

# **Nikkei-JPX Commodity Index Guidebook**

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Osaka Exchange, Inc. (OSE)

Tokyo Commodity Exchange, Inc. (TOCOM)

Nikkei Inc. (Nikkei)

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## 1 Introduction

### 1.1 Background

The Nikkei-JPX Commodity Index gives an overall indication of the price levels on the derivatives market of Osaka Exchange, Inc. (“OSE”) (limited to commodity-related market derivatives transactions) and commodity futures market of Tokyo Commodity Exchange, Inc. (“TOCOM”) (hereinafter collectively referred to as “the commodity derivative markets of OSE and TOCOM”). The Nikkei-JPX Commodity Index was developed as a fair and reliable commodity index aimed to provide an overall picture of the price levels in the commodity derivative markets of OSE and TOCOM, so that it could serve as a benchmark to evaluate the performance of individual mutual funds and commodity funds, as well as a guideline for commercial traders when formulating comprehensive hedging strategies. The Nikkei-JPX Commodity Index, designed to be practical, could also serve as a tool to hedge against inflation, because of the high correlation between commodity futures prices and price indexes (e.g.: Consumer Price Index, etc...), and as such, it will contribute to enhance the functionality of commodity futures markets as a public utility.

#### History of the Nikkei-JPX Commodity Index

July 24, 2006	TOCOM starts publicizing “TOCOM Index”
June 2, 2008	Aiming to provide the benchmarks for each component of the TOCOM Index., the Exchange starts publicizing “TOCOM Sub Commodity Indexes” based on the calculating methodology applied to the TOCOM Index
April 1, 2009	TOCOM and Nikkei Inc. (Nikkei) agree on joint management of the Index and changed its name to “Nikkei-TOCOM Commodity Index
December 3, 2012	Nikkei and TOCOM starts publicizing “Nikkei-TOCOM Leveraged Indexes” and “Nikkei-TOCOM Inverse Indexes” <sup>*1</sup>
December 2, 2013	Agricultural Product & Sugar Market commodities are added as components of the Nikkei-TOCOM Commodity Index and the Nikkei-TOCOM Nearby Month Commodity Index. As new sub-indexes, Nikkei-TOCOM Agricultural Product & Sugar Index, Nikkei-TOCOM Soybean Index, Nikkei-TOCOM Azuki Index, Nikkei-TOCOM Corn Index, Nikkei-TOCOM Sugar Index, as well as Nikkei-TOCOM Industrial Commodity Index start to be calculated.
July 27, 2020	Changed the index name to “Nikkei-JPX Commodity Index”, since a part of the component (gold, platinum, silver,

	palladium, rubber, soybeans, red beans and corn) transferred from TOCOM to OSE. *2
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- \*1 The Leveraged Indexes and Inverse Indexes are derived from the Nikkei-JPX Commodity Index (at the time called Nikkei-TOCOM Commodity Index) and the Sub-Commodity Indexes (hereinafter collectively referred to as the “base index(es)”). The Leveraged Indexes are designed to represent the doubled performance of the base indexes, and the Inverse Indexes to represent the inverse performance of the base indexes. (Details of the indexes are stipulated in the “‘Nikkei-JPX Leveraged Index’ ‘Nikkei-JPX Inverse Index’ Index Guidebook”.)
- \*2 The new “Nikkei-JPX Commodity Index” retains continuity from the previous TOCOM Index.

## 1.2 Index Management Special Committee

Japan Exchange Group, Inc. (hereinafter referred to as “JPX”), OSE and TOCOM (JPX, OSE and TOCOM hereinafter referred to as “JPX Group”) and Nikkei established an Index Management Special Committee (the “Committee”) to administer the Nikkei-JPX Commodity Index, which includes making decisions on such matters as calculation methodology, selection of components and their weights, and publication of the Index, etc.

## 1.3 Nikkei-JPX Commodity Index Guidebook

With a view towards ensuring the credibility of the Nikkei-JPX Commodity Index, the calculation methods, components weight, and other parameters of the Nikkei-JPX Commodity Index are made public in the Nikkei-JPX Commodity Index Guidebook. The Nikkei-JPX Commodity Index is calculated in accordance with the methods described within this Guidebook.

If any event not described within this Guidebook should occur, the Committee may utilize an alternative method which it deems appropriate in order to calculate the Nikkei-JPX Commodity Index.

## 1.4 Publication of the Nikkei-JPX Commodity Index

The Nikkei-JPX Commodity Index is calculated and published once a day, using the

settlement price of each component.

In this guidebook, the term “trading day” is used in referring to the time period from the opening of a night session following the closing of a day session on a business day (at OSE and TOCOM, same in the following) preceding the present business day, till the opening of a night session on the present business day.

All dates mentioned in this guidebook indicate the “trading day” except for those indicated otherwise.

Until May 1, 2009	Calculated and published once a day, using the settlement price of each component.
From May 7, 2009 to September 16, 2016	Calculated and published on a real time basis (every fifteen seconds), based on the latest contract price of each component at the time of index calculation (if there is no applicable contract execution in the relevant trading day, then based on the daily settlement price of the previous trading day). When the daily settlement price was determined after the close of a Day Session, the Index was calculated based on the daily settlement price and published.
On and after September 20, 2016	The index has been calculated and published once a day, using the settlement price of each component.

With respect to the Nikkei-JPX Sub-Commodity Indexes, they shall be calculated and disseminated once a day, based on the daily settlement price of each component.

### 1.5 Copyrights, etc.

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## 1.7 Licensing

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## 2 Index Specifications

### 2.1 Name

Nikkei-JPX Commodity Index (“Nikkei-JPX Commodity Index” or “the Index”)

### 2.2 Components

All commodities listed on the commodity derivative markets of OSE and TOCOM, excluding Options Transactions.

### 2.3 Designated Contract Month

Contract month with high liquidity (“Active Contract Month”; the 5<sup>th</sup> or 6<sup>th</sup> contract month) serves as the Designated Contract Month\*.

\* The Designated Contract Month means, among all the contract months of each index component, the contract month(s) selected as the benchmark contract month(s) from which price data for the Index component will be obtained.

### 2.4 Rolling of the Designated Contract Month

Rolling generally means replacing the near-expiry futures contract with more distant futures contract, which allows an investor to keep a futures position further ahead of the futures contract’s expiry date (contract month).

In Nikkei-JPX Commodity Index, the “Rolling” or the “Roll” means replacing the Designated Contract Month from the 5<sup>th</sup> contract month (former 6<sup>th</sup> contract month) to newly-generated 6<sup>th</sup> contract month to ensure the Index constantly tracks the price level of the Active Contract Month.

Rolls are implemented over the course of five trading days, between the 5<sup>th</sup> and 9<sup>th</sup> trading days of each month (hereinafter referred to as the “Roll Period”), the 5<sup>th</sup> contract month (former 6<sup>th</sup> contract month) being replaced by the new 6<sup>th</sup> contract month (i.e. increasing the weight of the 6<sup>th</sup> contract month from 0% to 20%, 40%, 60%, 80% and finally 100%).

For commodities on the markets in which contract months are generated only on odd months or even months, rolling is carried out only on the months following the contract months.



## 2.5 Calculation Methods

Index value = the total sum of (weight ratio of each component × price return) for each component

$$= W(\text{gold}) \times P(\text{gold})/P_0(\text{gold}) + W(\text{silver}) \times P(\text{silver})/P_0(\text{silver}) + \dots \\ + W(\text{raw sugar}) \times P(\text{raw sugar})/P_0(\text{raw sugar})$$

*W*: Weight ratio

*P*: Settlement price at time of index calculation

*P*<sub>0</sub>: Base price

Initially, the settlement price on May 31, 2002 shall serve as the base price.

After the subsequent rolling of the Designated Contract Months, the settlement price of the new Designated Contract Month shall serve as the base price. Following rebalancing of the components weight, the settlement price after the rebalancing shall serve as the base price.

## 2.6 Components Weight Ratio

The weight ratio is determined on the basis of the scale of the cash and futures markets for each component over the previous year (one year period from January to December).

## 2.7 Rebalancing Components Weight

In principle, the components weight shall be rebalanced once a year. A new weight ratio is published in late March every year, and is applied starting on the first trading day of June.

The period between the first day when the new weight ratio is announced (late March) and the first day the new weight ratio is applied (the first trading day of June) is hereinafter referred to as the “Advance Notice Period”.

## 2.8 Base Date

May 31, 2002.

The index based upon the settlement prices of this date shall be 100.00.

## 3 Components

### 3.1 Components

All the commodity derivative markets of OSE and TOCOM listed commodities, with the exception of: Option contracts, contracts linked to the Nikkei-JPX Commodity Index and Nikkei-JPX Sub Commodity Index, and those contracts which the Index Management Special Committee (the “Committee”) deem inappropriate as Index components.

### 3.2 Methods and Timing for Component Rebalancing

#### 3.2.1 New commodity listing or resumption of trading of a suspended contract

When a new commodity is listed, or the trade of a suspended contract is resumed, it will be included, in principle, as a component of the Nikkei-JPX Commodity Index from the day when its rebalanced weight ratio is applied (the first trading day of June), following the first rebalancing after its listing or resuming trade. This is provided that all contract months of the newly-listed or resumed commodity are available at least three months before the rebalanced weight ratio is applied and that the Committee does not deem the commodity as an inappropriate Index component.

##### 3.2.1.1 Review of commodities excluded from Index components

A commodity excluded from the Index is subject to review for appropriateness as an Index component principally at Index Management Special Committee meetings, which are held prior to the next periodic rebalancing of the Index. Such commodity may be included as a component of the Nikkei-JPX Commodity Index regardless of the periodic rebalancing provided that the Committee deems the commodity as an appropriate Index component. In that event, weight ratio is to be rebalanced simultaneously on a temporary basis.

#### 3.2.2 Low-Liquidity Circumstances

When, as a result of low liquidity, a listed commodity is suspended, the commodity will remain a component of the Nikkei-JPX Commodity Index until the last trading day of the month following the month in which the decision (or the Regulator’s approval) to suspend the contract, at which point it will be removed as an Index component. Accordingly, the remaining components’ weight ratio will be rebalanced (Extraordinary

Rebalancing).

In addition, a commodity which the Index Management Special Committee deems inappropriate as an Index component may be excluded from the Index during periodic rebalancing.

**[Example]** Following the decision to suspend the listing of gas oil on September 15, 2005, gas oil remained as a component of the Nikkei-JPX Commodity Index (then TOCOM Index) until October 31, 2005, and was excluded from the components as of November 1, 2005.

### 3.2.3 Delisting

The procedures described in 3.2.2 above apply.

### 3.2.4 Treatment of a “Mini” and Rolling Spot Futures Contract

A mini and Rolling Spot Futures contracts are smaller versions of the standard futures contracts with respect to the listed commodities (“standard contract”). The underlying commodity for mini and Rolling Spot Futures contracts are the same as for the standard contracts, and the settlement prices for mini contracts are the same as for the standard contracts and the settlement prices for Rolling Spot Futures contracts are determined based on that of standard contracts; therefore, they shall be deemed as one component of the index. Any new components shall not be created specifically for mini and Rolling Spot Futures contracts.

When calculating weight ratios of components for mini and Rolling Spot Futures contracts, the scale of each futures market shall be calculated by adding the end-of-month open interests of mini and Rolling Spot Futures contracts (in value terms) to the end-of-month open interests of standard contracts (in value terms). In this manner, the scale of the mini and Rolling Spot Futures contracts market shall be reflected in the Nikkei-JPX Commodity Index (see Article 5. “Components Weight Ratio”).

A new mini and Rolling Spot Futures contracts shall be included in the Nikkei-JPX Commodity Index starting from the day on which its new weight ratio is applied, following the first rebalancing upon its listing, pursuant to the method of including a newly-listed commodity into the Index as prescribed in the above Article 3.2.1.

Treatment of other matters relating to Mini and Rolling Spot contracts shall conform to 3.2.2 and 3.2.3 above.

**[Example]** Platinum mini futures contract has been listed since November 2008; therefore, it was included in the Nikkei-JPX Commodity Index (then Nikkei-TOCOM Commodity Index) on the first trading day of June 2009.

Gold Rolling Spot Futures contract has been listed since May 2015; therefore, it was included in the Nikkei-JPX Commodity Index on the first trading day of June 2016.

### 3.2.5 Treatment of Cash-settled Oil Products Transactions

As the listing products for Cash-settled Oil Products Transactions are same as the existing physically delivered futures transactions of oil products (hereinafter “Existing Physically Delivered Futures Transactions”), they shall not be added to the index component as a new component but be treated together with the Existing Physically Delivered Futures Transactions as one component.

When calculating weight ratios of components for Cash-settled Oil Products Transactions, the scale of each futures market shall be calculated by adding the end-of-month open interests of Cash-settled Oil Products Transactions (in value terms) to the end-of-month open interests of Existing Physically Delivered Futures Transactions of oil products (in value terms). In this manner, the scale of the Cash-settled Oil Products Transactions shall be reflected in the Nikkei-JPX Commodity Index (see Article 5 “Components Weight Ratio”).

Treatment of other matters relating to Cash-settled Oil Products Transactions shall conform to 3.2.1 and 3.2.3 above.

## 4 Designated Contract Months

### 4.1 Designated Contract Months

The Active Contract Month serves as the Designated Contract Month (the contract month whose prices are used to calculate the Nikkei-JPX Commodity Index). At the commodity derivative markets of OSE and TOCOM, the Active Contract Month is the 5<sup>th</sup> or 6<sup>th</sup> contract month.

### 4.2 Rolling of the Designated Contract Months

In order to ensure that the Designated Contract Months are rolled only after a certain number of days have elapsed following the generation of the new contract month, thus making it the Active Contract Month, and to reduce the impact on market prices caused by the rolling, the Designated Contract Months are rolled from the 5<sup>th</sup> contract month to the 6<sup>th</sup> contract month 20% at a time over the course of five trading days (between the 5<sup>th</sup> and 9<sup>th</sup> trading day of the month). For commodities on the markets in which contract months are generated only on odd months or even months, rolling is carried out only on the months following the contract months.

During the Roll Period, a daily settlement price for each Designated Contract Month will be used to calculate the Index.

Commodities of the even-numbered contract months: Gold, Silver, Platinum, Palladium, Aluminum<sup>(\*1)</sup>, Soybean

Commodities of the odd-numbered contract months: Corn, Raw Sugar<sup>(\*2)</sup>

(\*1) For the Aluminum market, there used to be six consecutive contract months through April of 2004, after which the contract months were modified to even-numbered months only. Due to the suspension of the aluminum futures contract, the commodity has been excluded as a component of the Nikkei-JPX Commodity Index (then Nikkei-TOCOM Commodity Index) since January 2010.

(\*2) Due to the suspension of the Raw Sugar Futures contract, the commodity has been excluded as a component of the Nikkei-JPX Commodity Index, the Nikkei-JPX Nearby Month Commodity Index and the Nikkei-JPX Agricultural Product Index (then the Nikkei-TOCOM Commodity Index, the Nikkei-TOCOM Nearby Month Commodity Index and the Nikkei-TOCOM Agricultural Product & Sugar Index) and revise the respective component weightings. The Nikkei-JPX Raw Sugar Index (then

the Nikkei-TOCOM Raw Sugar Index) also has been suspended.

#### 4.3 Special Rules on Rolling of the Designated Contract Month

In the event that due to the suspension of listing, etc., a new contract month is not being generated, the rolling of the Designated Contract Months for the component in question is not carried out.

## 5 Components Weight Ratio

### 5.1 Basic Concept

To take into consideration the economic importance in Japan and the market size of each component on the commodity derivative markets of OSE and TOCOM, the weight ratios are determined on the basis of the scale of the cash and futures markets for each component.

### 5.2 Formula

Weight ratio of each component =  $\alpha \times$  scale of the cash market +  $(1 - \alpha) \times$  scale of the futures markets

(where  $\alpha = 0.5$ )

#### 5.2.1 How W1 (scale of the cash market) is calculated

The scale of each component's cash market is calculated by dividing imports (to Japan) of said component (in value terms) in the previous year by imports (to Japan) of all the components (in value terms) in the previous year (January to December).

For refined oil products such as gasoline and kerosene, monthly domestic sales multiplied by the end-of-month price of each component is used in place of imports (in value terms).

For crude oil, the monthly domestic production volume of refined oil products such as gasoline and kerosene at refineries is subtracted from the monthly imports of crude oil, and the resulting number is then multiplied by the end-of-month crude oil price.

For azuki, the integrated value of the annual imports (in value terms) for the prior year and the annual volume of domestic production (in value terms) for the prior year is used. The annual volume of domestic production is calculated by multiplying national crop yields by the average end-of-month price.

The settlement price as of the last business day of the first contract month of each component will serve as the end-of-month price mentioned above; with the exception that the settlement price of the second contract month will be used for crude oil (until



the end of July 2003, the settlement price of the first contract month had been used).

Before the listing of a new commodity, and during the period when there is no first contract month following the new listing, the value of monthly imports divided by the quantity of monthly imports, as published by Principal Commodity, Export and Import Statistics-Ministry of Finance, will be used (This value is used between January and October 2001 for crude oil, and between January and October 2003 for gas oil).

With respect to the components to which mini and Rolling Spot Futures contracts were introduced, the scale of each cash market shall be calculated pursuant to the method for the components with standard contracts only as prescribed above, since the underlying cash commodity for mini and Rolling Spot Futures contracts are equivalent to that of standard contracts.

The scale of the cash market shall be calculated in the same manner as by Existing Physically Delivered Futures Transactions only, as the listing products for Existing Oil Physically Delivered Futures Transactions and Cash-settled Oil Products Transactions are the same.

$$W1_y^i = Q_y^i / \sum_i^{AllComponents} Q_y^i$$

$Q_y^i$ : Annual imports (in value terms)

Provided that:

Refined Oil products:  $Q_y^i = \sum_{m=1}^{12} (q_m^i \times p_m')$

Crude oil:  $Q_y^i = \sum_{m=1}^{12} \{ (q_m^i - r_m^j - r_m^k - r_m^l) \times p_m' \}$  (i: crude oil; j, k, l: oil products)

q: Monthly domestic sales (monthly imports for crude oil)

r: Monthly domestic production volume of refined oil products

p: End-of-month price

Azuki:  $Q_y^i$ : Annual imports (in value terms) + Annual domestic production volume (in value terms)

$$\text{Annual domestic production volume (in value terms)} = q^i \times \left( \sum_{m=1}^{12} p_m^i \right) / 12$$

q: Annual national crop yields

p: End-of-month price

### 5.2.2 How W2 (scale of the futures market) is calculated

The scale of the futures market is calculated by dividing the annual average of end-of-month open interests (in value terms) during the previous year (January to December) by the sum of the annual average of end-of-month open interests for all components during the previous year (January to December).

With respect to the components to which mini and Rolling Spot Futures contracts were introduced, the scale of each futures market shall be calculated by adding the end-of-month open interests of mini and Rolling Spot Futures contracts (in value terms) to the end-of-month open interests of standard contracts (in value terms).

With respect to the components to which Cash-settled Oil Products Transactions were introduced, the scale of each futures market shall be calculated by adding the end-of-month open interests of Cash-settled Oil Products Transactions (in value terms) to the end-of-month open interests of Existing Physically Delivered Futures Transactions (in value terms).

$$W2_y^i = V_y^i / \sum_i^{AllComponents} V_y^i$$

Provided that with respect to the components to which mini and Rolling Spot Futures contracts were introduced:

$$V_y^i = \left( \sum_{m=1}^{Number\ of\ months\ s} vs_m^i \right) / Number\ of\ months_s + \left( \sum_{m=1}^{Number\ of\ months\ m} vm_m^i \right) / Number\ of\ months_m + \left( \sum_{m=1}^{Number\ of\ months\ r} vr_m^i \right) / Number\ of\ months_r$$

(Number of Months = The number of calendar months in which the component is traded.)

$$vS_m^i = \sum_k^{\text{Allcontractmonths}} [\text{End-of-month open interest of standard contracts } k \times \text{End-of-month Settlement price of standard contracts } k \times \text{Standard contract multiplier } k]$$

$$vm_m^i = \sum_k^{\text{Allcontractmonths}} [\text{End-of-month open interest of mini contracts } k \times \text{End-of-month settlement price of mini contracts } k \times \text{Mini contract multiplier } k]$$

$$vr_m^i = \text{End-of-month open interest of Rolling Spot Futures contracts } k \times \text{End-of-month settlement price of Rolling Spot Futures contracts } k \times \text{Rolling Spot Futures contract multiplier } k$$

Oil Products:

$$V_y^i = \left( \sum_{m-1}^{\text{Number of month } p} vp_m^i \right) / \text{Number of month } p + \left( \sum_{m-1}^{\text{Number of month } cb} vcb_m^i \right) / \text{Number of month } cb + \left( \sum_{m-1}^{\text{Number of month } cl} vcl_m^i \right) / \text{Number of month } cl$$

(Number of Months = The number of calendar months in which the component is traded.)

$$vp_m^i = \sum_k^{\text{Allcontractmonths}} [\text{End-of-month open interest of Existing Physically Delivered Futures Transactions } k \times \text{End-of-month Settlement price of Existing Physically Delivered Futures Transactions } k \times \text{Existing Physically Delivered Futures Transactions multiplier } k]$$

$$vcb_m^i = \sum_k^{\text{Allcontractmonths}} [\text{End-of-month open interest of Cash-settled Oil Products Transactions(Barge) } k \times \text{End-of-month Settlement price of Cash-settled Oil Products Transactions(Barge) } k \times \text{Cash-settled Oil Products Transactions(Barge) multiplier } k]$$

$$vcl_m^i = \sum_k^{Allcontractmonths} [End-of-month\ open\ interest\ of\ Cash-settled\ Oil\ Products\ Transactions(Lorry)_k \times End-of-month\ Settlement\ price\ of\ Cash-settled\ Oil\ Products\ Transactions(Lorry)_k \times Cash-settled\ Oil\ Products\ Transactions(Lorry)\ multiplier_k]$$

Note: For soybean, azuki, corn and raw sugar, which are listed on the Agricultural Product & Sugar Market launched on February 12, 2013, month-end open interest (in value terms) recorded when they were traded from January 2012 until January 2013 on the Tokyo Grain Exchange.

### 5.3 Rebalancing of Components Weight

#### 5.3.1 Periodic rebalancing

The weight is rebalanced annually. After each rebalancing, the new weight is applied for the twelve months between the first trading day of June and the last trading day of May of the following year, following the “Advance Notice Period” between late March and the end of May.

Note that the “fiscal year” stated herein refers to the period beginning from the first trading day of June to the last trading day of May of the following year.

#### 5.3.2 Extraordinary rebalancing

Without limitation to the periodic rebalancing, the components weight is subject to a rebalancing when a certain listed commodity is included to or excluded from the components of the Nikkei-JPX Commodity Index. A new weight is calculated according to the formulas articulated in the Item 5.2. For the purpose of calculating the scale of the cash market of each existing component, the statistics (imports, etc.) employed for the periodic rebalancing of the same year is used. The new weight will remain in effect until the next periodic rebalancing.

## 6 Calculation Methods

### 6.1 Formulas

$Index_t^y$  = The total sum of the (Weight ratio of each component  $\times$  price return)

$$\text{for each component} = C_{y-1} \times c_y \times 100$$

$C_{y-1}$ : Index return from the base date up to the date of most recent rebalancing of the

$$\text{weight (fiscal year y-1)} = \prod_{i=2002}^{y-1} c_i$$

$c_y$ : Annual index return within the fiscal year y-1 =  $\sum_i^{\text{AllComponents}} (W_y^i \times R_n^i \times p_t^i / P_n^i)$

$W_y^i$ : Weight ratio of component i in the fiscal year y-1

$$= \alpha \times W1_y^i + (1 - \alpha) \times W2_y^i$$

$W1_y^i$ : Weight ratio according to the scale of the cash market

$W2_y^i$ : Weight ratio according to the scale of the futures market

$R_n^i$ : Price return of component i for the period from the date of last rebalancing to the date when the n<sup>th</sup> roll is completed (Price Return B) ( $R_n^i = 1$ )

$p_t^i / P_n^i$ : Price return of component i for the period from the date when the n<sup>th</sup> roll is completed to the t<sup>th</sup> day (Price Return A)

$p_t^i$ : Settlement price of component i on the t<sup>th</sup> day

$P_n^i$ : Base price of component i upon completion of the n<sup>th</sup> Roll

$\alpha$ : Weight ratio for the cash market derived from the scales of cash and futures markets ( $\alpha = 0.5$ )

## 6.2 Calculation Steps

The Nikkei-JPX Commodity Index is calculated using the following steps. See 6.3 and after for details on each step.

- i. Calculate the Price Return C of each component over applicable period
- ii. Calculate the index return of each component in a single fiscal year
- iii. Calculate the index return in a single fiscal year
- iv. Calculate the index return from the base date
- v. Calculate the Nikkei-JPX Commodity Index

## 6.3 Calculating Price Return C for Each Component over Applicable Period

### 6.3.1 Calculation during ordinary periods (The period other than the Roll Period)

If we assume that after the  $n^{\text{th}}$  roll the settlement price on the  $t^{\text{th}}$  day of a component  $i$  is  $p_t^i$ , and the base price at this time is  $P_n^i$ , the price return after the  $n^{\text{th}}$  roll up to the next  $(n+1)^{\text{th}}$  roll (Price Return A) is  $p_t^i / P_n^i$ .

If we then assume the price return over the period between rebalancing of weight and completion of the  $n^{\text{th}}$  roll (Price Return B) to be  $R_n^i$ , the price return over the period between rebalancing of weight and the  $t^{\text{th}}$  day (Price Return C) would be:  $R_n^i \times p_t^i / P_n^i$

**[Example]** Calculating the Price Return C of gasoline as of April 1, 2009

If we assume that:

The price return until completion of the most recent roll (Price Return B) (March 12:

10<sup>th</sup> Roll completed):  $R_{10}^{\text{Gasoline}} = 0.3963777$

The settlement price for the Designated Contract Month (September 2009) on April 1:

$$p_{4/1}^{Gasoline} = ¥43,130,$$

And the base price (settlement price of the Designated Contract Month as of March 12):

$$P_{4/1}^{Gasoline} = ¥37,300,$$

Then the Price Return C of gasoline as of April 1, 2009 would be:

$$R_{10}^{Gasoline} \times p_{4/1}^{Gasoline} / P_{10}^{Gasoline} = 0.3963777 \times 43,130 / 37,300 = 0.4583316.$$

### 6.3.2 Calculation during the Roll Period

Designated Contract Month is rolled from the 5<sup>th</sup> to the 6<sup>th</sup> contract month by 20% each over the course of five trading days (between the 5<sup>th</sup> and 9<sup>th</sup> trading days of the month). Accordingly, the price return of each component during the Roll Period (Price Return R) is the sum of partial price returns of the Designated Contract Month's already-rolled part and yet-to-be rolled part.

If we assume the first day of the Roll Period to be Day 1, the settlement price for the 5<sup>th</sup> contract month of a component *i* on the *d*<sup>th</sup> day of the Roll Period to be  $p_{sd}^i$ , the settlement price for the 6<sup>th</sup> contract month of a component *i* on the *d*<sup>th</sup> day of the Roll Period to be  $p_{sd}^i$  the Price Return R during the (n+1)<sup>th</sup> roll would be:

(1) Day 1 (5<sup>th</sup> Trading day)

$$0.2 \times p_{s1}^i / P_n^i \times p_{s1}^i / p_{s1}^i + 0.8 \times p_{s1}^i / P_n^i = p_{s1}^i / P_n^i$$

(2) Day 2 (6<sup>th</sup> Trading day)

$$\begin{aligned} & 0.2 \times p_{s1}^i / P_n^i \times p_{s2}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s2}^i / p_{s2}^i + 0.6 \times p_{s2}^i / P_n^i \\ & = 0.2 \times p_{s1}^i / P_n^i \times p_{s2}^i / p_{s1}^i + 0.8 \times p_{s2}^i / P_n^i \end{aligned}$$

(3) Day 3 (7<sup>th</sup> Trading day)

$$\begin{aligned} & 0.2 \times p_{s1}^i / P_n^i \times p_{s3}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s3}^i / p_{s2}^i + 0.2 \times p_{s3}^i / P_n^i \times p_{s3}^i / p_{s3}^i \\ & + 0.4 \times p_{s3}^i / P_n^i \end{aligned}$$

$$= 0.2 \times p_{s1}^i / P_n^i \times p_{s3}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s3}^i / p_{s2}^i + 0.6 \times p_{s3}^i / P_n^i$$

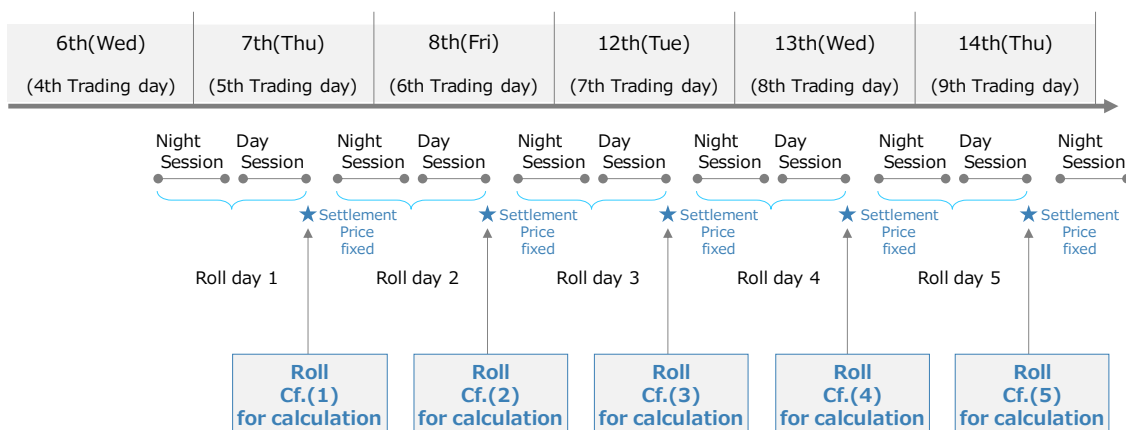
(4) Day 4 (8<sup>th</sup> Trading day)

$$\begin{aligned} & 0.2 \times p_{s1}^i / P_n^i \times p_{s4}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s4}^i / p_{s2}^i + 0.2 \times p_{s3}^i / P_n^i \times p_{s4}^i / p_{s3}^i \\ & + 0.2 \times p_{s4}^i / P_n^i \times p_{s4}^i / p_{s4}^i + 0.2 \times p_{s4}^i / P_n^i \\ & = 0.2 \times p_{s1}^i / P_n^i \times p_{s4}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s4}^i / p_{s2}^i + 0.2 \times p_{s3}^i / P_n^i \times p_{s4}^i / p_{s3}^i \\ & + 0.4 \times p_{s4}^i / P_n^i \end{aligned}$$

(5) Day 5 (9<sup>th</sup> Trading day)

$$\begin{aligned} & 0.2 \times p_{s1}^i / P_n^i \times p_{s5}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s5}^i / p_{s2}^i + 0.2 \times p_{s3}^i / P_n^i \times p_{s5}^i / p_{s3}^i \\ & + 0.2 \times p_{s4}^i / P_n^i \times p_{s5}^i / p_{s4}^i + 0.2 \times p_{s5}^i / P_n^i \times p_{s5}^i / p_{s5}^i \\ & = 0.2 \times p_{s1}^i / P_n^i \times p_{s5}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s5}^i / p_{s2}^i + 0.2 \times p_{s3}^i / P_n^i \times p_{s5}^i / p_{s3}^i \\ & + 0.2 \times p_{s4}^i / P_n^i \times p_{s5}^i / p_{s4}^i + 0.2 \times p_{s5}^i / P_n^i \end{aligned}$$

[Example] October 20XX



Day Session = 8:45 ~ 15:15

Night Session = 16:30 ~ 5:30 (rubber market closes at 19:00)

If we then assume the price return over the period between rebalancing of weight and completion of the n<sup>th</sup> roll of contract months (Price Return B) to be  $R_n^i$ , the price return over the period from rebalancing of weight to the t<sup>th</sup> day (Price Return C) would be:



(1) Day 1 (5<sup>th</sup> Trading day)

$$R_n^i \times p_{sl}^i / P_n^i$$

(2) Day 2 (6<sup>th</sup> Trading day)

$$R_n^i \times (0.2 \times p_{sl}^i / P_n^i \times p_{s2}^i / p_{sl}^i \times 0.8 \times p_{s2}^i / P_n^i)$$

(3) Day 3 (7<sup>th</sup> Trading day)

$$R_n^i \times (0.2 \times p_{sl}^i / P_n^i \times p_{s3}^i / p_{sl}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s3}^i / p_{s2}^i + 0.6 \times p_{s3}^i / P_n^i)$$

(4) Day 4 (8<sup>th</sup> Trading day)

$$R_n^i \times (0.2 \times p_{sl}^i / P_n^i \times p_{s4}^i / p_{sl}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s4}^i / p_{s2}^i + 0.2 \times p_{s3}^i / P_n^i \times p_{s4}^i / p_{s3}^i + 0.4 \times p_{s4}^i / P_n^i)$$

(5) Day 5 (9<sup>th</sup> Trading day)

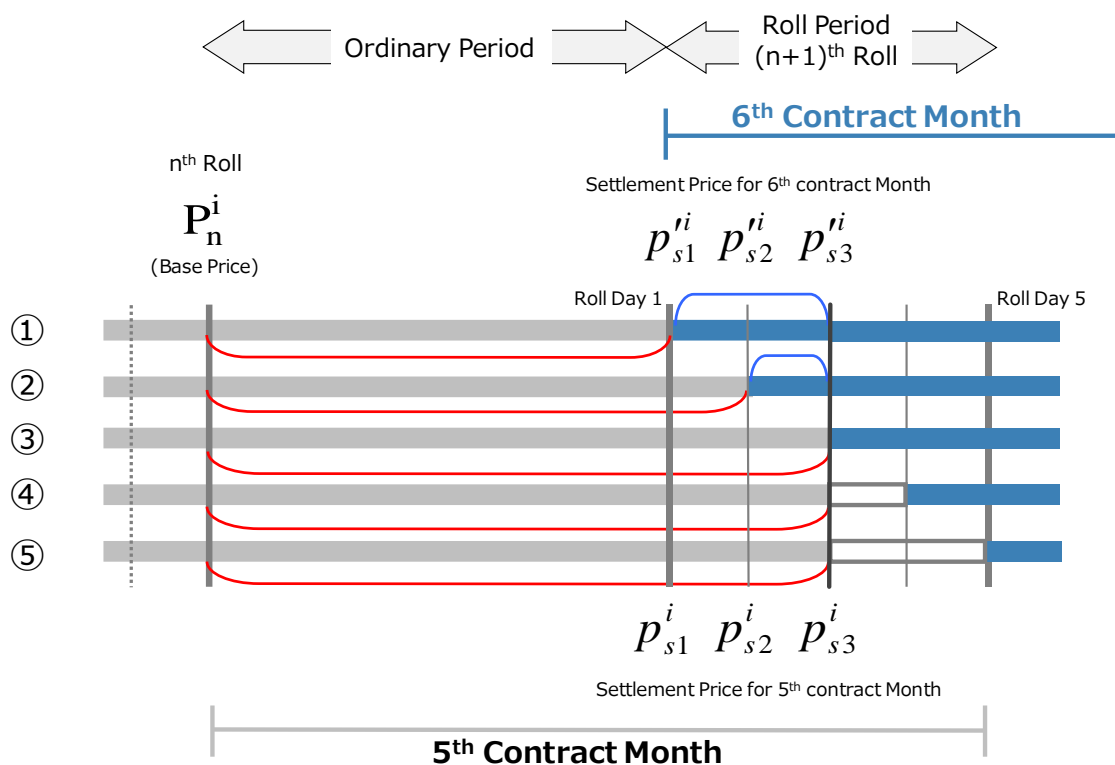
$$R_n^i \times (0.2 \times p_{s1}^i / P_n^i \times p_{s5}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s5}^i / p_{s2}^i + 0.2 \times p_{s3}^i / P_n^i \times p_{s5}^i / p_{s3}^i + 0.2 \times p_{s4}^i / P_n^i \times p_{s5}^i / p_{s4}^i + 0.2 \times p_{s5}^i / P_n^i)$$

The (n+1)<sup>th</sup> roll is completed on Day 5 when the component i has been completely rolled from the 5<sup>th</sup> contract month to the 6<sup>th</sup> contract month.

With regard to the calculation of the Price Return C on the following trading day (Day 6) and thereafter, the Price Return C up to Day 5 will serve as the new Price Return B and the settlement price on Day 5 will serve as the new Base Price. Accordingly, the Price Return B on Day 6 and thereafter would be:

$$R_{n+1}^i \times p_t^i / P_{n+1}^i$$

**[Example] Price Return C after Day 3 of the Roll Period**



- ① Partial price return on Day 3 of the part (20%) of the Designated Contract Month which was rolled on Day 1 of the Roll Period:  $0.2 \times p_{s1}^i / P_n^i \times p_{s3}^{ii} / p_{s1}^{ii}$   
 (product of the price return (of 5<sup>th</sup> contract month) up to the Roll  $p_{s1}^i / P_n^i$  and the price return (of 6<sup>th</sup> contract month) following the Roll  $p_{s3}^{ii} / p_{s1}^{ii}$ )
- ② Partial Price return on Day 3 of the part (20%) of the Designated Contract Month which was rolled on Day 2 of the Roll Period:  $0.2 \times p_{s2}^i / P_n^i \times p_{s3}^{ii} / p_{s2}^{ii}$   
 (product of the price return (of 5<sup>th</sup> contract month) up to the roll  $p_{s2}^i / P_n^i$  and the price return (of 6<sup>th</sup> contract month) following the Roll  $p_{s3}^{ii} / p_{s2}^{ii}$ )
- ③④⑤ Partial Price return on Day 3 of the parts (20%+20%+20%) of the Designated Contract Month which were yet to be rolled:  $0.6 \times p_{s3}^i / P_n^i$

Using partial price returns ① – ⑤ above, and the price return up to completion of the most recent roll of contract months (Price Return B), the Price Return C on Day 3 of the Roll Period will be:

$$R_n^i \times (0.2 \times p_{s1}^i / P_n^i \times p_{s3}^i / p_{s1}^i + 0.2 \times p_{s2}^i / P_n^i \times p_{s3}^i / p_{s2}^i + 0.6 \times p_{s3}^i / P_n^i)$$

**[Example]** Calculating the Price Return C of gasoline as of April 9, 2009 (Day 3 of the Roll Period)

Price return upon completion of the most recent roll (March 12: 10<sup>th</sup> roll completed)(Price Return B):  $R_{10}^{Gasoline} = 0.3963777$

Base price (settlement price for the Designated Contract Month as of March 12):

$$P_{10}^{Gasoline} = \text{¥}37,300$$

If we assume the settlement prices for the 5<sup>th</sup> contract month (September 2009) and the 6<sup>th</sup> contract month (October 2009) on Day 1 and Day 2 of the Roll Period are as follows:

Day 1 (April 7): ¥45,620 for the 5<sup>th</sup> contract month,  
 ¥45,270 for the 6<sup>th</sup> contract month  
 Day 2 (April 8): ¥43,950 for the 5<sup>th</sup> contract month,  
 ¥43,680 for the 6<sup>th</sup> contract month

If we then assume the settlement price for the 5<sup>th</sup> contract month (September 2009) and the 6<sup>th</sup> contract month (October 2009) on Day 3 of the Roll Period are as follows:

Day 3 (April 9): ¥45,550 for the 5<sup>th</sup> contract month,  
 ¥45,250 for the 6<sup>th</sup> contract month

Then the Price Return C of gasoline on April 9, 2009 will be:

$$0.3963777 \times (0.2 \times 45,620/37,300 \times 45,250/45,270 + 0.2 \times 43,950/37,300 \times 45,250/43,680 + 0.6 \times 45,550/37,300) = 0.4841111$$

#### 6.4 Calculating Index Return for Each Component in a Single Fiscal Year

The index return of each component between rebalancing of weight and index calculation (“single fiscal year”) is calculated by multiplying the price return of each component by the weight ratio of each component.

**[Example]** Calculating the index return of gasoline in a single fiscal year on April 1, 2009

$$\begin{aligned} W_{2008}^{Gasoline} \times R_{10}^{Gasoline} \times P_{4/1}^{Gasoline} / P_{10}^{Gasoline} &= 0.1894 \times 0.3963777 \times 43,130 / 37,300 \\ &= 0.0868080 \end{aligned}$$

#### 6.5 Calculating Index Return in a Single Fiscal Year

The index return in a single fiscal year is calculated by adding up the index returns of all components in a single fiscal year.

**[Example]** Calculating the index return in a single fiscal year on April 1, 2009

$$\begin{aligned} \sum_i^{AllComponents} (W_{2008}^i \times R_n^i \times P_{4/1}^i / P_n^i) \\ &= W_{2008}^{Gold} \times R_5^{Gold} \times P_{4/1}^{Gold} / P_5^{Gold} + \dots + W_{2008}^{Rubber} \times R_{10}^{Rubber} \times P_{4/1}^{Rubber} / P_{10}^{Rubber} \\ &= 0.2287304 + 0.0085576 + 0.0575428 + 0.0030551 + 0.0156939 + 0.0868080 \\ &\quad + 0.0358571 + 0.0998168 + 0.0150039 \\ &= 0.5510656 \end{aligned}$$

#### 6.6 Calculating Index Return from the Base Date

The index return between the base date (May 31, 2002) and the day of index calculation is calculated by multiplying the index return up to the previous year by the index return in a single fiscal year.

**[Example]** Calculating the index return from the base date on April 1, 2009

$$C_{2007} \times \sum_i^{AllComponents} \left( W_{2008}^i \times R_n^i \times P_{4/1}^i / P_n^i \right) = 3.7951052 \times 0.5510656$$

$$= 2.0913519$$

## 6.7 Calculating the Nikkei-JPX Commodity Index

The Nikkei-JPX Commodity Index is calculated by multiplying the index return between the base date and the day of index calculation by 100.

**[Example]** Calculating the Nikkei-JPX Commodity Index on April 1, 2009

$$Index_{4/1}^{2009} = C_{2007} \times \sum_i^{AllComponents} \left( W_{2008}^i \times R_n^i \times P_{4/1}^i / P_n^i \right) \times 100$$

$$= 2.0913519 \times 100$$

$$= 209.13$$

## 6.8 Calculating the Nikkei-JPX Commodity Index after Rebalancing of Weight Ratio

### 6.8.1 Following periodic rebalancing

Following rebalancing of weight, a new weight will be applied, the index return up until the last trading day of May will be  $C_y$ , and the base price will be updated to the settlement price on the last trading day of May.

Calculating the Nikkei-JPX Commodity Index using the settlement price as of the last trading day of the fiscal year y-1 (the last trading day of May of fiscal year y)

$$Index_{EndofMay}^{y-1} = C_{y-1} \times \sum_i^{AllComponents} \left( W_{y-1}^i \times R_n^i \times P_{EndofMay}^i / P_n^i \right) \times 100 = C_y \times 100$$

Calculating the Nikkei-JPX Commodity Index on the  $t^{\text{th}}$  day of fiscal year y

$$Index_t^y = C_y \times \sum_i^{AllComponants} (W_y^i \times R_n^i \times p_t^i / P_n^i) \times 100$$

Note that on the base date of fiscal year y (the last trading day of May of year y) the Nikkei-JPX Commodity Index will be:

$$\begin{aligned} Index_0^y &= C_y \times \sum_i^{AllComponants} (W_y^i \times R_0^i \times p_0^i / P_0^i) \times 100 \\ &= C_y \times 1.0 \times 100 = Index_{EndofMay}^{y-1} \end{aligned}$$

Thus this ensures the continuity of the Nikkei-JPX Commodity Index before and after rebalancing of weight.

**[Example]** Calculating the Nikkei-JPX Commodity Index at the time of the periodic rebalancing of weight and the switch to a new fiscal year (from fiscal 2007 to fiscal 2008, then “JPX Index”)

Calculating the Nikkei-JPX Commodity Index (then TOCOM Index) as of the last trading day of fiscal 2007 (May 30, 2008)

$$\begin{aligned} Index_{5/30}^{2008} &= C_{2007} \times \sum_i^{AllComponants} (W_{2008}^i \times R_n^i \times p_{5/30}^i / P_n^i) \times 100 \\ &= 2.7607100 \times 1.3746845 \times 100 \\ &= 3.7951052 \times 100 = C_y \times 100 \end{aligned}$$

Thus, the Nikkei-JPX Commodity Index (then TOCOM Index) for fiscal 2008 will be:

$$Index_t^{2008} = 3.7951052 \times \sum_i^{AllComponants} (W_{2008}^i \times R_n^i \times p_t^i / P_n^i) \times 100$$

### 6.8.2 Following extraordinary rebalancing

The Nikkei-JPX Commodity Index following extraordinary rebalancing of weight is calculated in the same manner as when calculating the Nikkei-JPX Commodity Index following periodic rebalancing, except that at the time of applying a new weight the index return up to the last trading day before the rebalancing will be defined as  $C_{y-1}$  (“-”:

hyphen), and the base price will be updated to the settlement price at the time of the rebalancing.

**[Example]** Calculating the Nikkei-JPX Commodity Index during extraordinary rebalancing of weight due to suspension of the listing of gas oil contract

Calculating the Nikkei-JPX Commodity Index (then TOCOM Index) on the last trading day before the rebalancing (October 31, 2005)

$$\begin{aligned}
 Index_{10/31}^{2005} &= C_{2004} \times \sum_i^{10\text{Commodities}} \left( W_{2005-1}^i \times R_n^i \times P_{10/31}^i / P_n^i \right) \times 100 \\
 &= 1.9125361 \times 1.1779060 \times 100 \\
 &= 2.2527877 \times 100 = C_{2005-1} \times 100
 \end{aligned}$$

Thus, the Nikkei-JPX Commodity Index (then TOCOM Index) following extraordinary rebalancing of weight will be:

$$Index_t^{2005-2} = 2.2527877 \times \sum_i^{9\text{Commodities}} \left( W_{2005-2}^i \times R_n^i \times P_t^i / P_n^i \right) \times 100$$

## 7 Nikkei-JPX Sub Commodity Index

### 7.1 Calculating Nikkei-JPX Sub Commodity Index

To calculate Nikkei-JPX sub-indexes, the same formulas and component weight as those used for the Nikkei-JPX Commodity Index, are used.

Index Name	Components <sup>(*)</sup>	Base Date	Notes
Nikkei-JPX Nearby Month Commodity Index	All commodities listed on OSE and TOCOM, excluding option transactions	May 31, 2002	<ul style="list-style-type: none"> <li>Front contract month shall serve as the Designated Contract Month to be used in the Index (*2).</li> <li>The contract month is rolled by 20% each day over the course of five trading days between the 4th trading day preceding the last trading day of the month and the last trading day of the month (*3).</li> </ul>
Nikkei-JPX Industrial Commodity Index (*4)	Precious metals, aluminum, oil and rubber	May 31, 2002	<ul style="list-style-type: none"> <li>Active Contract Month shall serve as the Designated Contract Month to be used in the Index (as applicable to the Nikkei-JPX Commodity Index).</li> <li>The contract month is rolled from the 5th contract month to the 6th contract month by 20% each day over the course of five trading days between the 5th trading day of the month and the 9th trading day of the month (as applicable to the Nikkei-JPX Commodity Index).</li> </ul>
Nikkei-JPX Precious Metals Index	Precious metals	May 31, 2002	
Nikkei-JPX Oil Index	Oil	May 31, 2002	
Nikkei-JPX Agricultural Product Index (*5)	Agricultural products	November 29, 2013	
Nikkei-JPX Gold Index	Gold	May 31, 2002	
Nikkei-JPX Silver Index	Silver	May 31, 2002	
Nikkei-JPX Platinum Index	Platinum	May 31, 2002	
Nikkei-JPX Palladium Index	Palladium	May 31, 2002	
Nikkei-JPX Aluminum Index (*6)	Aluminum	May 31, 2002	
Nikkei-JPX Gasoline Index	Gasoline	May 31, 2002	
Nikkei-JPX Kerosene Index	Kerosene	May 31, 2002	
Nikkei-JPX Crude Oil Index	Crude Oil	May 31, 2002	
Nikkei-JPX Rubber Index	Rubber	May 31, 2002	



Nikkei-JPX Soybean Index	Soybean	November 29, 2013	
Nikkei-JPX Azuki Index	Azuki	November 29, 2013	
Nikkei-JPX Corn Index	Corn	November 29, 2013	
Nikkei-JPX Raw Sugar Index (*7)	Raw Sugar	November 29, 2013	

\*1: Limited to the listed commodities that are components of the Nikkei-JPX Commodity Index (as designated in the Item 9.2 Component below).

\*2: In principle, this is either the first or second contract month; however, for crude oil it is the second or third contract month, since the Final Settlement Day (referred as the Last Trading Day until 7 May 2009) of each contract month is set on the first business day of every month (for the period before the Last Trading Day was changed from “the 3<sup>rd</sup> business day preceding the last business day of the month” to “the first business day of the following month”, either the first or second contract month serves as the Designated Contract Month for crude oil). For gasoline, kerosene, rubber and azuki contracts, the Designated Contract Months may be the first, second, or third contract month if the last trading day of the first contract month falls within the Roll Period.

\*3: In order to prevent the existence of open positions without the intention of physical delivery until immediately before the Last Trading Day, and to reduce the impact of the roll of the Designated Contract Month on market prices, contract months are rolled by 20% each day over the course of five trading days between the 4th trading day preceding the last trading day of the month and the last trading day of the month. For commodities on the markets in which contract months are generated only on odd months or even months, rolling is carried out only on the months following the contract months. During the Roll Period, a daily settlement price for each Designated Contract Month will be used to calculate Sub-indexes.

\*4: Components and index prices of the Nikkei-JPX Industrial Commodity Index had been identical to those of the Nikkei-JPX Commodity Index (then Nikkei-TOCOM Commodity Index) until November 29, 2013, when listed commodities of Agricultural Products and Sugar Market were included. The

Industrial Commodity Index assumed the role as the index of industrial commodity prices thereafter.

- \*5: Due to the suspension of the Raw Sugar Futures contract, the commodity has been excluded as a component of the Nikkei-JPX Agricultural Product Index (then Nikkei-TOCOM Agricultural Product & Sugar Index) since February 2015.
- \*6: Calculation and publication of the Nikkei-JPX Aluminum Index (then Nikkei-TOCOM Aluminum Index) has been suspended since January 2010.
- \*7: Calculation and publication of the Nikkei-JPX Raw Sugar Index (then Nikkei-TOCOM Raw Sugar Index) has been suspended since February 2015.

## 8 Rule of Rounding

### 8.1 Rounding of Figures in the Index Calculation Process

			Formula, etc.	Rounding
Price Return	Ordinary Period		$p_t / P_n$	Round to the eighth decimal place
	Roll Period	Day 1 ①	The time daily settlement price is set : $p'_{s1} / P_n^i$	
		Day 2 ②	The time daily settlement price is set : $0.2 \times p'_{s1} / P_n^i \times p'_{s2} / p'_{s1} + 0.8 \times p'_{s2} / P_n^i$	
		Day 3 ③	The time daily settlement price is set : $0.2 \times p_{s1} / P_n \times p'_{s3} / p'_{s1} + 0.2 \times p_{s2} / P_n \times p'_{s3} / p'_{s2} + 0.6 \times p_{s3} / P_n$	
		Day 4 ④	The time daily settlement price is set : $0.2 \times p_{s1} / P_n \times p'_{s4} / p'_{s1} + 0.2 \times p_{s2} / P_n \times p'_{s4} / p'_{s2} + 0.2 \times p_{s3} / P_n \times p'_{s4} / p'_{s3} + 0.4 \times p_{s4} / P_n$	
		Day 5 ⑤	The time daily settlement price is set : $0.2 \times p_{s1} / P_n \times p'_{s5} / p'_{s1} + 0.2 \times p_{s2} / P_n \times p'_{s5} / p'_{s2}$ $+ 0.2 \times p_{s3} / P_n \times p'_{s5} / p'_{s3} + 0.2 \times p_{s4} / P_n \times p'_{s5} / p'_{s4} + 0.2 \times p_{s5} / P_n$	
Price Return C	Ordinary Period		$R_n \times p_t / P_n$	
	Roll Period		$R_n \times [① \text{ or } ② \text{ or } ③ \text{ or } ④ \text{ or } ⑤]$	
Index return of each component in a single fiscal year			Weight of each component $\times$ Price Return C over an applicable period	
Index Return			(Index return up to the previous year) $\times$ (Index return in a single fiscal year)	
Nikkei-TOCOM Commodity Index			Index Return $\times 100$	Round to the third decimal place

$p_t$  : Settlement price on the  $t^{\text{th}}$  day

$P_n$  : Base price after the  $n^{\text{th}}$  roll of the Designated Contract Months

$p_{s1}$ 、 $p_{s2}$ 、 $p_{s3}$ 、 $p_{s4}$ 、 $p_{s5}$  : Settlement prices for the 5th contract month on the 1<sup>st</sup> through the 5<sup>th</sup> day during the Roll Period

$p'_{s1}$ 、 $p'_{s2}$ 、 $p'_{s3}$ 、 $p'_{s4}$ 、 $p'_{s5}$  : Settlement prices for the 6th contract month on the 1<sup>st</sup> through the 5<sup>th</sup> day during the Roll Period

$R_n$  : Price return of component for the period from the date of last rebalancing to the date when the  $n^{\text{th}}$  roll is completed

## 8.2 Rounding of the Component Weight

	Formulas, etc.	Rounding
Scale of the cash market W1	Imports, etc./Sum of imports, etc. of all components ( $Q^i / \sum Q^i$ )	Round down to the sixth decimal place
Scale of the futures market W2	Average of end-of-month open interests /Sum of the averages of end-of-month open interests ( $V^i / \sum V^i$ )	Round down to the sixth decimal place
Component Weight Ratio W	i . $W = \alpha \times W1 + (1 - \alpha) \times W2$	Round to the fifth decimal place
	ii . The weight of the component with the largest weight is adjusted so that the sum of the weights of all components is 1.00	-
End-of Month Price (*)	Monthly import value/Monthly import quantity	Disregard decimals
Import quantity, etc.	$\sum$ (Monthly domestic sales $\times$ end-of-month prices)	Not rounded**
Annual Domestic Production	Annual national crop yields $\times$ average end-of - month price	Disregard decimals
Average end-of-month open interests $V^i$	Average end-of-month open interests ( $(\sum v) / \text{Number of Months}$ )	Disregard decimals

\* End-of-month prices: Only the prices used when there is no first contract month for the component

\*\* Although Export and Import Statistics show import values of precious metals, aluminum, and rubber in units of 1,000 yen, the product of monthly domestic sales of oil products, etc. and their end-of-month prices are not rounded (e.g. fractions below 100 yen are not rounded off).

## 9 Data

### 9.1 Sources of Statistical Data

Component	Data on imports, etc.	Sources
Gold	Annual imports (in value terms)	Gold (excluding monetary gold)
Silver		Silver
Platinum		Platinum
Palladium		Palladium
Aluminum		Aluminum and aluminum alloy
Rubber		Natural Rubber
Soybean		Soybean
Corn		Corn (forage)

• Values by Principal Commodity, Export and Import Statistics, Ministry of Finance

Raw Sugar			Raw Sugar
Crude Oil	Annual sum of [(Monthly imports – monthly domestic production (refineries) of oil products) × end-of-month settlement prices ]	<ul style="list-style-type: none"> <li>• Values by Principal Commodity, Export and Import Statistics, Ministry of Finance</li> <li>• Supply-Demand Statistics (petroleum), Mineral Resources and Petroleum Products Statistics, Ministry of Economy, Trade and Industry</li> </ul>	<ul style="list-style-type: none"> <li>• Crude Oil</li> <li>① Summary of supply-demand situation for petroleum products</li> <li>(4) ① Summary of supply-demand situation, Production (refineries)</li> </ul>
Gasoline	Annual sum of (Monthly domestic sales × end-of-month settlement price)	<ul style="list-style-type: none"> <li>• Supply-Demand Statistics (petroleum), Mineral Resources and Petroleum Products Statistics, Ministry of Economy, Trade and Industry</li> </ul>	<ul style="list-style-type: none"> <li>① Summary of supply-demand situation for petroleum products</li> <li>(4) ① Summary of supply-demand situation, Domestic sales</li> </ul>
Kerosene			
Gas Oil			
Azuki	Annual national crop yields × average end-of-month price + annual imports (in value terms)	<ul style="list-style-type: none"> <li>• Crop Situation Survey (beans), Ministry of Agriculture, Forestry and Fisheries of Japan</li> <li>• Values by Export and Import Statistics per Commodity, Ministry of Finance</li> </ul>	Azuki

#### Note

1. Figures for the imports, production (refineries) and domestic sales are adopted from the revised report of the statistics except the annual domestic crop yields of azuki, for which the figures are adopted from the first report of the statistics.
2. The domestic sales figures for gasoline, kerosene, and gas oil for the period between fiscal 2002 and 2005-2(Beginning of November 2005 - End of May 2006), for which the figures are adopted from the annual revision report of the statistics.
3. The end-of-month prices for azuki for the period between January 2012 and January 2013, which precedes the launch of the Agricultural Product & Sugar Market on February 12, 2013, are adopted from the end-of-month settlement prices for the first contract month recorded on the Tokyo Grain Exchange market.

## 9.2 Component

Period	Component
5/31/2002 - 5/31/2004	Gold, Silver, Platinum, Palladium, Aluminum, Gasoline, Kerosene, Crude Oil, Rubber
6/1/2004 - 10/31/2005 (*1)	Gold, Silver, Platinum, Palladium, Aluminum, Gasoline, Kerosene, Gas Oil, Crude Oil, Rubber
11/1/2005 - 12/31/2009 (*2)	Gold, Silver, Platinum, Palladium, Aluminum, Gasoline, Kerosene, Crude Oil, Rubber

1/1/2010 - 11/29/2013	(*3)	Gold, Silver, Platinum, Palladium, Gasoline, Kerosene, Crude Oil, Rubber	
12/2/2013 - 1/30/2015	(*4)	Gold, Silver, Platinum, Palladium, Gasoline, Kerosene, Crude Oil, Rubber, Soybean, Azuki, Corn, Raw Sugar	
2/2/2015 - 7/22/2020	(*5)	Gold, Silver, Platinum, Palladium, Gasoline, Kerosene, Crude Oil, Rubber (*6), Soybean, Azuki (Red Bean), Corn	
7/27/2020 -	(*7)	OSE market	TOCOM market
		Gold, Silver, Platinum, Palladium, Rubber (*6), Soybean, Azuki, Corn	Gasoline, Kerosene, Crude Oil

(\*1) Gas oil was included in the TOCOM Index components following its listing on the TOCOM market.

(\*2) Gas oil was excluded from the TOCOM Index components following the suspension of listing on the TOCOM market.

(\*3) Aluminum was excluded from the Nikkei-TOCOM Commodity Index components following the suspension of listing on the TOCOM market.

(\*4) Soybean, azuki, corn and raw sugar were included in the components of the Nikkei-TOCOM Commodity Index following the launch of the Agricultural Product & Sugar Market

(\*5) Raw Sugar was excluded from the Nikkei-TOCOM Commodity Index components following the suspension of listing on the TOCOM market.

(\*6) As has been the case until now, "Rubber" only covers RSS (Ribbed Smoked Sheet) rubber; it excludes TSR (Technically Specified Rubber).

(\*7) A part of the component (gold, platinum, silver, palladium, rubber, soybeans, red beans and corn) transferred from TOCOM to OSE

### 9.3 Component Weight Ratio

Component Weight Ratio is specified in Attachment 1.

### 9.4 Designated Contract Month

Designated Contract Month is specified in Attachment 2.

### 9.5 Multiplier

Multiplier is specified in Attachment 3.

## 10 Nikkei-JPX Leveraged Index and Nikkei-JPX Inverse Index

All matters concerning the calculation and publication of the Nikkei-JPX Leveraged Indexes and Nikkei-JPX Inverse Indexes are stipulated separately in the "Nikkei-JPX Leveraged Index' 'Nikkei-JPX Inverse Index' Index Guidebook".

## 11 Inquiries

Inquiries on the Nikkei-JPX Commodity Index should be directed to the following:

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