

# Macquarie Commodity Strategy 171 Selective Carry Deferred Exposure Index

**Index Manual  
August 2015**

## NOTICES AND DISCLAIMERS

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### BASIS OF PROVISION

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This Index Manual sets out the rules for the Macquarie Commodity Strategy 171- Selective Carry Deferred Exposure Index (the *Index*) and reflects the methodology for determining the composition and calculation of the Index (the *Methodology*). The Methodology and the Index derived from this Methodology are the exclusive property of Macquarie Bank Limited (the *Index Sponsor*). They have been provided to you solely for your internal use and you may not, without the prior written consent of the Index Sponsor, distribute, reproduce, in whole or in part, summarise, quote from or otherwise publicly refer to the contents of the Methodology or use it as the basis of any financial instrument.

### DATE OF INDEX MANUAL AND CHANGES TO THE INDICES

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If you have been granted written consent by the Index Sponsor to reference the Index in any contract or financial instrument, you should include in such contract or financial instruments robust fall-back provisions to deal with cessation or material modification of the Index.

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The Index and any financial instruments based on the Index may not be suitable for all investors and any investor must make an independent assessment of the appropriateness of any transaction in light of their own objectives and circumstances including the potential risks and benefits of entering into such a transaction. If you are in any doubt about any of the contents of this document, you should obtain independent professional advice.

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## HISTORICAL VALUES OF THE INDICES

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## NOTICES

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# MACQUARIE SELECTIVE CARRY ALPHA INDEX

## TABLE OF CONTENTS

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Notices And Disclaimers.....	2
Basis Of Provision.....	2
Date Of Index Manual And Changes To The Indices.....	2
Not Research Or An Offer .....	2
Historical Values Of The Indices.....	3
Disclaimer Of Liability .....	3
Notices .....	4
Macquarie Selective Carry Alpha Index .....	5
Introduction .....	6
The Index Components .....	6
Single commodity indices eligible for inclusion in the Index .....	<b>Error! Bookmark not defined.</b>
Allocation of Weights to the Components .....	6
Calculation methodology .....	7
General notes on the Index and the Methodology .....	7
Index governance.....	8
Index sponsor and index calculation agent .....	9
The Index Sponsor.....	9
The Index Calculation Agent .....	9
Relationship of the Index Sponsor and the Index Calculation Agent .....	9
Definitions.....	10
Index Calculation.....	13
Section 1: Holdings Calculation.....	13
Target Holdings calculation on a Holdings Calculation Date .....	13
Daily Holdings calculation .....	13
Section 2: Daily Index Calculation .....	14
Section 3: Market Disruption Events .....	15
Index calculation under Market Disruption Events .....	15

## INTRODUCTION

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The Macquarie MQCP171 index (hereinafter, the *Index*) is a rules-based benchmark designed to track exposure to a diversified basket of single commodity indices (the *Components* of the Index). These Components each track a single “deferred commodity future” and were selected from the population of single commodity indices that relate to commodities generally included in broad benchmark commodity indices.

The Index Sponsor implements the exposure by constructing the Index with eight Components. Each Component has a specified Weight of in the Index. These Weights are rebalanced at the end of each month, so that the exposure to each Component is always the same as of the last Index Business Day of each month.

This Index is designed to be part of an investment strategy commonly referred to as ‘commodity carry’. It aims, when traded in conjunction with a short exposure to nearby commodity futures, to track the storage-related risk premium that can be captured by taking long exposure to long-dated (*deferred*) commodity futures contracts and short exposure to short-dated (*front month*) commodity futures contracts. The existence of the risk premium is justified by the fact that short-term storage is typically more expensive than long-term storage. It is, however, possible that despite this risk premium, deferred futures will underperform front month futures.

## SELECTION OF INDEX COMPONENTS

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With respect to each Component, “deferred commodity futures contracts” above refers to commodity futures contracts with expirations typically included in broad benchmark three-month forward commodity indices. The “deferred” set of contract expirations were then adjusted to address certain risks related to seasonality, such as long and short exposure to futures in a single commodity which have expiries that represent different crop years or different seasons. The population of single commodity indices eligible for inclusion in the Index is the set of indices that track this adjusted set of deferred contract expirations.

Selection of the Components was determined on the basis that, if included together in an equally-weighted basket with short indices tracking the “front-month contracts” of the same commodities (that is, commodity futures contracts with expirations typically included in broad benchmark commodity indices that track the set of commodity futures closest to expiration), they would have resulted in the best risk-adjusted performance over the period from 2009 to 2015. This was a one-time process that resulted in selection of the Components specified in the definitions section below.

## ALLOCATION OF WEIGHTS TO THE COMPONENTS

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Once the Components were selected, a mean-variance optimization algorithm was utilized to determine the proportion of Index exposure (or Weight) that is assigned to each Component. Although the Index is a long-only index, the optimization did not only take account of long exposure. For each Component, the optimisation took into account the returns and correlations of the cumulative performance of long

exposure to deferred futures contracts together with short exposure to front month futures contracts. The Weights determined by this algorithm are fixed and will not change over time.

## CALCULATION METHODOLOGY

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The Index calculation methodology is outlined in the Index Calculation section below. To facilitate an understanding of the calculations, the Methodology contains various worked examples which demonstrate the types of calculations needed to calculate the level of the Index on a particular date.

## GENERAL NOTES ON THE INDEX AND THE METHODOLOGY

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The Index is designed to be replicable and readily accessible to market participants and is calculated daily in both an Excess Return and a Total Return format. To facilitate an understanding of the calculations, the Methodology contains various worked examples which demonstrate the types of calculations needed to calculate the level of the Index on a particular date.

The Index (including the Components) is calculated and maintained by the Index Calculation Agent and supervised by the Index Sponsor and Oversight Committee, as described below. Once the Index has been created, the selection of Components that comprise it, the Weights of each Component and the commodity future that underlies each Component will all be fixed and will not be amended going forward. All determinations with regard to the Index are made following the rules set out in this document, without discretion by the Index Sponsor or Index Calculation Agent.

The Index (including the Components) are not based upon submissions provided by third parties (or an affiliate of the Index Sponsor or Index Calculation Agent) or expert judgment. The Index is ultimately based upon actual transaction data sourced from regulated markets and exchanges.

## INDEX GOVERNANCE

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The Index Sponsor has established an independent oversight committee (the *Oversight Committee*) to review and oversee management of the Index (including the Components thereof) and resolve any issues that arise. The committee is comprised of the following designees, each an employee of Macquarie Bank Limited:

- A Senior Managing Director in the Metals, Mining & Agriculture division of the Commodities and Financial Markets group;
- A Director from the Legal and Governance group;
- A representative from the Technology division of the Corporate Operations Group;
- A representative from the Risk division of the Risk Management Group; and
- A representative from the Compliance division of the Risk Management Group.

Each member of the Oversight Committee is sufficiently knowledgeable about commodity futures contracts and the commodities markets in general, and is required to act in good faith and in a commercially reasonable manner.

The Index Sponsor will make available upon request the names of the individuals forming the Oversight Committee.

The Oversight Committee has considered the features of the Index, the intended, expected or known usage of the Index and the materiality of existing or potential conflicts of interest together with overseeing the daily management and operations of the Index.

The Oversight Committee has approved the Methodology and this Index Manual and will be available on an ad hoc basis for the approval of any changes to the Methodology or Components of the Index, any contemplated cancellation of the Index (or Components) and the resolution of any issues which arise in relation to the Index or Components of the Index.



## INDEX SPONSOR AND INDEX CALCULATION AGENT

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### THE INDEX SPONSOR

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Macquarie Bank Limited is the Index Sponsor. Notwithstanding anything to the contrary, the Index Sponsor will maintain all ownership rights, expressed or otherwise, with respect to the Index, including the ability to license, sell or transfer any or all of its ownership rights with respect to the Index, including but not limited to terminating and appointing any successor Index Calculation Agent. The Index Calculation Agent is appointed by the Index Sponsor to calculate and maintain each Index (including the Components of the Index) from and until such time that the Index Sponsor terminates its relationship with the current Index Calculation Agent and appoints a successor index calculation agent. Any such termination or appointment of a successor will be subject to the approval of the Oversight Committee.

The Index Sponsor may, from time to time, revise, amend and/or supplement this Manual. If such revisions or supplement materially affect the calculation of the Index, the Index Sponsor shall publish a new Manual no later than 30 days prior to implementation of the revised or supplemented rules. If it is not reasonably practicable to publish revised Manual 30 days prior to such changes, the revised Manual will be published as soon as reasonably practicable.

### THE INDEX CALCULATION AGENT

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The Technology division of the Corporate Operations Group of Macquarie Bank Limited acts as “Index Calculation Agent” in respect of the Index (and Components of the Index) as of the date of this Manual. The methodology employed by the Index Calculation Agent in determining the composition and calculation of the Index is set out in the calculations and procedures described in this Manual.

### RELATIONSHIP OF THE INDEX SPONSOR AND THE INDEX CALCULATION AGENT

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The Index Calculation Agent is appointed by the Index Sponsor, subject to the approval of the Oversight Committee. While, as of the date of publication of these rules, both the Index Sponsor and the Index Calculation Agent form part of Macquarie Bank Limited, they are independent divisions within the bank and employees discharging the obligations of the Index Calculation Agent have separate lines of reporting and accountability from the employees performing the functions of the Index Sponsor.

## DEFINITIONS

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**Components** are the components specified in the table below:

Component
Macquarie Minimum Drawdown Aluminium Beta ER (L)
Macquarie Minimum Drawdown Corn Beta ER (L)
Macquarie Minimum Drawdown Cotton Beta ER (L)
Macquarie Minimum Drawdown Crude Oil (WTI) Beta ER (L)
Macquarie Minimum Drawdown Lean Hogs Beta ER (L)
Macquarie Minimum Drawdown Natural Gas Beta ER (L)
Macquarie Minimum Drawdown Soybean Oil Beta ER (L)
Macquarie Minimum Drawdown Sugar Beta ER (L)

The total number of Components is denoted by  $n$ .

These Components are calculated in accordance with the Macquarie Single Commodity Indices methodology, the latest version of which can be found in the following website: <http://www.macquarie.com/mgl/com/commodityindexdocumentation>

**Component Level**, in respect of an Index Business Day, is the closing level of each Component as determined by the Index Calculation Agent. If the Index Business Day is not a day on which the Component is scheduled to be published, the Component Level for that day will be the most recent available Component Level on the most recent publication day.

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

**Equivalent Holdings**, in respect of an Index Business Day, are numbers which, if applied as Holdings to the Underlying Contracts of the Index, would perfectly describe the performance of the Index in respect of that Index Business Day. Equivalent Holdings are determined in order to facilitate calculation of the Index where any Underlying Contract is subject to a Market Disruption Event. The calculation of Equivalent Holdings is set out in Section 3 (*Market Disruption Events*) of the Index Calculation section below.

**Equivalent Target Holdings**, in respect of an Index Business Day, are numbers which, if applied as Holdings to the Underlying Contracts of the Index, would perfectly describe what the performance of the Index would have been if the Holdings of the Index were instead equal to the Target Holdings of the Index. Equivalent Target Holdings are determined in order to facilitate calculation of the Index where any Underlying Contract is subject to a Market Disruption Event. The calculation of Equivalent Target Holdings is set out in Section 3 (*Market Disruption Events*) of the Index Calculation section below.

**Holding**, in respect of a Component and an Index Business Day, is a number which is determined by the Index Calculation Agent as described in Section 2 (*Holdings Calculation*) of the Index Calculation section below. The Holding in respect of a Component is determined in order to calculate the daily Index Level and represents the proportionate affect on the Index Level of a change in the relevant Component level.

**Holdings Calculation Date** is the Index Business Day on which the Target Holdings are periodically calculated in order to rebalance the Holding of each Component back to the specified Weights. The Holdings Calculation Date is the last Index Business Day of each calendar month.

**Index Calendar** is the set of trading days of the NYSE Euronext Holiday schedule (<http://www.nyx.com/holidays-and-hours/euronext>).

**Index Business Days** are the days in the Index Calendar.

**Index Level** is the Level of the Index that is calculated according to the relevant section of this Methodology

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

**Index Start Date** is 03-Jan-2000.

**Initial Index Level** is 100.

**Index Ticker** means MQCP171E Index (Bloomberg).

**Market Disruption Events** are events which affect the ability of market participants to trade at the published Settlement Price of a futures contract or other security that is necessary for the exact replication of the Index. The details of what constitutes a Market Disruption Event and the ways in which such events affect the calculation of the Index Level are explained in Section 3 (*Market Disruption Events*) of the Index Calculation section below.

**Target Holdings** are a set of multipliers, derived from the Weights, which are utilised to rebalance the Components of the Index on each Holdings Calculation Date. Calculation of Target Holdings is described in Section 1 (*Holdings Calculation*) of the Index Calculation section below.

**Trading Facility** means each regulated futures exchange, facility or platform on or through which the Underlying Contracts of the Index are traded.

**Treasury Bill Rate** in respect of any Index Business Day, 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>) on the most recent of the weekly auction dates prior to such Index Business Day.

The **Underlying Contracts** in respect of an Index Business Day are all Contracts which are, directly or indirectly, an underlying of the Index or, if that Index Business Day is a Holdings Calculation Date, scheduled to be an underlying of the Index.

**Weights** are the weights periodically established by the Weighting Methodology.

**Weighting Methodology:** On each Holdings Calculation Date, the Weights of the MQCP171E Index, which are used to determine the Holdings of the Index in respect of each Holdings Calculation Date, shall be set according to the table below:

Component	Weight
Macquarie Minimum Drawdown Aluminium Beta ER (L)	23.2774%
Macquarie Minimum Drawdown Corn Beta ER (L)	12.0991%
Macquarie Minimum Drawdown Cotton Beta ER (L)	4.1594%
Macquarie Minimum Drawdown Crude Oil (WTI) Beta ER (L)	18.6867%
Macquarie Minimum Drawdown Lean Hogs Beta ER (L)	7.1600%
Macquarie Minimum Drawdown Natural Gas Beta ER (L)	8.7427%
Macquarie Minimum Drawdown Soybean Oil Beta ER (L)	14.1197%
Macquarie Minimum Drawdown Sugar Beta ER (L)	11.7549%

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## INDEX CALCULATION

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The following sections detail how the Index Calculation Agent will calculate the daily Index Levels of the Index based on inputs set out in the Definitions section.

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### SECTION 1: HOLDINGS CALCULATION

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On any Index Business Day,  $t$ , each Component  $i$  has a Holding,  $H_{i,t}$ , associated with it. The Holdings,  $\{H_{1,t}, \dots, H_{n,t}\}$ , of the  $n$  Components are used as inputs on the daily calculation of the Index. In this section, we outline the Holdings,  $\{H_{1,t}, \dots, H_{n,t}\}$ , calculations on any Index Business Day,  $t$ .

On the last Index Business Day of each calendar month, the Holding of each Component  $i$ , is rebalanced in accordance with the Weighting Methodology.

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#### TARGET HOLDINGS CALCULATION ON A HOLDINGS CALCULATION DATE

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The calculation of the Target Holdings on a Holdings Calculation Date,  $R$ , requires as input the set of Weights in respect of that Holdings Calculation Date  $R$  and the Component Levels of the Components on the Index Business Day immediately preceding that Holdings Calculations Date,  $R$ .

On any Holdings Calculation Date,  $R$ , let the Weight of each Component  $i$  be denoted by  $W_{i,R}$  so that  $\{W_{1,R}, \dots, W_{n,R}\}$  are the Weights of the  $n$  Components in the Index as determined by the Weighting Methodology of the Index in respect of the Holdings Calculation Date  $R$ . Analogously, let  $\{C_{1,R-1}, \dots, C_{n,R-1}\}$  be the set of Component Levels of the Components on the Index Business Day immediately preceding the Holdings Calculation Date,  $R$ . The Index Target Holdings,  $\{TH_{1,R}, \dots, TH_{n,R}\}$ , for each of the  $n$  Components in the Index are calculated according to the formula below:

$$TH_{i,R} = I_{R-1} \times \frac{W_{i,R}}{C_{i,R-1}} \text{ for every Component } i = 1, \dots, n$$

where  $I_{R-1}$  is the Index Level on the Index Business Day immediately preceding the Holdings Calculation Date  $R$ .

For example if, on the Index Business Day preceding a Holdings Calculation Date,  $R$ , the Index level is 100, the Component Level is 80 and the Weight of that Component is 40%, then the Target Holding of that Component in respect of that Holdings Calculation Date will be equal to  $100 \times (0.4) / 80 = 0.5$

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#### DAILY HOLDINGS CALCULATION

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

- (i) If  $t$  is the Index Business Day immediately following the Holdings Calculation Date  $R$ , the Holdings  $\{H_{1,t}, \dots, H_{n,t}\}$  are set equal to the Target Holdings  $\{TH_{1,R}, \dots, TH_{n,R}\}$  calculated on that Holdings Calculations Date.

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

## SECTION 2: DAILY INDEX CALCULATION

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The Index represents the performance of a synthetic, unfunded exposure to the Components of the Index, that is, the Index tracks what an investor would receive if it purchased or sold the futures contracts underlying the Index, without taking into consideration the cost of investment capital. On each Index Business Day,  $t$ , the Index level,  $I_t$ , is calculated (rounded to seven significant figures) based on the value of the Index on the preceding Index Business Day,  $I_{t-1}$ , and the change in level of each of the Components, according to the formula:

$$I_t = I_{t-1} + \sum_i H_{i,t}(C_{i,t} - C_{i,t-1})$$

where:

- $I_t$  is the Index Level on the close of day  $t$ ;
- $H_{i,t}$  is the Holding of Component  $i$  on the Index Business Day  $t$ ;
- $C_{i,t}$  is the level of Component  $i$  on the Index Business Day  $t$ ;
- $t-1$  is the Index Business Day immediately preceding Index Business Day  $t$

The Index Start Date as well as the Index Starting Level, which is the value of the Index on the Index Start Date, are specified in the Definitions section of this document.

For example, if the Index were comprised of two components which had the following Component levels:

	Component 1	Component 2
Index Business Day t-1	32.48	31.21
Index Business Day t	32.83	31.49

and the following Holdings:

	Holding
Component 1	1.72
Component 2	1.48

then if the Index Level on Index Business Day t-1 was equal to 102.0564, the Index Level on Index Business Day t will be equal to:

$$I_t = 102.0564 + 1.72 \times (32.83 - 32.48) + 1.48 \times (31.21 - 31.49) = 103.0728$$

## SECTION 3: MARKET DISRUPTION EVENTS

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The Index is ultimately comprised of a set of futures on physical commodities (the *Underlying Contracts*). On any given Index Business Day, disruptions can occur that prevent these Underlying Contracts from being traded. When this happens, it is necessary for the calculations of each Index to be adjusted so that they all remain replicable by market participants i.e. adjustments are made to the Index calculations to ensure that the Index Levels reflect futures prices that were attainable in the market at the times they would need to be traded in order to replicate the performance of the Index.

On a Holdings Calculation Date, this is generally achieved by delaying any changes to the composition of each Component that is directly dependent on the disrupted Underlying Contracts. On any other Index Business Day, given replication of the Index does not require trading of Underlying Contracts on such days, in the event that a price is not available for a particular Underlying Contract, that price will be appropriately substituted by the Index Calculation Agent in order for the calculations in respect of a particular Index Business Day to take place.

With respect to the calculation of the Index, a “Market Disruption Event” means the occurrence, in respect of one or more Underlying Contracts, of one or more of the following events, as determined by the Index Calculation Agent:

- (i) a failure by the relevant Trading Facility to report or announce a settlement price for an Underlying Contract;
- (ii) all trading in an Underlying Contract of the Index is suspended and does not recommence at least ten minutes prior to the actual closing time of the regular trading session;
- (iii) the settlement price published by the relevant Trading Facility for one (or more) Underlying Contracts 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;
- (iv) any other event, if the Index Sponsor reasonably determines that the event materially interferes with the ability of market participants to hedge the Index;
- (v) the occurrence of a Market Disruption Event in respect of an Underlying Contract that shares the same Commodity.

The Index Calculation Agent will determine the Index Level under Market Disruption Events in accordance with the following section.

### INDEX CALCULATION UNDER MARKET DISRUPTION EVENTS

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If, on a Holdings Calculation Date  $R$ , a Market Disruption Event with respect to one or more Underlying Contracts occurs (such day, a “Disrupted Holdings Calculation Date” and each such Contract a “Disrupted Contract”), then the Index Calculation for subsequent Index Business Days, until the second consecutive non-disrupted Index Business Day, will be modified as follows:

- (i) As long as a Market Disruption Event that occurred or was continuing on the Holdings Calculation Date R is continuing, the Index Level will be calculated according to the following formula:

$$I_t = I_{t-1} + \sum_j H_{j,t} (f_{j,t} - f_{j,t-1})$$

where

$H_{j,t}$  is the Equivalent Holding for Underlying Contract  $j$  as calculated according to sub-paragraphs (ii)-(v) below

$f_{j,t}$  is the settlement price of Underlying Contract  $j$  as of the Index Business Day  $t$

- (ii) The Index Calculation Agent shall determine the Equivalent Holdings and the Equivalent Target Holdings with respect to the Index.

The Equivalent Holdings is the set of holdings  $\{H'_{1,R}, \dots, H'_{m,R}\}$  of Underlying Contracts  $\{F_1, \dots, F_m\}$  of the Index which perfectly describes the returns of the Index in the time period from the immediately preceding Holdings Calculation Date to the Holdings Calculation Date R.

The Equivalent Target Holdings is a set of target holdings  $\{TH'_{1,t}, \dots, TH'_{m,t}\}$  for the Underlying Contracts, which perfectly describes the returns of the Index on the days following the Disrupted Holdings Calculation Date and until the first subsequent Holdings Calculation Date.

The Equivalent Holdings and the Equivalent Target Holdings shall be determined for all Underlying Contracts, therefore some  $H'_{j,t}$  and/or  $TH'_{j,t}$  may have a value of 0.

- (iii) On the Index Business Day immediately following a Disrupted Holdings Calculation Date and until all Market Disruption Events that occurred on the Disrupted Holdings Calculation Date have ceased, the Equivalent Holdings  $\{H'_{1,t}, \dots, H'_{m,t}\}$  are calculated based on the following formula:

$$H_{j,t} = TH_{j,R} + SCH_{j,t}$$

where:

$TH_{j,R}$  means the Equivalent Target Holding of Contract  $j$  on Holdings Calculation Date R

$SCH_{j,t}$  means  $\begin{cases} H_{j,t-1} - TH_{j,R} & \text{if } j \text{ is a Disrupted Contract; or} \\ 0 & \text{otherwise} \end{cases}$

$H_{j,t-1}$  means the Equivalent Holding of Contract  $j$  on Index Business Day  $t-1$



- (iv) For each Disrupted Contract  $j$ , the Equivalent Holding  $H'_{j,t}$  shall be equal to the Equivalent Target Holding  $TH'_{j,t}$  on the first Index Business Day following a Disrupted Holdings Calculation Date on which no Market Disruption Event in respect of that Contract  $j$  occurs or is continuing. If a Market Disruption Event continues for more than 5 Index Business Days following a Disrupted Holdings Calculation Date, the Index Calculation Agent shall, in good faith, determine the levels of each Disrupted Component  $j$  that will be used in the calculation of Holdings and Index Levels.
- (v) For each Underlying Contract that is not a Disrupted Contract, the Holding  $H_{j,t}$  on the Index Business Day immediately following the Disrupted Holdings Calculation Date shall be the Equivalent Target Holding.
- (vi) On the second consecutive non-disrupted Index Business Day immediately following a Disrupted Holdings Calculation Date, the Index Calculation Agent will resume calculation of the Index in accordance with section 2

Further explanation of Holdings and Equivalent Holdings:

In respect of any given Index Business Day, the Index is represented as a basket of its Components with a Holding in respect of each Component determined on the immediately preceding Holdings Calculation Date according to the Holdings Calculation section above. For the purposes of determination of whether disruption to futures trading affects the Index, however, the Holdings of the Index must instead be expressed in terms of the futures contracts that ultimately underlie the Index. As the Index is a linear basket of its Components, and because the same holds true of all components of those Components, (whether they themselves are futures or indices), it is possible to work through the Holdings of the Index, and, by ultimately breaking down each index to the futures contracts that comprise it, determine a new set of Holdings that, in respect of that Index Business Day, exactly represents the composition of the Index in terms of its Underlying Contracts.

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## CONTACTS

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For more information on the Macquarie Macquarie Commodity Strategy 171- Selective Carry Deferred Exposure Index please contact:

Arun Assumall  
Global Head of Commodity Investor Products  
[arun.assumall@macquarie.com](mailto:arun.assumall@macquarie.com)

Maia Mathieson  
Commodity Investor Products  
[maia.mathieson@macquarie.com](mailto:maia.mathieson@macquarie.com)