

# FTSE/CoreCommodity CRB<sup>®</sup> Index Methodology

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# Contents

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Section 1 Introduction .....	3
Section 2 Management responsibilities .....	5
Section 3 FTSE Russell index policies .....	6
Section 4 Input data .....	8
Section 5 Determination of the Benchmark .....	12
Section 6 Publication .....	18
Section 7 Definition of key terms .....	19
Appendix 1 Climate related disclosures.....	20

## Section 1

# Introduction

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## 1. Introduction

### 1.1 FTSE/CoreCommodity CRB® Indices

- 1.1.1 This Methodology contains the rules for calculating the FTSE/CoreCommodity CRB Indices. This Methodology and all information contained herein is the exclusive property of FTSE International Limited, or its affiliates, and CoreCommodity Indexes, LLC, or its affiliates (“CoreCommodity”), as applicable. FTSE International Limited and CoreCommodity shall have no liability to any person or entity for the accuracy or completeness of the information contained herein.
- 1.1.2 FTSE/CoreCommodity CRB Indices are calculated for the following segments (“Commodity Segments”):
- the Primary CRB index comprising 19 individual commodities,
  - the Non-Energy CRB index which excludes energy commodities and comprises 15 individual commodities, and
  - the Non-Agri and Livestock CRB index which excludes both agricultural and livestock commodities and comprises 9 individual commodities.
- 1.1.3 The commodities belonging to each Commodity Segment are shown in section 4.2 below. For each Commodity Segment, four types of indices are calculated:
- an excess return index based on the front futures expiration month for each commodity (the “Main” excess return index),
  - an excess return index based on the futures expiration months for each commodity that are 3 months behind the front expiration months (the “Forward” excess return index),
  - a total return index derived from the Main excess return index and based on 3-Month US Treasury Bill,
  - a total return index derived from the Main excess return index and based on US Fed published overnight rate,
  - a total return index derived from the Forward excess return index and based on 3-Month US Treasury Bill, and
  - a total return index derived from the Forward excess return index and based on US Fed published overnight rate.
- 1.1.4 In addition, a euro denominated, and currency hedged index is calculated for the Primary CRB index using 1 month FX forwards with a daily adjusted notional. The total return index for this euro denominated and currency hedged index is calculated both using the 3-Month US Treasury Bill and using the US Fed published overnight rate.
- 1.1.5 The FTSE CoreCommodity CRB Index does not take account of ESG factors in its index design.

## 1.2 FTSE Russell

FTSE Russell is a trading name of FTSE International Limited, Frank Russell Company, FTSE Global Debt Capital Markets Limited (and its subsidiaries FTSE Global Debt Capital Markets Inc. and FTSE Fixed Income Europe Limited), FTSE Fixed Income LLC, FTSE (Beijing) Consulting Limited, Refinitiv Benchmark Services (UK) Limited, Refinitiv Limited and Beyond Ratings.

1.3 FTSE Russell hereby notifies users of the index series that it is possible that circumstances, including external events beyond the control of FTSE Russell, may necessitate changes to, or the cessation of, the index series and therefore, any financial contracts or other financial instruments that reference the index series or investment funds which use the index series to measure their performance should be able to withstand, or otherwise address the possibility of changes to, or cessation of, the index series.

1.4 Index users who choose to follow this index series or to buy products that claim to follow this index series should assess the merits of the index series rules-based methodology and take independent investment advice before investing their own or client funds. No liability whether as a result of negligence or otherwise is accepted by FTSE Russell or CoreCommodity for any losses, damages, claims and expenses suffered by any person as a result of:

- any reliance on these Ground Rules, and/or
- any inaccuracies in these Ground Rules, and/or
- any non-application or misapplication of the policies or procedures described in these Ground Rules, and/or
- any inaccuracies in the compilation of the index series or any constituent data.

## Section 2

# Management responsibilities

### 2.1 FTSE International Limited (FTSE)

2.1.1 FTSE is the benchmark administrator of the index series<sup>1</sup>.

2.1.2 As Administrator, FTSE International Limited is responsible for collecting input data, determining and publishing the Benchmark, and for all aspects of governance, oversight, compliance and integrity of the Benchmark.

### 2.2 CC/CRB Oversight Committee

2.2.1 The CC/CRB Oversight Committee is responsible for overseeing the provision of the FTSE/CoreCommodity CRB Indices, including reviewing the benchmark definition and methodology at least annually, overseeing any changes to the benchmark methodology or cessation of the benchmark, and overseeing the administrator's control framework, management and operation of the benchmark.

### 2.3 Benchmark Manager

2.3.1 A Benchmark Manager is appointed by FTSE from time to time. The Benchmark Manager is a subject matter expert and is responsible for the integrity and quality of the Index which includes the following specific responsibilities:

- Interpreting the Index Methodology and implement the change procedure (if any)
- Reviewing feedback received from the Index stakeholders and the CC/CRB Oversight Committee.
- Developing and implementing changes to the index methodology pursuant to feedback from stakeholders or in response to market events in accordance with the FTSE benchmark change and cessation policy.
- Managing interaction with the index stakeholders.

### 2.4 Identification of potential limitations of the Benchmark

The design of the Benchmark is resilient against disruptions and periods of high volatility. However, technical problems or extreme market events may lead to re-publish the most recent Benchmark end of day close until the disruption has ended, or changes have been implemented. The administrator will attempt to notify interested parties of any such actions as well in advance as is practicable. There is no assurance, however, that following a Market Emergency, the actions taken in response to such Market Emergency, or any other force majeure event, will not have an adverse effect on the value of the FTSE/CoreCommodity CRB® Indices or the manner in which they are calculated.

### 2.5 Amendments to these Ground Rules

The FTSE/CoreCommodity CRB Indices Methodology is reviewed once per year and, if required by market events, more frequently. Any potential changes to the Methodology are reviewed by the CC/CRB Oversight Committee and are subject to the FTSE Russell's policy for benchmark methodology changes. All reasonable efforts will be made to provide at least one month's notice of any changes to the Methodology prior to their implementation.

<sup>1</sup> The term administrator is used in this document in the same sense as it is defined in [Regulation \(EU\) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds](#) (the European Benchmark Regulation) and [The Benchmarks \(Amendment and Transitional Provision\) \(EU Exit\) Regulations 2019](#) (the UK Benchmark Regulation)

## Section 3

# FTSE Russell index policies

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### 3. FTSE Russell index policies

This Methodology should be read in conjunction with the following policy documents, which can be accessed using the links below:

#### 3.1 Policy for Benchmark Methodology Changes

Details of FTSE Russell's policy for making benchmark methodology changes can be accessed using the following link:

[Policy for Benchmark Methodology Changes.pdf](#)

#### 3.2 FTSE Russell Governance Framework

To oversee its indices, FTSE Russell employs a governance framework that encompasses product, service and technology governance. The framework incorporates the London Stock Exchange Group's three lines of defence risk management framework and is designed to meet the requirements of the IOSCO Principles for Financial Benchmarks<sup>2</sup>, the European benchmark regulation<sup>3</sup> and the UK benchmark regulation<sup>4</sup>. The FTSE Russell Governance Framework can be accessed using the following link:

[FTSE Russell Governance Framework.pdf](#)

#### 3.3 Real Time Status Definitions

For indices that are calculated in real time, please refer to the following guide for details of real time status definitions:

[Real Time Status Definitions.pdf](#)

#### 3.4 Refix Policy

A retrospective recalculation will only be made when a manifest and material error has been identified. Any retrospective recalculation will be notified to users via the alert system on LSEG Workspace.

#### 3.5 Complaints, Operational Enquiries and Proce Challenges

FTSE Russell's complaints procedure can be accessed using the following link: [FTSE Russell Benchmark Determination Complaints Handling Policy](#)

A Price Challenge is a request from a user or a stakeholder to verify and confirm the accuracy of one or more of the published Benchmark rates, inputs to those rates (if publicly available), or whether a specific benchmark determination is representative of market value.

Operational enquiries do not meet the definition of a compliant and include Benchmark Price Challenges. However, FTSE Russell may decide to treat an operational enquiry or a series of operational enquiries as a formal complaint.

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<sup>2</sup> IOSCO Principles for Financial Benchmarks Final Report, FR07/13 July 2013

<sup>3</sup> Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds

<sup>4</sup> The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019

Operational enquires must be submitted to FTSE Russell by e-mail and should contain as much information as possible, including your name, your title, the institution you represent, your e-mail address and telephone number, to enable the operational enquiry to be investigated in a timely manner.

The e-mail address to raise Core Commodity benchmark related price challenge and operational enquiries is: [index\\_queries@lseg.com](mailto:index_queries@lseg.com)

## Section 4

# Input data

## 4. Input data

### 4.1 Data source

4.1.1 All commodity prices used in the FTSE/CoreCommodity CRB indices are taken from commodity futures contract prices published by the CME Group (COMEX, NYMEX, CBOT and CME), Intercontinental Exchange (ICE – NYBOT) London Metal Exchange (LME). CME Group of exchanges, Intercontinental Exchange (ICE) and London Metal Exchange (LME) regulated global marketplace and a well-established platform for commodity futures price discovery. 3-month US Treasury bill rates are based on previous day high value. US Fed published overnight rates are based upon previous day's rate.

### 4.2 Index weights

4.2.1 The FTSE/CoreCommodity CRB Indices are designed to provide a liquid and economically relevant benchmark that will provide the representation of broad commodity market. The FTSE/CoreCommodity CRB Indices are using a four-tiered approach to allocating among the commodities included in the Index. Group I include only petroleum products; Group II includes seven commodities which are highly liquid; Group III is comprised of four liquid commodities; Group IV includes commodities that may provide valuable diversification. All commodities are equally weighted within Groups II, III and IV.

#### **Petroleum products**

Group I of the FTSE/CoreCommodity CRB Index includes only petroleum products – WTI crude oil, heating oil and unleaded gasoline. Petroleum-linked futures have experienced tremendous growth over the past several decades. Crude oil, heating oil, and unleaded gasoline are among the most liquid, widely followed and economically significant commodities futures contracts traded globally. In order to reflect the critical role of petroleum in the global economy and maintain the diversified nature of the FTSE/CoreCommodity CRB Index, assigns a fixed weighting of 33% to this sector.

#### **Highly liquid commodities**

Group II in the FTSE/CoreCommodity CRB Index consists of markets that are highly liquid. These markets represent a diverse cross section across several commodity sectors. In the spirit of historic versions of the CRB Index, these markets are all equally weighted. Main CRB index includes Corn, Soybeans, Live Cattle, Gold, Aluminium, Copper and Natural Gas.

#### **Liquid commodities**

Group III of commodities includes a second cross section of diverse markets that although highly significant and liquid are weighted at a slightly lower level than those in Group II. These commodities help further the goals of diversification, broad representation and liquidity of the Index. Once again, these commodities are equally weighted.

#### **Diversifying commodities**

This final group of five commodities represent markets that may provide meaningful diversification to the index, strengthening the exposure to the Softs, Grains, Industrial Metals, Meats and Precious Metals markets. These assets are equally weighted as well.



### 4.3 Commodity segment index weights

The weight of individual commodities within each Commodity Segment index is as follows. Note that the weights of individual commodities are the same in both the main index and the 3-month forward index for any particular Commodity Segment.

	Commodity	Index weight			Contract months	Exchange
		CRB	Non-Energy	Non-Agri		
	WTI Crude Oil	23.00%	-	23.00%	Jan-Dec	NYMEX
<b>Group I</b>	Heating Oil	5.00%	-	5.00%	Jan-Dec	NYMEX
	Unleaded Gas	5.00%	-	5.00%	Jan-Dec	NYMEX
	<b>Total</b>	<b>33.00%</b>	<b>-</b>	<b>33.00%</b>		
	Natural Gas	6.00%	-	15.00%	Jan-Dec	NYMEX
	Corn	6.00%	9.84%	-	Mar, May, Jul, Sep, Dec	CBOT
	Soybeans	6.00%	9.84%	-	Jan, Mar, May, Jul, Nov	CBOT
<b>Group II</b>	Live Cattle	6.00%	9.84%	-	Feb, Apr, Jun, Aug, Oct, Dec	CME
	Gold	6.00%	9.84%	15.00%	Feb, Apr, Jun, Aug, Dec	COMEX
	Aluminum	6.00%	9.84%	15.00%	Mar, Jun, Sep, Dec	LME
	Copper	6.00%	9.84%	15.00%	Mar, May, Jul, Sep, Dec	COMEX
	<b>Total</b>	<b>42.00%</b>	<b>59.04%</b>	<b>60.00%</b>		
	Sugar	5.00%	8.20%	-	Mar, May, Jul, Oct	NYBOT
<b>Group III</b>	Cotton	5.00%	8.20%	-	Mar, May, Jul, Dec	NYBOT
	Cocoa	5.00%	8.20%	-	Mar, May, Jul, Sep, Dec	NYBOT
	Coffee	5.00%	8.20%	-	Mar, May, Jul, Sep, Dec	NYBOT
	<b>Total</b>	<b>20.00%</b>	<b>32.80%</b>	<b>-</b>		
	Nickel	1.00%	1.64%	3.50%	Mar, Jun, Sep, Dec	LME
	Wheat	1.00%	1.64%	-	Mar, May, Jul, Sep, Dec	CBOT
<b>Group IV</b>	Lean Hogs	1.00%	1.64%	-	Feb, Apr, Jun, Jul, Aug, Oct, Dec	CME
	Orange Juice	1.00%	1.60%	-	Jan, Mar, May, Jul, Sep, Nov	NYBOT
	Silver	1.00%	1.64%	3.50%	Mar, May, Jul, Sep, Dec	COMEX
	<b>Total</b>	<b>5.00%</b>	<b>8.16%</b>	<b>7.00%</b>		

#### 4.4 Futures contract expiration months by calculation month

The calendar below shows the relevant futures contract expiration months used during each calendar month prior to the roll over period.

Commodity	Exchange	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WTI Crude Oil	NYMEX	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Heating Oil	NYMEX	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Unleaded Gas	NYMEX	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Natural Gas	NYMEX	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Corn	CBOT	Mar	Mar	May	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar
Soybeans	CBOT	Mar	Mar	May	May	Jul	Jul	Nov	Nov	Nov	Nov	Jan	Jan
Live Cattle	CME	Feb	Apr	Apr	Jun	Jun	Aug	Aug	Oct	Oct	Dec	Dec	Feb
Gold	COMEX	Feb	Apr	Apr	Jun	Jun	Aug	Aug	Dec	Dec	Dec	Dec	Feb
Aluminum	LME	Mar	Mar	Jun	Jun	Jun	Sep	Sep	Sep	Dec	Dec	Dec	Mar
Copper	COMEX	Mar	Mar	May	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar
Sugar	NYBOT	Mar	Mar	May	May	Jul	Jul	Oct	Oct	Oct	Mar	Mar	Mar
Cotton	NYBOT	Mar	Mar	May	May	Jul	Jul	Dec	Dec	Dec	Dec	Dec	Mar
Cocoa	NYBOT	Mar	Mar	May	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar
Coffee	NYBOT	Mar	Mar	May	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar
Nickel	LME	Mar	Mar	Jun	Jun	Jun	Sep	Sep	Sep	Dec	Dec	Dec	Mar
Wheat	CBOT	Mar	Mar	May	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar
Lean Hogs	CME	Feb	Apr	Apr	Jun	Jun	Jul	Aug	Oct	Oct	Dec	Dec	Feb
Orange Juice	NYBOT	Mar	Mar	May	May	Jul	Jul	Sep	Sep	Nov	Nov	Jan	Jan
Silver	COMEX	Mar	Mar	May	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar

Exceptional Roll schedule for 2020 to address exceptional market conditions, including the negative settlement price of the WTI Crude Oil May 2020 futures contract.

Commodity	Exchange	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WTI Crude Oil	NYMEX	Feb	Mar	Apr	May	Jun	Sep	Sep	Sep	Oct	Nov	Dec	Jan

The 3 Month Forward index expiration months used during each calendar month are as follows.

Commodity	Exchange	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WTI Crude Oil	NYMEX	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Heating Oil	NYMEX	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Unleaded Gas	NYMEX	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Natural Gas	NYMEX	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Corn	CBOT	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar	Mar	Mar	May
Soybeans	CBOT	May	Jul	Jul	Nov	Nov	Nov	Nov	Jan	Jan	Mar	Mar	May
Live Cattle	CME	Jun	Jun	Aug	Aug	Oct	Oct	Dec	Dec	Feb	Feb	Apr	Apr
Gold	COMEX	Jun	Jun	Aug	Aug	Dec	Dec	Dec	Dec	Feb	Feb	Apr	Apr
Aluminum	LME	Jun	Jun	Sep	Sep	Sep	Dec	Dec	Dec	Mar	Mar	Mar	Jun
Copper	COMEX	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar	Mar	Mar	May
Sugar	NYBOT	May	Jul	Jul	Oct	Oct	Oct	Mar	Mar	Mar	Mar	Mar	May
Cotton	NYBOT	May	Jul	Jul	Dec	Dec	Dec	Dec	Dec	Mar	Mar	Mar	May
Cocoa	NYBOT	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar	Mar	Mar	May
Coffee	NYBOT	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar	Mar	Mar	May
Nickel	LME	Jun	Jun	Sep	Sep	Sep	Dec	Dec	Dec	Mar	Mar	Mar	Jun
Wheat	CBOT	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar	Mar	Mar	May
Lean Hogs	CME	Jun	Jun	Jul	Aug	Oct	Oct	Dec	Dec	Feb	Feb	Apr	Apr
Orange Juice	NYBOT	May	Jul	Jul	Sep	Sep	Nov	Nov	Jan	Jan	Mar	Mar	May
Silver	COMEX	May	Jul	Jul	Sep	Sep	Dec	Dec	Dec	Mar	Mar	Mar	May

Exceptional 2020 WTI Crude Oil roll schedule for 2020 forward index expiration months

Commodity	Exchange	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WTI Crude Oil	NYMEX	May	Jun	Jul	Aug	Sep	Dec	Dec	Dec	Jan	Feb	Mar	Apr

## Section 5

# Determination of the Benchmark

## 5. Determination of the Benchmark

### 5.1 Individual commodity percent return

5.1.1 An individual commodity “Percent Return” is calculated for each commodity in each Commodity Segment Main index and Forward index. The futures contract expiration months used in the Main Commodity Segment Main indices and the Forward indices are shown in section 4.4 above.

Each Percent Return on business day  $t$ ,  $PR_t$ , is calculated with reference to the previous business day  $t - 1$  as

$$PR_t = PR_{t-1} * \frac{CPS_t}{CPS_{t-1}} \quad (1)$$

where  $CPS$  is the price of the front expiration month of the relevant futures contract or, if day  $t$  falls within the four day roll period then  $CPS$  shall be the weighted average price of the front and immediate back expiration months (see below).

If day  $t$  falls outside the roll period,  $CPS$  is calculated on day  $t$  as

$$CPS_t = FP_t \quad (2)$$

Similarly,  $CPS$  is calculated on day  $t - 1$  as

$$CPS_{t-1} = FP_{t-1} \quad (3)$$

where  $FP_t$  is the futures price of relevant futures contract on day  $t$ .

The roll from the front expiration month to the immediate back expiration month of the relevant futures contract takes place over the first four business day period of each calendar month. Exposure is rolled in equal amounts of 25% on each day during the roll period such that by the fourth day of the roll period, 100% of the weight is in the immediate back expiration month.

If day  $t$  falls during a roll period,  $CPS$  is calculated on day  $t$  as

$$CPS_t = \sum_{i=1}^2 DW_t^i * FP_t^i \quad (4)$$

where the summation is over the front expiration month of the relevant futures contract ( $i = 1$ ) and the immediate back month ( $i = 2$ ).  $DW_t^i$  is the daily roll weight for expiration month ' $i$ ' on day  $t$  and  $FP_t^i$  is the futures price of expiration month ' $i$ ' on day  $t$ . Similarly,  $CPS$  is calculated on day  $t - 1$  as

$$CPS_{t-1} = \sum_{i=1}^2 DW_{t-1}^i * FP_{t-1}^i \quad (5)$$

where  $FP_{t-1}^i$  is the futures settlement price of expiration month ' $i$ ' on day  $t - 1$

Once the four day roll period is complete, the immediate back month during the roll becomes the relevant futures contract and equations 2 and 3 are then used until the start of the next roll period.

All values throughout this Methodology are rounded to six decimal places.

## 5.2 Commodity Excess Return indices

The FTSE/CoreCommodity Commodity Segment Main and Forward excess return indices are calculated using the individual commodity percent returns calculated in accordance with equation 1 for the relevant Main or Forward index.

Each Commodity Segment excess return index on day  $t$ , denoted as  $ER_t$ , is calculated as

$$ER_t = \sum_{i=1}^n PR_t^i \quad (6)$$

The summation is over all  $n$  individual commodities belonging to the relevant Commodity Segment Main or Forward index. For each Commodity Segment,

- $n = 19$  for FTSE/CoreCommodity CRB index,
- $n = 15$  for Non-Energy, and
- $n = 9$  for Non-Agri and Livestock versions.

The same values apply for  $n$  for both the Main and the Forward excess return indices for each particular Commodity Segment.

## 5.3 Commodity Total Return Indices based on 3 Month US Treasury Bill

Total return indices are calculated for each Commodity Segment Main and Forward index. Each total return index,  $TR_t$ , replicates the total return of a portfolio of futures and a cash investment. It is calculated using the futures daily returns plus the daily interest from the cash investment as follows

$$TR_t = TR_{t-1} \times \left( \frac{ER_t}{ER_{t-1}} + TBR_t \right) \times (1 + TBR_t)^{d-1} \quad (7)$$

where  $d$  is the number of calendar days between the current and previous business days, and  $TBR_t$  is the daily interest from the cash investment calculated as

$$TBR_t = \left( \frac{1}{1 - \frac{91}{360} \times TB_{t-1}^{3mo}} \right)^{\frac{1}{91}} - 1 \quad (8)$$

Each Total Return Index,  $TR_t$ , is calculated in USD and  $TB_{t-1}^{3mo}$  is the 3 month US Treasury Bill high rate for the previous day.

#### 5.4 Commodity Total Return (Overnight Rate) Indices based on US Fed published Overnight Rate

Additional Total return indices are calculated for each Commodity Segment Main and Forward index. Each total return (Overnight Rate) index,  $TRS_t$ , replicates the total return of a portfolio of futures and a cash investment. It is calculated using the futures daily returns plus the daily interest from the cash investment as follows

$$TRS_t = TRS_{t-1} \cdot \left[ \frac{ER_t}{ER_{t-1}} \cdot \left( 1 + (d-1) \cdot \frac{SOFR_{t-1}}{360} \right) + \left( \frac{SOFR_{t-1}}{360} \right) \right] \quad (9)$$

where  $d$  is the number of calendar days between the current and previous business days, and  $SOFR_{t-1}$  is overnight rate published by US Fed on next morning.

Total Return (Overnight Rate) index version published on 10<sup>th</sup> October 2022 with index calculation start date from 9<sup>th</sup> September 2022.

#### 5.5 Commodity Euro Daily Hedged Indices

The FTSE/CoreCommodity CRB Total Return Euro Daily Hedged Index  $TH_t$  is a euro denominated index that combines the FTSE/CoreCommodity CRB Total Return Index with the return from a one month FX forward purchase of euros and sale of US dollars. The notional of the FX forward is adjusted on a daily basis.

$$\frac{TH_t^{EUR}}{TH_0^{EUR}} = \frac{FX_t}{FX_0} \cdot \frac{TR_t^{USD}}{TR_0^{USD}} + \sum_{i=1}^t \left\{ \frac{TR_{i-1}^{USD}}{TR_0^{USD}} \cdot \frac{[\widehat{FX}_{i-1}^T - \widehat{FX}_i^T]}{FX_0} \right\} \quad (10)$$

Where:

$TH_t^{EUR}$  = FTSE/CoreCommodity CRB Total Return Euro Daily Hedged Index

$TR_t^{USD}$  = FTSE/CoreCommodity CRB Total Return Index based on 3 month US Treasury Bill in US dollars

$FX_t$  = Spot Forex rate (on a "USD1 <-> EUR x.xx" basis) at the time  $t$

Similarly

$$\frac{THS_t^{EUR}}{THS_0^{EUR}} = \frac{FX_t}{FX_0} \cdot \frac{TRS_t^{USD}}{TRS_0^{USD}} + \sum_{i=1}^t \left\{ \frac{TRS_{i-1}^{USD}}{TRS_0^{USD}} \cdot \frac{[\widehat{FX}_{i-1}^T - \widehat{FX}_i^T]}{FX_0} \right\} \quad (11)$$

Where:

$THS_t^{EUR}$  = FTSE/CoreCommodity CRB Total Return Euro Daily Hedged (Overnight Rate) Index

$TRS_t^{USD}$  = FTSE/CoreCommodity CRB Total Return (Overnight Rate) Index based on US Fed published Overnight rate

The one month FX forward contract will expire and be replaced at the close of the 6<sup>th</sup> US business day of each month (i.e. at the monthly rebalance). The date and time of the last rebalance is denoted  $t = 0$  and the date and time of the next rebalance is denoted  $T$ . The forward rate  $\widehat{FX}_t^T$  used during the month

on day  $t$  (where  $0 < t \leq T$ ) for maturity at  $T$  is derived using an interpolation:

$$\widehat{FX}_t^T = FX_t + (\widehat{FX}_t^{1Month} - FX_t) \cdot \frac{n(t, T)}{n(t, t + 1Month)} \quad (12)$$

where:

$\widehat{FX}_t^{1Month}$  = One Month Forward Rate on day  $t$  for maturity one month from  $t$

$n(t, T)$  = Actual number of days from  $t$  to  $T$

$n(t, t + 1Month)$  = Actual number of days from  $t$  to  $t + 1$  month

$t - 1$  = Previous Business Day

## 5.6 Monthly rebalance

The FTSE/CoreCommodity CRB Commodity Segment Main and Forward indices are rebalanced monthly after close of 6th Business day to reinstate the fixed weights allocations from 2005 revision. This is done by rescaling the percent return for individual commodities ( $PR_{i,t}$ ) belonging to each Commodity Segment Main and Forward excess return index ( $ER_t$ ) as follows

$$PR_{i,t} = W_i \times ER_t \quad (13)$$

where  $W_i$  is the weight of the individual commodity in that Commodity Segment excess return index. Note that weights of individual commodities are the same in both the Main index and the Forward index for each Commodity Segment.

The consequence of the monthly rebalance is that by the end of the seventh business day, each individual percent return for a particular Commodity Segment Main and Forward index is equal to

$$PR_{i,r} = ER_{r-1} \times W_i \times \frac{CPS_{i,r}}{CPS_{i,r-1}} \quad (14)$$

where  $r$  is defined as the seventh business day.

## 5.7 Insufficient data and market disruptions

The administrator endeavours to develop and publish indices only where FTSE has a high level of confidence of long-term availability and access to the necessary data to administer the indices.

A "Market Emergency" is herein defined as any unscheduled and extraordinary condition in which liquidity in the markets used to source input data is interrupted (such as an event resulting in the unscheduled closing of futures exchanges). Should a Market Emergency occur, FTSE reserves the right to take such action with respect to the FTSE/CoreCommodity CRB Indices as it deems appropriate given the circumstances and after consulting with the Index Oversight Committee as appropriate (see section 2).

The administrator will attempt to notify interested parties of any such actions as well in advance as is practicable. There is no assurance, however, that following a Market Emergency, the actions taken in response to such Market Emergency, or any other force majeure event, will not have an adverse effect on the value of the FTSE/CoreCommodity CRB Indices or the manner in which they are calculated.

### 5.7.1 Monthly rollover disruptions

A "Rollover Disruption Event" is defined as any day on which a commodity is scheduled to roll, on which either: a) the front month or back month contracts for the commodity settle at the daily maximum or minimum price as determined by the rules for the relevant exchange, or b) the exchange fails to publish an official settlement price for the commodity, or c) the exchange on which the commodity trades is not scheduled to be open. If a Rollover Disruption Event occurs for any commodity, that portion of the rollover

for that commodity only which was scheduled to occur on that day will be deferred until the next business day upon which no Rollover Disruption Event occurs for that commodity.

### 5.7.2 Monthly Rebalance Disruptions

At the close on the monthly rebalance date<sup>5</sup>, if any one or more of the commodities is disrupted due to the unavailability of official closing settlement prices or partial exchange holidays or any settlement of individual commodity futures contracts at a daily maximum or minimum price limit, then the rebalance will be halted for the disrupted commodity and all other undisrupted commodities will process the rebalance as per the normal schedule. This step will result in the total index weights being greater than or less than 100% after the close of 6th Business Day (which, if applied to a replication portfolio would be akin to having a portfolio that is either leveraged or under-invested, respectively).

Under this process, the percent return of the disrupted commodity “*k*” will be calculated in the usual daily manner as described in the methodology until the disruption ends:

$$PR_{k,t} = PR_{k,t-1} * \frac{CPS_{k,t}}{CPS_{k,t-1}} \quad (15)$$

where *CPS* is the price of the relevant futures contract.<sup>6</sup>

Please note that the approach above for the disrupted commodity is applied after the market close on the 6th business day to derive that commodity’s percent return on the 7th business day after a partial (i.e. disrupted) rebalance. This is repeated for each subsequent business day until the disruption has ended. (Note that as a consequence, the excess return index on 6th business day is not affected by the approach described above.)

For non-disrupted commodities, the usual rebalance procedure described in the methodology is followed. So, for example, on the 7th business day, the rebalanced commodity percent return for all non-disrupted commodities (“*i*”) will be:

$$PR_{i,7} = W_i \times ER_6 \times \frac{CPS_{i,7}}{CPS_{i,6}} \quad (16)$$

During a disruption, the excess return index is determined on and from the 7th business day until the disruption ends in accordance with equation 17:

$$ER_r = ER_{r-1} \times \left[ 1 + \left( \frac{\sum_{i=1}^n PR_{i,r} - \sum_{i=1}^n PR_{i,r-1}}{ER_{r-1}} \right) \right] \quad (17)$$

Where *r* is greater than or equal to 7 (i.e. denotes business days on and from the 7th business day). Note that when *r* – 1 refers to the 6<sup>th</sup> business day, the percent returns  $PR_{i,r-1}$  used for non-disrupted commodities are those determined by the rebalance after the market close.

The summation in equation 17 is over all *n* individual commodities belonging to the relevant Commodity Segment.

In equation 17, the percent returns for the disrupted commodity are calculated using equation 15 (i.e. are not rebalanced on the 6th business day). The percent returns for non-disrupted commodities are based on rebalanced percent returns (where the rebalance on the 6th business day is in accordance with equation 13).

#### Adjustment on the day when the disruption ends and undisrupted settlement values are available

On the resumption day the weight of the disrupted commodity will be adjusted using a ratio  $R_k$  to restore the total index weight to 100%:

<sup>5</sup> Rebalance Details are available in section 5.6.

<sup>6</sup> The definition of *CPS* is available in section 5.1, page 11.



$$R_k = \frac{\widehat{W}_{k,6}}{W_k} \quad (18)$$

where  $\widehat{W}_{k,6}$  is the non-rebalanced weight for the disrupted commodity "k" at the close of the 6th business day and  $W_k$  represents the constant monthly rebalancing weight<sup>3</sup> for the same commodity.

The additional adjustment ratio will be used to determine the target weight of the disrupted commodity on resumption and an ad-hoc rebalance to normalise the change impact.

The preliminary target weight  $PW_{k,d}$  for the disrupted commodity "k" on the resumption day  $d$  is

$$PW_{k,d} = \frac{\widehat{W}_{k,d}}{R_k} \quad (19)$$

And  $\widehat{W}_{k,d}$  represents the non-rebalanced disrupted commodity weight on the resumption day  $d$ .

To normalise the weights to 100% on the resumption day, an additional ad-hoc rebalance of commodities is applied to derive the final weights  $FW_{i,d}$

$$FW_{i,d} = \frac{DW_{i,d}}{\sum_{j=1}^n DW_{j,d}} \quad (20)$$

where for the non-disrupted commodities,  $DW_{i,d}$  is the weight on the resumption day i.e.  $DW_{i,d} = \widehat{W}_{i,d}$ . For the disrupted commodity "k",  $DW_{k,d}$  is the preliminary target weight derived in equation 6, i.e.  $DW_{k,d} = PW_{k,d}$ .

On the first business day  $d + 1$  after the resumption date  $d$ , following the ad-hoc rebalance, the percent return for each commodity "i" is calculated as:

$$PR_{i,d+1} = ER_d \times FW_{i,d} \times \frac{CPS_{i,d+1}}{CPS_{i,d}} \quad (21)$$

Please note if on the resumption day if another commodity will face market disruption, then the same process will repeat for the disruptive commodity/es. If in any scenario the rebalance disruption extends beyond the month-end and enters into the start of the next month roll period then the equations 18 to 21 will not be in effect, Section 5.7 above will apply, and FTSE Russell Policy for Benchmark Methodology Changes will be followed, which includes consultations with users when practicable on any proposed methodology change and an established review and approval process, in the event a change to the methodology is proposed.

The constant monthly rebalancing weights are available in section 4.3, page 8

## Section 6

# Publication

## 6. Publication

### 6.1 Index publication

The FTSE/CoreCommodity CRB Indices are published on LSEG Workspace with the following RICs:

FTSE/CoreCommodity CRB <sup>®</sup> Excess Return Index	.TRCCRB
FTSE/CoreCommodity CRB <sup>®</sup> Total Return Index	.TRCCRBTR
FTSE/CoreCommodity CRB <sup>®</sup> Total Return (Overnight Rate) Index	.TRCCRBTS
FTSE/CoreCommodity CRB <sup>®</sup> Total Return Euro Daily Hedge Index	.TRCCRBTH
FTSE/CoreCommodity CRB <sup>®</sup> Total Return Euro Daily Hedge (Overnight Rate) Index	.TRCCRBHS
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Excess Return Index	.TRCCTBER
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Total Return Index	.TRCCTBTR
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Total Return (Overnight Rate) Index	.TRCCTBTS
FTSE/CoreCommodity CRB <sup>®</sup> Non-Energy Excess Return Index	.TRCCRBNEER
FTSE/CoreCommodity CRB <sup>®</sup> Non-Energy Total Return Index	.TRCCRBNETR
FTSE/CoreCommodity CRB <sup>®</sup> Non-Energy Total Return (Overnight Rate) Index	.TRCCRBES
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Non-Energy Excess Return Index	.TRCCTXER
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Non-Energy Total Return Index	.TRCCTXTR
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Non-Energy Total Return (Overnight Rate) Index	.TRCCTXTS
FTSE/CoreCommodity CRB <sup>®</sup> Index Non-Agriculture and Livestock Excess Return Index	.TRCCRBNALER
FTSE/CoreCommodity CRB <sup>®</sup> Index Non-Agriculture and Livestock Total Return Index	.TRCCRBNALTR
FTSE/CoreCommodity CRB <sup>®</sup> Index Non-Agriculture and Livestock Total Return (Overnight Rate) Index	.TRCCRBAS
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Index Non-Agriculture and Livestock Excess Return Index	.TRCCAXER
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Index Non-Agriculture and Livestock Total Return Index	.TRCCAXTR
FTSE/CoreCommodity CRB <sup>®</sup> 3-Month Forward Index Non-Agriculture and Livestock Total Return (Overnight Rate) Index	.TRCCAXTS

### 6.2 Index dissemination

6.2.1 Each of the FTSE/CoreCommodity CRB Indices is published at the close of business day on which US futures market NYMEX is open for business.

### 6.3 Delayed publication

6.3.1 The Administrator, FTSE International Limited, may at its discretion delay publication of the FTSE/Core Commodity CRB Index in the event that technical difficulties are preventing receipt of input data or if FTSE International Limited has reason to believe that either the input data or the determination of the Benchmark includes a potential error. In such cases, all reasonable efforts will be made to publish the Benchmark at the earliest opportunity.

## Section 7

# Definition of key terms

Capitalised terms used in this document but not otherwise defined are defined in the following table.

Key Term	Definition
Administrator	A natural or legal person that has control over the provision of a benchmark (see Benchmark Regulation)
Authorised Benchmark Administrator	An Administrator that is authorised pursuant to Article 34 of the Benchmarks Regulation
Benchmarks Regulation	<a href="#">Regulation (EU) 2016/1011 of the European Parliament and of the Council of 8 June 2016 on indices used as benchmarks in financial instruments and financial contracts or to measure the performance of investment funds</a> (the European Benchmark Regulation) and <a href="#">The Benchmarks (Amendment and Transitional Provision) (EU Exit) Regulations 2019</a> (the UK Benchmark Regulation)
Business Day	Any business day on which US CME NYMEX are open for trade
Methodology	The written rules and procedures according to which information is collected and the Benchmark is determined
CC	CoreCommodity Indexes, LLC, CRB index partner.

## Appendix 1

# Climate related disclosures

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### Explanation of how ESG factors are reflected in the key elements of the benchmark methodology

Item 1. Name of the benchmark administrator.	FTSE International Limited
Item 2. Type of benchmark or family of benchmarks.	Other
Item 3. Name of the benchmark or family of benchmarks.	FTSE/CoreCommodity CRB Index Family
Item 4. Does the benchmark methodology for the benchmark or family of benchmarks take into account ESG factors?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Date on which information has been last updated and reason for the update:	April 2024 Methodology review date

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