between period m and period n (not counting the settlement date)

7.2.2 Capital return (annualized)

$$RC(m,n) = \left(\frac{CI(n)}{CI(m)} - 1\right) \times \frac{365}{\Delta t_D}$$

Period m is assumed to precede period n in a given timeline.

$RC(m,n)$	:	Capital return from period m through period n
$CI(i)$	:	Principal investment index return index at period i
$\Delta t_D (>0)$	:	Days between period m and period n (not counting the settlement date)

7.2.3 Income return (annualized)

$$RI(m,n) = RT(m,n) - RC(m,n)$$

Period m is assumed to precede period n in a given timeframe.

$RI(m,n)$: Income return from period m through period n

$RT(m,n)$: Total return from period m through period n

$RC(m,n)$: Capital return from period m through period n

7.3 Reference for obtaining market data

The NOMURA J-TIPS Index references the following bond market pricing data for the mark-to-market valuation of the index portfolios (listed in descending order of priority):

- JS Price
- Nomura price

These values are provided on a settlement-day basis, and should be converted to trade-day basis for use as a reference in calculating portfolio and performance indicators [4].

JS Prices are evaluated and calculated by Nomura Securities Co., Ltd. and later examined by Nikkei Inc., Nikkei Financial Technology Research Institute, Inc., and Nomura Research Institute, Ltd. JS Prices are reliable for a variety of purposes, including mark-to-market accounting. JS Prices are calculated using reasonable and consistent methodology and undergo a process that examines validations to detect relative/absolute outliers using the methodology designed by Nikkei Inc., Nikkei Financial Technology Research Institute, Inc., Nomura Research Institute, Ltd., and Nomura Securities Co., Ltd.

JS Price lists more than 12,000 bonds in total (mainly publicly offered and private placement domestic bonds) and covers almost 100% of index portfolios. In addition, JS Price offers daily prices with good continuity.

NSC dealers in the front office trading desk in the Global Market Division value Nomura prices for their own daily valuation process, and NSC is one of the key financial instrument firms in the yen bond market, and is actively engaged in transactions with other financial instrument firms and its clients. For this reason, NSC is in a good position to obtain traded prices and/or quotations in the secondary market.

7.4 Key indices and data released

Key indices provided in the NOMURA J-TIPS Index and their base dates are as follows (base dates vary depending on the index):

Index	**Base date (= Base index value)**	**Publication start date**
NOMURA J-TIPS Index	31 Mar. 2004 (=100)	Oct. 2004
NOMURA J-TIPS Index - deflation floored	31 Oct. 2013 (=100)	Nov. 2013

4. Tokyo Repo Rate is used as the discount rate.

Appendix: Data delivery services

Data on performance indices, such as the total investment return index, and portfolio indicators are available from the following sources:

NOMURA J-TIPS Index data providers

- Nomura Securities' Securities Market Benchmarks' website

http://qr.nomura.co.jp/jp/jtips/index.html (Japanese page)

- Nomura Research Institute Integrated Data Services (IDS)

Contact: Nomura Research Institute Investment Data Service Department

e-mail: ids-sales@nri.co.jp

- Quick

NRIJ001	NOMURA Indices guidance
NRIJ125	NOMURA J-TIPS Index

Contact for further inquiries

For inquiries on the use of NOMURA J-TIPS Index as an investment benchmark, please refer to the contact details below:

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Appendix A-1

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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.
When inflation-indexed JGBs are purchased via public offerings, secondary distributions (uridashi deals), or other OTC transactions with Nomura Securities, only the purchase price shall be paid, with no sales commission charged. Inflation-indexed JGBs carry the risk of losses, as prices fluctuate in line with changes in market interest rates and fluctuations in the nationwide consumer price index. The notional principal of inflation-indexed JGBs changes in line with the rate of change in nationwide CPI inflation from the time of its issuance. The amount of the coupon payment is calculated by multiplying the coupon rate by the notional principal at the time of payment. The maturity value is the amount of the notional principal when the issue becomes due. For JI17 and subsequent issues, the maturity value shall not undercut the face amount.
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In interest rate swap transactions and USD/JPY basis swap transactions (“interest rate swap transactions, etc.”), only the agreed transaction payments shall be made on the settlement dates. Some interest rate swap transactions, etc. may require pledging of margin collateral. In some of these cases, transaction payments may exceed the amount of collateral. There shall be no advance notification of required collateral value or collateral ratios as they vary depending on the transaction. Interest rate swap transactions, etc. carry the risk of losses owing to fluctuations in market prices in the interest rate, currency and other markets, as well as reference indices. Losses incurred as such may exceed the value of margin collateral, in which case margin calls may be triggered. In the event that both parties agree to enter a replacement (or termination) transaction, the interest rates received (paid) under the new arrangement may differ from those in the original arrangement, even if terms other than the interest rates are identical to those in the original transaction. Risks vary by transaction. Please thoroughly read the written materials provided, such as documents delivered before making a contract and disclosure statements.
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