Macquarie Index of Futures Methodology

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The Macquarie Index of Futures Methodology (hereinafter, the *Methodology*) is a generic methodology for calculating indices composed of commodity futures. An index constructed by applying the Methodology to a set of inputs is hereinafter generically called the *Index*. The Methodology outlines the calculations of daily index values for Excess Return and Total Return versions of the Index given the set of inputs specified in its Index Specification document.

Definitions

Index Business Days are the days in the Index Calendar as specified in the Index Specification.

Index Start Date is the Index Business Day specified as such in the Index Specification.

Initial Index Level is the value of the index on the Index Start Date as such in the Index Specification.

Commodity is each of the Commodities specified in the Index Specification. The total number of commodities is denoted by n.

Contract is a futures contract traded in a Trading Facility and having a Commodity as underlying.

Trading Facility is an exchange, board of trade, facility or platform designated by the Commodity Futures Trading Commission to trade futures under the Commodity Exchange Act.

The **Contract Rolling Out** of a Commodity on an Index Business Day is the Contract specified in the Static Contract Schedule Table of the Index Specification for the calendar month to which that particular Index Business Day belongs.

The **Contract Rolling In** of a Commodity on an Index Business Day is the contract specified in the Static Contract Schedule Table of the Index Specification for the calendar month immediately following — with January following December — the calendar month to which that particular Index Business Day belongs.

Settlement Prices on an Index Business Day are the prices of the Contract Rolling In and the Contract Rolling Out, expressed in US dollars, published by the relevant Trading Facility and referred by them as the settlement price for that particular Contract. If the Index Business Day is not a trading day of the relevant Trading Facility, then the Settlement Price of that particular Contract will be the most recent available price on the most recent trading day of the relevant Trading Facility.

Roll Start Date is the Index Business Day on which the index exposure periodically starts to move from the Contract Rolling Out into the Contract Rolling In for each Commodity. The Roll Start Date is specified in the Index Specification.

Roll Length is the number of the Index Business Days required to periodically move the exposure from the Contract Rolling Out into the Contract Rolling In for each Commodity. The Roll Length value is specified in the Index Specification.

Roll Period is the set of Index Business Days consisting of the period starting and including Roll Start Date and lasting for the number of Index Business Days established by the Roll Length.

Roll Fraction means the fraction of exposure rolled out of the Contract Rolling Out and into the Contract Rolling In on each Index Business Day of the Roll Period. The Roll Fraction is equal to the inverse of Roll Length.

The **Roll Weights** allocate exposure between the Contract Rolling Out and the Contract Rolling In through a calendar month for each of the Commodities.

Weights are the weights periodically established by the Weighting Methodology specified in the Index Specification.

Observation Date is the Index Business Day on which the Weights are periodically calculated using the Weighting Methodology specified in the Index Specification.

Target holdings are a set of multipliers used for the daily calculations of the Index derived from the Weights.

Treasury Bill Rate is the 91-day discount rate for U.S. Treasury Bills, as reported by the U.S. Department of the Treasury's Treasury Direct service (http://www.treasurydirect.gov/RI/OFBills).

Holdings Calculation Date is the Index Business Day on which the Target Holdings are periodically calculated. The Holdings Calculation Date is specified in the Index Specification.

Index Sponsor is Macquarie Bank Limited (Macquarie), the entity that publishes or announces (directly or through an agent) the daily level of the Index.

Section 1: Holdings Calculation

On any Index Business Day, t, each Commodity i has a Holding, $H_{i,t}$, associated with it. As outlined in the next section, the Holdings, $\{H_{1,t}, \ldots, H_{n,t}\}$, of the n Commodities are used as inputs on the daily calculation of the Index. In this section, we outline the Holdings, $\{H_{1,t}, \ldots, H_{n,t}\}$, calculations on any Index Business Day, t, departing from the calculation of the Target Holdings on the Holdings Calculations Date, R, immediately preceding the Index Business Day t.

Target Holdings calculation on a Holdings Calculations

The calculation of the Target Holdings on a Holdings Calculations Date, R, requires as input the set of Weights obtained on the Observation Date immediately preceding the Holdings Calculations Date, R. The set of Settlement Prices of the Contract Rolling In on the same date is another input to the calculation of the Holdings.

On any Holding Calculations Date, R, let the Weight of each Commodity i be denoted by $W_{i,R}$ so that $\{W_{1,R}, \ldots, W_{n,R}\}$ are the Weights of the n Commodities in the Index as generated by the Weighting Methodology on the Observation Date immediately preceding the Holding Calculations Date, R. Analogously, let $\{CRO_{1,R-1}, \ldots, CRO_{n,R-1}\}$ be the set of Settlement Prices of the Contract Rolling Out on the Index Business Day immediately preceding the Holding Calculations Date, R. The index Target Holdings, $\{TH_{1,R}, \ldots, TH_{n,R}\}$, for each of the n Commodities in the Index are calculated (rounded to eight decimal points) according to the formula below:

$$TH_{i,R} = \left(\sum_{j=1}^{n} H_{j,R-1} \times CRO_{j,R-1}\right) \times \frac{W_{i,R}}{CRO_{i,R-1}} \; for\ every\ Commodity\ i = 1, \ldots, n$$

where $\{H_{1,R-1}, \ldots, H_{n,R-1}\}$ is the set of Holdings prevalent on the Index Business Day immediately preceding Holding Calculations Date, R.

On the first Holding Calculations Date, R, set of Target Holdings is calculated (rounded to eight decimal points) according to the formula below:

$$TH_{i,R} = I_0 \times \frac{W_{i,R}}{CRO_{i,R-1}} \; for\ every\ Commodity\ i = 1, \ldots, n$$

where I_0 is the Initial Index Level.

Daily Holdings calculation

On any Index Business Day, *t*, the set of Holdings $\{H_{1,t}, \ldots, H_{n,t}\}$ is calculated according to the following rule:

(i) If *t* is the Index Business Day immediately following the last Index Business Day of the Roll Period (including the potential extension imposed by Market Disruption Events as outlined in Section 4), the Holdings $\{H_{1,t}, \ldots, H_{n,t}\}$ are set equal to the Target Holdings $\{TH_{1,R}, \ldots, TH_{n,R}\}$ calculated on the Holdings Calculations Date, *R*, immediately preceding the Index Business Day *t.*

(ii) On any other Index Business Day, *t*, the Holding of each Commodity *i* on that day, $H_{i,t}$, is set to be equal to the Holding of that particular Commodity on the previous Index Business Day, $H_{i,t-1}$.

Section 2: Roll Weights Calculation

The Roll Weights allocate exposure between the Contract Rolling Out and the Contract Rolling In throughout a calendar month. They are calculated daily for each Commodity *t* according to the following rule:

(i) The Roll Weight of Commodity *i* on Index Business Day *t*, $RW_{i,t}$, is equal to one (1) if the Index Business Day, *t*, precedes the Roll Period for the calendar month to which the Index Business Day *t* belongs.

(ii) The Roll Weight of Commodity *i* on Index Business Day *t*, $RW_{i,t}$, will decrease by the amount defined by the Roll Fraction on each day of the Roll Period. That is, $RW_{i,t} = RW_{i,t-1}$ - *Roll Fraction* for each Index Business Day *t* belonging to the Roll Period until $RW_{i,t}$ is equal to zero at the end of the Roll Period.

(iii) The Roll Weight of Commodity *i* on Index Business Day *t*, $RW_{i,t}$, is set equal to zero (0) for all Index Business Days succeeding the Roll Period in the calendar month to which the Index Business Day *t* belongs.

(iv) If a Market Disruption Event occurs, then each Contract will have its roll postponed as described in Section 4.

Section 3: Daily Index Calculations

On an Index Business Day, *t*, the Excess Return Index level, I_t, is calculated (rounded to the eight decimal points) based on the value of the Excess Return Index in the preceding Index Business Day, I_{t-1}, and the **Index Daily Return**, IDR_t, according to the formula:

$$I_t = I_{t-1} \times (1 + IDR_t).$$

The Index Daily Return, IDR_t, is determined according to the formula below:

$$IDR_t = \frac{\sum_{i=1}^{n} RW_{i,t-1} \times H_{i,t-1} \times CRO_{i,t} + (1 - RW_{i,t-1}) \times TH_{i,t-1} \times CRI_{i,t}}{\sum_{i=1}^{n} RW_{i,t-1} \times H_{i,t-1} \times CRO_{i,t-1} + (1 - RW_{i,t-1}) \times TH_{i,t-1} \times CRI_{i,t-1}} - 1$$

where:

$RW_{i,t-1}$ is the Roll Weight of Commodity *i* on the Index Business Day *t-1* immediately preceding the Index Business Day *t*;

$H_{i,t-1}$ is the Holding of Commodity *i* on the Index Business Day *t-1* immediately preceding the Index Business Day *t*;

$CRO_{i,t}$, and $CRI_{i,t}$, are the Settlement Prices of the the Contract Rolling Out and the Contract Rolling In of Commodity *i* on the Index Business Day *t*, respectively; and

$CRO_{i,t-1}$ and $CRI_{i,t-1}$ are the Settlement Prices of the the Contract Rolling Out and the Contract Rolling In of Commodity *i* on the Index Business Day *t-1* immediately preceding the Index Business Day *t*, respectively.

The Index Start Date as well as the Excess Return Index Level, which is the value of the Index Start Date, are specified in the Index Specification.

On an Index Business Day, *t*, the Total Return Index level, TI_t, is calculated (rounded to the eight decimal points) based on the value of the Total Return Index in the preceding Index Business Day, TI_{t-1}, the Index Daily Return, IDR_t, and the **Collateral Return**, CR_t, according to the formula:

$$TI_t = TI_{t-1} \times (1 + IDR_t + CR_t)$$

$$CR_t = \left[\frac{1}{1 - \frac{91}{360} \times TBAR_{t-1}}\right]^{days/91} - 1$$

where

> $TBAR_{t-1}$ is the Treasury Bill Rate of the most recent weekly US Treasury Bill auction prior to the Index Business Day *t,* and
> *days* is the number of calendar days between the Index Business Day *t* and the previous Index Business Days *t-1*.

The Index Start Date as well as the Total Return Index Level, which is the value of the Index Start Date, are specified in the Index Specification.

Section 4: Market Disruption Events

With respect to the daily calculation of the Index, a “Market Disruption Event” means the occurrence of one or more of the following events as determined by the Index Sponsor in its sole discretion:

(i) a material limitation, suspension, or disruption of trading in one (or more) of the Contracts underlying the Index which results in a failure by the relevant Trading Facility to report or announce a settlement price for such Contract on the day on which such event occurs or any succeeding day on which it continues to occur;

(ii) the settlement price published by the relevant Trading Facility for one (or more) Contract underlying the Index is a “limit price”, which typically means that the Trading Facility published settlement price for such Contract for a trading day has increased or decreased from the previous trading day’s settlement price by the maximum amount permitted under applicable rules of the Trading Facility;

(iii) any other event, if the Index Sponsor determines in its sole discretion that the event materially interferes with the ability of the Index Sponsor or any of its affiliates to hedge the Index.

Roll Weight calculation under Market Disruption Events

If on an Index Business Day during the Roll Period, *t*, a Market Disruption Event occurs, then the Commodity with an underlying Contract affected by the Market Disruption Event will have its roll postponed according to the following methodology:

(i) For each Commodity *i* not affected by the Market Disruption Event, the Roll Weight, $RW_{i,t}$ is defined normally as in Section 2.

(ii) For each Commodity *i* affected by the Market Disruption Event, the Roll Weight, $RW_{i,t}$, will be set equal its previous value, i.e., $RW_{i,t} = RW_{i,t-1}$.

(iii) The postponed portion of the roll in (ii) above will roll on the first Index Business Day not affected by Market Disrupted Events.

In the event that the Roll Period ends without the Roll Weight being full redistributed into the Contract Rolling In, then the Roll Period is extended until there is no Market Disruption Event. If the Roll Period is extended five (5) days, then the Index Sponsor retains the discretion (but is not obligated) to delay the rolling of the affected Contract and/or to use a different Settlement Price in order to effect that portion of the roll. It is anticipated, however, that the Index Sponsor will only exercise this discretion under extraordinary circumstances.

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