



Commodity Index Methodology

The ICE BofAML Commodity Index eXtra Handbook

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ICE BofAML Commodity Index eXtra (MLCX)

The ICE BofAML Commodity Index eXtra is designed to provide a liquid, consistent, representative and cost-efficient benchmark for measuring commodity market performance. MLCX constituent selection and weighting takes account of the liquidity of the constituent futures contracts and the value of the global production of each underlying commodity. These criteria ensure that the Index reflects the relative significance of these commodities in the global economy.

MLCX family of commodity indices

MLCX is supported by a comprehensive family of sector, single commodity and modified indices. Total return, excess return and spot versions of the indices are compiled.

Index oversight and the Index Advisory Committee

ICE Data Indices, LLC (“IDI”) is the Administrator of the Index (“Index Administrator”). To assist in the operation of the Index, IDI has established an advisory committee (“Index Advisory Committee”) comprised of members of IDI that has primary responsibility for review and maintenance of the MLCX and its methodologies. Ultimately, governance of the MLCX falls under the oversight of the Index Governance Committee of IDI.

Index rules and methodologies

This Handbook describes the rules and methodology used to select MLCX constituents and compute the index values. However, it may be necessary, from time to time, for the Index Advisory Committee to make certain judgments with respect to the operation of the Index that are not provided for in this Handbook. In addition, upon the occurrence of extraordinary market events, the Index Advisory Committee may need to take various actions not specifically addressed in this Handbook.

Annual rebalancing

MLCX constituent futures contracts and the weights are set annually. This Handbook contains the rebalanced index constituents and weights effective as of January 1, 2019.

Chapter 1: The ICE BofAML Commodity index eXtra Overview

Section 1.1 Introduction

Initially introduced in 2006, The ICE BofAML Commodity Index eXtra is designed to provide a liquid, consistent, representative and cost-efficient benchmark for measuring commodity market performance. MLCX constituent selection and weighting takes account of the liquidity of the constituent futures contracts (the “MLCX Contracts”) and the value of the global production of each underlying commodity. These criteria ensure that the Index provides a highly liquid benchmark and reflects the relative significance of these commodities in the global economy.

The material and information presented in this Handbook (the “Handbook”) regarding the ICE BofAML Commodity index eXtraSM (the “MLCX” or the “Index”) sets forth the methodology for determining the composition and for calculating the value of the MLCX. The Handbook, the contents of the Handbook and the MLCX and its methodology are the exclusive property of IDI and its affiliates. ICE Data Indices, LLC is the Administrator of the Index.

The MLCX contains six market sectors: Energy, Base Metals, Precious Metals, Grains & Oil Seeds, Livestock and Soft Commodities & Others (each, a “Market Sector”). As a general rule, each Market Sector contains a minimum of two and a maximum of four MLCX Contracts. However, the MLCX was revised in 2014 to allow the Energy sector to expand to five commodities by including both WTI and Brent crude oil contracts (as opposed to only Brent in 2013). This change was adopted to reflect the development of two distinct oil markets: North America (WTI) and Rest of the World (Brent) crude production. The imposition of limits on the number of contracts per Market Sector allows market participants seeking to replicate the Index to reduce transaction costs without materially impacting the performance of the Index or the diversity of representation of commodities in the Index.

The selection and weighting of the MLCX Contracts is typically determined once a year, based on data as of June 30, and the annual rebalancing changes are applied beginning with the January 1 calculation. Each of the MLCX Contracts included in the Index is rolled into a later expiry over a fifteen day period in each month prior to the month in which a contract expires, in accordance with a prescribed schedule set forth in Section 3.2. The MLCX Total Return Index reflects the performance of a fully collateralized investment in commodity futures contracts, inclusive of interest earned on the collateral. Excess return, on the other hand, excludes the interest earned on the collateral and therefore represents the return attributed purely to price movement of the constituent MLCX Contracts. A spot index value is also calculated, which is a non-investable measure of commodity price changes that does not take into account the rolling of future contracts as in an investable portfolio. Therefore, the difference between excess return and spot return shows the return attributed to rolling constituent contracts to a new expiry

Table 1: MLCX Index Family

Index	Type	Reference Tickers		
		Total Return	Excess Return	Spot Return
ICE BofAML Commodity index eXtra	Broad Market Index	MLCXTR	MLCXER	MLCXSP
ICE BofAML Commodity index eXtra (AGriculture)	Sector 1	MLCXAGTR	MLCXAGER	MLCXAGSP
ICE BofAML Commodity index eXtra (GRains)	Sector 2	MLCXGRTR	MLCXGRER	MLCXGRSP
ICE BofAML Commodity index eXtra (LiveStock)	Sector 2	MLCXLSTR	MLCXLSE	MLCXLSSP
ICE BofAML Commodity index eXtra (Soft Commodities)	Sector 2	MLCXSTR	MLCXSCER	MLCXSCSP
ICE BofAML Commodity index eXtra (Coffee)	Single commodity	MLCXKCTR	MLCXKCER	MLCXKCSP
ICE BofAML Commodity index eXtra (Cotton)	Single commodity	MLCXCTTR	MLCXCTER	MLCXCTSP
ICE BofAML Commodity index eXtra (Sugar)	Single commodity	MLCXSBTR	MLCXSBER	MLCXSBSP
ICE BofAML Commodity index eXtra (ENERgy)	Sector 1	MLCXENTR	MLCXENER	MLCXENSP
ICE BofAML Commodity index eXtra (Gas Oil)	Single commodity	MLCXQSTR	MLCXQSER	MLCXQSSP
ICE BofAML Commodity index eXtra (Brent Crude oil)	Single commodity	MLXCOTR	MLXCOCER	MLXCOCSP
ICE BofAML Commodity index eXtra (Industrial Metals)	Sector 1	MLCXIMTR	MLCXIMER	MLCXIMSP
ICE BofAML Commodity index eXtra (Aluminum)	Single commodity	MLCXLATR	MLCXLAER	MLCXLASP
ICE BofAML Commodity index eXtra (Copper)	Single commodity	MLCXLPTR	MLCXLPER	MLCXLPSP
ICE BofAML Commodity index eXtra (Nickel)	Single commodity	MLCXLNTR	MLCXLNER	MLCXLNSP
ICE BofAML Commodity index eXtra (Zinc)	Single commodity	MLCXLXTR	MLCXLXER	MLCXLXSP
ICE BofAML Commodity index eXtra (Precious Metals)	Sector 1	MLCXPTR	MLCXPMER	MLCXPMSP
ICE BofAML Commodity index eXtra (Cocoa)	Single commodity	MLXCCTR	MLXCCE	MLXCCCSP
ICE BofAML Commodity index eXtra (Lead)	Single commodity	MLCXLLTR	MLCXLLER	MLCXLLSP
ICE BofAML Commodity index eXtra Biofuels Exchange Series	Chapter 4	MLCXBTR	MLCXBEXER	MLCXBXSP
ICE BofAML Commodity index eXtra Precious Metals Plus	Chapter 4	MLCXPMPT	MLCXPMPE	MLCXPMPS
ICE BofAML Commodity index eXtra 03 Index	Chapter 4	MLCX03TR	MLCX03ER	MLCX03SP
ICE BofAML Commodity index eXtra CLA Index	Chapter 4	na	MLCXCLAE	na

Section 1.2 MLCX Handbook

This Handbook describes the rules and methodology used to select MLCX constituents and compute the index values. However, it should be noted that neither this Handbook nor any set of procedures are capable of anticipating all possible circumstances and events that may occur with respect to the MLCX and the application of its rules and methodologies. Accordingly, this Handbook does not purport to be complete or to address all of the situations or issues that may arise in connection with the Index. It may be necessary, from time to time, for the Index Advisory Committee to make certain judgments with respect to the operation of the Index that are not provided for in this Handbook. In addition, upon the occurrence of extraordinary market events, the Index Advisory Committee may need to take various actions not specifically addressed in this Handbook. The Index Advisory Committee reserves the right to take any such actions that it believes are necessary or appropriate, in its sole discretion, in order to preserve or enhance the ability of the Index to achieve its objectives. Finally, IDI reserves the right to modify the principles underlying the Index, as set forth in this Handbook, from time to time, if it believes such modifications to be necessary or appropriate. In taking any of the foregoing actions, IDI will consider its effect on the Index and the interests of market participants generally. However, IDI has no obligation to take into account, at any time or in any manner, the interests of any particular market participant when taking any actions described in this Handbook or any other actions. Any modifications to this Handbook, and any changes made or actions taken in connection with the Index (including any changes made by IDI to the methodology for determining the composition or value of the MLCX) will be made available to market participants in the manner described in Section 1.5. Any general changes in Index rules and methodologies are also subject to review by the Index Governance Committee of IDI.

All questions of interpretation with respect to the application of the provisions in this Handbook, including any determinations that need to be made in the event of a market emergency or any other extraordinary circumstance, will be resolved or determined by the Index Advisory Committee, where appropriate.

For a complete list of the definitions used in this Handbook, please refer to Appendix E.

Section 1.3 Construction Philosophy

The MLCX is designed to provide a vehicle for investment in the commodity markets through a transparent benchmark. The general principles upon which the MLCX is constructed include:

1. **Liquidity** – The futures contracts included in the Index should be sufficiently liquid to accommodate the level of trading needed to support trading in the Index. The selection mechanism is therefore based primarily on liquidity.
2. **Weighting** – The weight of each futures contract in the Index should reflect the value of the global production of each commodity underlying the contract, as a measure of the significance of the commodity in the global economy, with appropriate adjustments to avoid “double counting”.
3. **Sectors** – Each Market Sector should be adequately represented in the Index in relation to its share of the global market, adjusted to avoid excessive exposure to any one Market Sector.

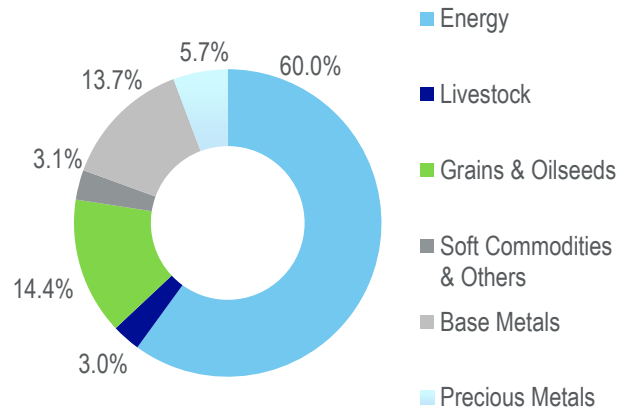
- Rolling** – constituent MLCX Contracts that are near their expiration are rolled to a later expiry over a fifteen day period to limit the market impact that such contract rolls could have.

While liquidity is the primary driver of the MLCX Contract selection methodology, various other criteria are also used to enhance diversification and representation. The MLCX is designed to reflect the significance of the underlying commodities in the global economy. However, in order to manage the risk of excessive concentrations the weight of any given Market Sector is limited to 60% of the overall Index, with a minimum allocation of 3% per Market Sector. Also, the MLCX differentiates between “intermediate” and “final” commodities (e.g., those that are used in the production of other commodities, versus those that are not), adjusting for double-counting to assign proportional weights to “upstream” commodities. For example, the MLCX avoids double-counting the input of grain in the agricultural side of the commodity markets by extracting the amount of corn and soymeal used for livestock feeding purposes.

Table 2: Weights of MLCX contracts

Contract	Code	Exchange	12/31/2018
Brent Crude Oil	B	ICE Futures Europe	27.673885%
Gasoil	G	ICE Futures Europe	11.985667%
Gasoline (RBOB)	N	ICE Futures Europe	11.416989%
Crude Oil (WTI)	T	ICE Futures Europe	6.334050%
Copper	LP	LME	6.150714%
Corn	C	CBOT	5.306953%
Gold	GC	COMEX	5.147142%
Wheat	W	CBOT	5.000518%
Aluminum	LA	LME	4.791007%
Soybean Meal	SM	CBOT	2.625881%
Natural Gas	NG	NYMEX	2.589409%
Sugar	SB	ICE Futures U.S.	2.098013%
Live Cattle	LC	CME	2.072763%
Zinc	LX	LME	1.745103%
Soybean	S	CBOT	1.500046%
Coffee	KC	ICE Futures U.S.	1.043214%
Nickel	LN	LME	1.005145%
Lean Hogs	LH	CME	0.927237%
Silver	SI	COMEX	0.586264%

Chart 1: MLCX Sector Weights



The weight of each MLCX Contract is based on the global production of the commodity underlying the contract, provided that the contract reflects global prices for the underlying commodity. However, in some cases MLCX Contracts only have pricing links to a limited number of markets around the world. For instance, the NYMEX natural gas contract primarily represents the US market and the surrounding North American markets in Canada and Mexico. In addition, some European gas markets, such as the UK, are developing an increasing link to US natural gas prices through the liquefied natural gas market. As a result, rather than using production of natural gas in the world or in the US to assign a weight to the natural gas contract, the natural gas production of the US, Canada, Mexico and the UK have been aggregated. Similarly, as US livestock prices can be affected by local issues such as disease and trade restrictions, the

livestock component of MLCX has been limited to production of cattle and hogs in the United States, instead of using global production weights. In addition, for the WTI contract only North American production (US, Canada, and Mexico) is considered, while for the Brent contract global production excluding North America is included.

Section 1.4 Contract Roll Methodology

Each of the futures contracts included in the Index is rolled into the next available (or later) contract month in advance of the month in which expiration of the contract occurs in accordance with the procedures outlined in Section 3.2. The rolling process takes place over a fifteen day period during each month prior to the relevant expiration month for each contract, which reduces the impact that the roll might have on the market. The rolling of contracts is effected on the same days for all contracts included in the Index, regardless of exchange holiday schedules, emergency closures or other events that could prevent trading in such contracts, although the Index Advisory Committee reserves the right to delay the rolling of a particular contract under extraordinary circumstances. If an MLCX Contract is rolled on a day on which the relevant contract is not available for trading, the roll will be affected on the basis of the most recent available settlement price. While these principles will be the primary basis for implementing any future modifications to the MLCX, the Index Advisory Committee may choose to only partially apply the principles as it deems necessary in order to address any unforeseen or exceptional circumstances.

Section 1.5 Index Advisory Committee

Index Advisory Committee is comprised of members from IDI. The Index Administrator can add additional members to the Index Advisory Committee as it deems appropriate. The Index Advisory Committee will discuss any necessary action required in connection with the MLCX, including but not limited to: (i) adjustments relating to the calculation or publication of the MLCX; (ii) determination of the occurrence or continuation of circumstances that have a material impact upon the operation, maintenance, management or performance of the MLCX; and (iii) modification of the MLCX methodology.

The Index Advisory Committee is scheduled to meet at least annually and on additional occasions as may be warranted in the judgment of the Index Advisory Committee or upon request by an Index Advisory Committee Member. The Index Advisory Committee may determine, among other things, the inclusion/exclusion of any of the contracts/exchanges in the Index, any changes to the composition of the MLCX or in the weights of the MLCX Contracts, and any changes to the calculation procedures applicable to the MLCX. Any general changes in Index rules and methodologies are also subject to review by the Index Governance Committee of IDI.

Any modifications to this Handbook, and any changes made or actions taken in connection with the Index (including any changes made by the Index Advisory Committee to the rules and methodologies for determining the composition or value of the MLCX) will be made available to market participants in a published report. Wherever practicable, any such changes or actions will be made available at least 30 days prior to the effective date, subject to a determination by the Index Advisory Committee that it is not feasible or appropriate to provide at least 30 days' notice.

Chapter 2: Construction

Section 2.1 Exchange Selection

As part of its annual review, the Index Advisory Committee determines the set of exchanges from which MLCX constituent futures contracts will be selected (the “Selected Exchanges”). The Index Advisory Committee reserves the right to modify the list of Selected Exchanges at any time during the year, including the addition or removal of an exchange from the list, as it deems such changes to be necessary or appropriate in its discretion. To be considered for inclusion in this list, an exchange must be located in a country that is a member of the Organization for Economic Co-operation and Development (OECD). In addition, the exchange must be one of the principal trading forums, based on relative liquidity, for US dollar-denominated futures contracts on major physical commodities. Of those exchanges that meet these two criteria, selections are made on the basis of liquidity, geographical location and commodity type. Currently, there are four Selected Exchanges: the New York Mercantile Exchange (NYMEX and COMEX Divisions), the Chicago Mercantile Exchange (CME) (CME and the Chicago Board of Trade (CBOT) Divisions), the London Metal Exchange (LME) and ICE Futures (ICE) (ICE Futures Europe and ICE Futures US Divisions).

Changes to the list of Selected Exchanges may be made for a variety of reasons. For example, provided it meets the two established criteria, the Index Advisory Committee may add an exchange to the list of Selected Exchanges in order to include new contracts that are not currently represented in the Index or to capture a more liquid contract on a commodity that is already represented in the MLCX. In general, changes to the list of Selected Exchanges will be made for purposes of enhancing the ability of the Index to achieve its objectives as a benchmark for commodity market performance and investment in commodities as an asset class.

Section 2.2 Contract Selection

2.2.1 Eligibility

An “**Eligible Contract**” is a futures contract representing a qualifying Market Sector that is traded on a Selected Exchange and that satisfies the requirements specified below for inclusion in the MLCX. An MLCX Contract is an Eligible Contract that is selected for inclusion in the MLCX. An Eligible Contract must satisfy all of the following requirements; provided, however, that the Index Advisory Committee may, in its discretion, determine that a contract that does not satisfy one or more of the requirements set forth below will nevertheless be included in the MLCX, if the inclusion of a contract is, in the judgment of the Index Advisory Committee, necessary or appropriate for the maintenance of the integrity of the Index and/or the realization of its objectives:

- It must be denominated in U.S. Dollars.
- It must be based on the price of a physical commodity in one of the Market Sectors represented in the index and provide for cash settlement or physical delivery at a specified time, or during a specified period, in the future.
- Detailed trading volume data regarding the contract must be available for at least two years prior to the initial inclusion of the contract in the MLCX.

- The contract must have a Total Trading Volume (as defined in Section 2.2.2) of at least 500,000 contracts for each annual period, as discussed below.
- Reference Prices must be publicly available on a daily basis either directly from the Selected Exchange or through an external data vendor, provided the Reference Prices are available from the data vendor on every day on which the relevant exchange is open for business. For purposes of calculating the MLCX, “**Reference Prices**” means the official settlement or similar prices posted by the relevant Selected Exchange or its clearing house with respect to a contract and against which positions in such contract are margined or settled.

A list of all futures contracts traded on the Selected Exchanges, with an indication of those that are Eligible Contracts, is assembled as part of the annual review. This list is used by the Index Advisory Committee in the determination of the MLCX Contracts to be included in the Index.

2.2.2 Contract Liquidity Requirements and MLCX Contract Selection

The principal criterion for the selection of Eligible Contracts is “Liquidity”, measured in terms of a contract’s notional value of traded contracts. The notional value of traded contracts is derived from the Total Trading Volume during the most recent twelve month period from July 1 through June 30, and the value of that trading volume, based on the Average Reference Price of the contract as explained in more detail below.

Eligible contracts are ranked on the basis of their Liquidity measure. A preliminary set of contracts are selected for the index in ranked order, subject to the minimum and maximum requirements for each Market Sector. The preliminary contract list is then reviewed and any non-Intercontinental Exchange (“ICE”) contracts are replaced with the comparable ICE contract provided the ICE contract: (i) has the same closing settlement price and substantially similar characteristics as the contract it is replacing, and (ii) in the opinion of the committee, where a proposed replacement contract may not meet the established quantitative criteria, it has sufficient trading volume for inclusion. Finally, certain contracts on the preliminary list may be excluded by the Index Advisory Committee in order to preserve the integrity and advance the objectives of the Index. For example, and without limitation, if the Index Advisory Committee determines that an Eligible Contract that would otherwise be included in the MLCX is not sufficiently tradable, either because of unusual terms or market conditions, the Index Advisory Committee may decide to exclude that contract. Or contracts may be excluded to avoid double counting or overrepresentation. The most recent preliminary list of contracts, with an indication of those that are currently included in MLCX, appears in Appendix B.

The **Total Trading Volume (TTV)** is equal to the sum of the daily trading volumes in all expiration months of the contract on each day during the most recent twelve-month period beginning on July 1 and ending on June 30. As noted, the TTV of an Eligible Contract must be at least 500,000.

The **Average Reference Price (ARP)** is the average of the Reference Price of the Front Month Contract for an MLCX Contract on each Trading Day during the twelve month period beginning on July 1 and ending on June 30 of each year.

The “**Front Month Contract (FMC)**” on any given day is the first available contract expiration month after the date on which the determination is made

“**Trading Day**” means any day on which the relevant Selected Exchange is open for trading.

Liquidity (LIQ), for purposes of determining the order by which Eligible Contracts are selected for inclusion in the index, is equal to the Total Trading Volume multiplied by the Contract Size with respect to each contract, and multiplied by the Average Reference Price for each contract. The “Contract Size” (CS) with respect to a contract is the number of standard physical units of the underlying commodity represented by one contract. For example, the Contract Size of a crude oil futures contract is 1,000 barrels.

For each contract:

$$LIQ = TTV \times CS \times ARP$$

Once the LIQ is determined, each of the Eligible Contracts is then listed in order of LIQ, from highest to lowest. In the Eligible Contract preliminary selection process, all six core MLCX Market Sectors must be represented by a minimum of two and a maximum of four (five for Energy) Eligible Contracts. The contract with the highest LIQ is selected for inclusion in the index and the selection process continues, in order, until every Market Sector has at least two and no more than four (five for Energy) constituent contracts. Based on this selection process, MLCX can have a minimum of 12 and a maximum of 25 MLCX Contracts.

The determination of Eligible Contracts and selection of MLCX Contracts included in the Index occurs once a year. The results for the following calendar year are announced in December and take effect on the first business day of the next year.

Section 2.3 MLCX Contract Weighting

The weight of each MLCX Contract in the Index is determined on the basis of the Global Production Value (as defined in Section 2.3.1) of each MLCX Commodity, which is a measure that is designed to provide a non-biased reflection of the relative economic importance of each MLCX Contract in the global economy. An “**MLCX Commodity**” is any commodity or group of commodities that essentially function as a single commodity based on their production, consumption or delivery characteristics, the nature of their trading markets or other features that make them substitutes for each other for various purposes, as determined by the Index Advisory Committee in its sole discretion.

2.3.1 Global Production Value

The **Global Production Value** (GPV_{c,y}) of each MLCX Commodity during each year will be calculated in U.S. Dollars based on the Average Global Production Quantity (as defined below) of the relevant MLCX Commodity multiplied by the number of units in which those quantities are quoted (see Appendix C) times the Average Reference Price of the applicable MLCX Contract over the preceding one-year period from July 1 to June 30, where “c” is the MLCX Commodity and “y” is the active year.

For each year y, for each MLCX Commodity underlying the MLCX Contract c:

$$GPV = AGPQ \times ARP$$

The **Average Global Production Quantity (AGPQ)** is the annual average of the three most recent available years of global production quantity (GPQ) with respect to all MLCX Commodities

underlying the MLCX Contracts, expressed in the same units as the specifications of the MLCX Contract. In order to calculate the AGPQ using homogeneous average global production quantities over the same time period, the most recent three year period for which data is available for all MLCX Commodities is identified. For instance, in calculating the weights for the 2008 calendar year, an MLCX Commodity might not have available data beyond 2005 while all others have data through 2006. As a result, the AGPQ for the MLCX Commodities for 2008 will be based on the average of 2003 through 2005 production data.

For each MLCX Commodity underlying the MLCX Contract:

$$AGPQ_y = \frac{(GPQ_{y-3} + GPQ_{y-4} + GPQ_{y-5})}{3}$$

The sources used by the Index Advisory Committee in calculating the GPQ of each MLCX Commodity are identified in Appendix C. The GPV calculated for each MLCX Commodity is based on sources that the Index Advisory Committee believes to be reliable, but the Index Advisory Committee makes no warranty regarding the reliability or accuracy of such data, and reserves the right to change any or all of the sources at any time.

The AGPQs are generally based on worldwide production data for each MLCX Commodity. However, in some cases the pricing of an MLCX Commodity might be based solely on a limited number of regional markets and determinations in such cases might be made on the basis of regional or national production as specified in Appendix C contract parameters.

2.3.2 Production Quantity Adjustments

Certain commodities are derived from other commodities in various forms. For example, gasoline and heating oil are produced from crude oil, and, because livestock feed on corn and other grains, they are to an extent derived from agricultural commodities. As a result, if all of these commodities are represented in the MLCX, and their weights are based on the production levels of each MLCX Commodity without adjustment, the Index will reflect a “double counting” of certain commodities. In order to avoid this result, the GPQs of MLCX Commodities that are derived from other MLCX Commodities represented in the Index are subtracted from the GPQs of the MLCX Commodities from which they are derived.

This section has a new parameter, $cons(c)$, which is defined as the set of MLCX Commodities that are inputs into the production process of one or more other MLCX Commodities c , and therefore, in the judgment of the Index Advisory Committee, should be adjusted to avoid double-counting. Appendix D identifies the commodity production chains involving MLCX Commodities produced through the use of other MLCX Commodities and the manner in which the production quantity of each MLCX Commodity should be reduced to take the derivative MLCX Commodity into account. These measures are necessarily approximations determined in good faith by the Index Advisory Committee, but will be used consistently for the purposes of calculating the MLCX, unless and until the Index Advisory Committee, in its discretion, determines that a change to such measures is necessary or appropriate.

A **Conversion Measure ($CM_{c:n}$)** is the conversion factor used to convert the units in which a derived MLCX Commodity is expressed into the units of the MLCX Commodity from which it is derived. The Conversion Measures used in calculating the GPQ adjustments are set forth in Appendix D.

The **Adjusted Average Global Production Quantity (AAGPQ)** is the global quantity of an MLCX Commodity that is used for purposes of calculating the weight of each MLCX Contract in the Index, after adjustment for quantities attributable to inputs into derivatives of the MLCX Commodity that are also included in the Index, in accordance with Appendix D.

For each year y :

$$AAGPQ_c = AGPQ_c - \sum_{n \in \text{cons}(c)} AGPQ_n \times CM_{cn}$$

The Adjusted Average Global Production Value (AAGPV) is the Adjusted Average Global Production Quantity multiplied by the Average Reference Price.

For each MLCX Commodity c :

$$AAGPV_c = AAGPQ_c \times ARP_c$$

The **Percentage Dollar Weight (PDW)** of an MLCX Commodity c is therefore:

$$PDW_c = \frac{AAGPQ_c \times ARP_c}{\sum_j AAGPQ_j \times ARP_j}$$

and the PDW of a Market Sector i is

$$PDW_S = \frac{\sum_{i \in S} AAGPQ_i \times ARP_i}{\sum_j AAGPQ_j \times ARP_j}$$

2.3.3 Market Sectors and Total Dollar Weight Adjustments

Application of Market Sector limits

There is a 60% maximum and a 3% minimum PDW for each Market Sector represented in the Index. In the event one or more of the unadjusted Market Sector PDWs f_i^{unadj} for each Market Sector i fall outside that range, the PDWs are adjusted. This adjustment is effected such that the adjusted Market Sector PDWs f_i^{adj} satisfy the following conditions:

$$i) \quad 3\% \leq f_i^{adj} \leq 60\%$$

$$\sum_i f_i^{adj} = 1$$

$$ii) \quad f_i^{adj} = 60\% \Rightarrow \frac{f_i^{adj}}{f_j^{adj}} \leq \frac{f_i^{unadj}}{f_j^{unadj}}$$

$$f_i^{adj} = 3\%, f_j^{adj} > 3\% \Rightarrow \frac{f_i^{adj}}{f_j^{adj}} \geq \frac{f_i^{unadj}}{f_j^{unadj}}$$

$$3\% < f_i^{adj} \leq f_j^{adj} < 60\% \Rightarrow \frac{f_i^{adj}}{f_j^{adj}} = \frac{f_i^{unadj}}{f_j^{unadj}}$$

Procedures for calculating the adjustments to the Total Dollar Weight in each Market sector are set forth in the following case examples.

Case 1: No Market Sector over 60%, n Market Sectors below 3%

1) Let h^0 denote the sum of the initial weights between 3% and 60%, and let $h^1 = 1 - n \cdot 3\%$.

2) If $f_i^{unadj} < 3\%$ set $f_i^{adj} = 3\%$, else set $f_i^{adj} = \frac{h_1}{h_0} \times f_i^{unadj}$.

Note that all new weights other than the ones set to 3% are reduced. Hence some of the reduced weights may fall below 3%. If this is the case, then all such weights are set to 3% and all other weights are reduced (other than the ones which have been set to 3% previously) proportionally so that the sum of all weights equals one. If necessary, this procedure is repeated until all weights are greater than or equal to 3%.

Case 2: One Market Sector over 60%, no Market Sectors below 3%

Suppose that $f_j^{unadj} > 60\%$.

1) Let h^0 denote the sum of the initial weights between 3% and 60%, and let $h^1 = 40\%$.

2) Set $f_i^{adj} = 60\%$

3) Set $f_i^{adj} = \frac{h_1}{h_0} \times f_i^{unadj}, i \neq j$.

Note that all new weights other than f_i^{adj} are increased, hence all new weights will satisfy the constraints.

Case 3: One Market Sector over 60%, n Market Sectors below 3%

Suppose that $f_j^{unadj} > 60\%$ and let R be the net increase/decrease of the new weights, i.e.

$$R = f_j^{unadj} - 60\% - (3\%n - S),$$

where S is the sum of all weights less than 3%. We now distinguish between two different cases.

$R > 0$:

- 1) Set $f_j^{adj} = 60\%$ and increase all other weights proportionally so that the sum of all new weights equals one
- 2) If some weights are still below 3%, then they are set to be equal to 3%, and while maintaining $f_j^{adj} = 60\%$, rescale all other weights proportionally so that the sum of all new weights equals one
- 3) Repeat 2) if necessary without reducing weights that were previously set to 3%

$R < 0$:

- 1) All weights that are less than 3% are set to be equal to 3%, and all other weights are reduced proportionally so that the sum of all new weights equals one
- 2) We have now four different sub cases:
 - i) If all new weights satisfy the constraints then no further adjustments are needed
 - ii) If $f_j^{adj} \leq 60\%$ and at least one weight is below 3%, then continue the adjustment process at Case 1
 - iii) If $f_j^{adj} > 60\%$ and no weights are below 3% then continue the adjustment process at Case 2
 - iv) If $f_j^{adj} > 60\%$ and at least one weight is below 3%, then continue the adjustment process at Case 3 but leave the weights set to 3% in 1) out of the analysis

Calculation of contract weights after applying sector limits

The **Contract Production Value (CPV)** is the modified commodity production value for each MLCX Commodity, after applying the requirements and limits for aggregate Market Sector weights.

$$CPV_i = AAGPV_i \times \left(\frac{f_S^{adj}}{f_S^{unadj}} \right),$$

where S is the Market Sector containing MLCX Commodity i.

Each MLCX Contract is assigned a **Contract Production Weight (CPW)**, which constitutes the weight of the relevant MLCX Contract in the Index. The Contract Production Weight is equal to the Contract Production Value divided by the Last available Contract Price for a particular MLCX Contract applied in an Index Period. The “**Last available Contract Price (LCP)**” is the most recent available Reference Price for each MLCX Contract on the last day of the Index Period that the MLCX is rolling out of. See Appendix C for a list of the sources of production data and the conversions used in making this determination.

For each year y, for each MLCX Commodity c:

$$CPW = \frac{CPV}{LCP} = \frac{AAGPV_i \times \left(\frac{f_j^1}{f_j^0} \right)}{LCP}$$

Chapter 3: Index Calculation

The MLCX is calculated on the basis of the respective weights of the MLCX Contracts and the applicable Reference Prices, and in accordance with the formulas set forth in this section. However, because futures contracts, by their terms, have stated expirations (typically on a monthly basis), an index of futures contracts can only be calculated by reference to contracts with specific expirations. Moreover, as the contract that is used to calculate the value of the index at a particular time approaches expiration, it is necessary to transfer, or “roll” the exposure from that contract into the next (or another) available contract expiration. Accordingly, this section addresses not only the methodology for calculating the MLCX but also the process of “rolling” contracts from one expiry to another

Section 3.1 Preliminary Definitions

A **Market Sector** S is any category of the MLCX Contracts in the Index that constitutes either the full Index or the components of the Index included in any of the identified Market Sectors.

A **Business Day** is any New York Mercantile Exchange Trading Day, with the Trading Day being defined for this purpose in accordance with New York Mercantile Exchange rules (which may define a “trading day” as beginning with the opening of electronic trading during the preceding evening).

An **Index Period** P is a period of time during which there are no changes in the list of MLCX Contracts or in the CPWs assigned to the MLCX Contracts. The purpose of the Index Period is to identify each time period within which a particular Index composition and set of CPWs remains in effect. Typically, an Index Period is a calendar year. However, if the composition of the Index, or the CPWs, change during a given year, such as due to extraordinary market events or other special circumstances, the calendar year in which such changes occur will include two or more Index Periods.

For any given day t , or any given month m , $p(t)$ and $p(m)$ are the Index Period, into which day t or month m , respectively, fall. Therefore, whenever there is a change in the composition of the Index or in any CPW, a new Index Period begins. If t^* is the last Business Day of the present Period p , then the following Period is denoted by $p(t^*) + 1$. Once the new Period has begun, it is denoted by $p(t)$, and the previous period is then referred to as $p(t) - 1$.

The **Calendar Month** in which t falls is denoted by $m = m(t)$, and the subsequent Calendar Month is denoted by $m(t) + 1$.

The **Underlying Contract Table** in Table 3 in Section 3.2 lists which MLCX Contract expirations are to be included in the Index. For each MLCX Contract c and a given Business Day t , the Underlying Contract Table gives the Month Code of the MLCX Contract expiration that will be included in the Index at the beginning of the Calendar Month, and that will need to be rolled out of, during that Calendar Month, $m(t)$, if the particular MLCX Contract rolls in such month (see Section 3.2 for more information).

Market Disruption Event means the occurrence on any Business Day of any one or more of the following circumstances:

- A Selected Exchange is not open for trading due to an exchange holiday.
- A material limitation, suspension, or disruption of trading in one or more MLCX Contracts which results in a failure by the exchange on which each applicable MLCX Contract is traded to report an exchange published settlement price for such contract on the day on which such event occurs or any succeeding day on which it continues.
- The exchange published settlement price for any MLCX Contract included a "limit price", which means that the exchange published settlement price for such contract for a day has increased or decreased from the previous day's exchange published settlement price by the maximum amount permitted under applicable exchange rules.
- Failure by the applicable exchange or other price source to announce or publish the exchange published settlement price for any MLCX Contract.
- A suspension of trading in one or more MLCX Contracts for which trading does not resume at least ten (10) minutes prior to the scheduled or rescheduled closing time.

Section 3.2 Contract Roll Methodology

The expiration months of all MLCX Contracts included in the Index, and the months in which each such contract is rolled into the next available expiration, are set forth in Table 3. This list is reviewed annually by the Index Advisory Committee and amended as needed

Table 3: Rolling schedule of MLCX contracts

Contract	Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aluminum	LA	H	J	K	M	N	Q	U	V	X	Z	F+	G+
Brent Crude	B	H	J	K	M	N	Q	U	V	X	Z	F+	G+
Cocoa	CC	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Coffee	KC	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Copper	LP	H	J	K	M	N	Q	U	V	X	Z	F+	G+
Corn	C	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Cotton	CT	H	K	K	N	N	Z	Z	Z	Z	Z	H+	H+
Crude Oil (WTI)	T	H	J	K	M	N	Q	U	V	X	Z	F+	G+
Gasoil	G	H	J	K	M	N	Q	U	V	X	Z	F+	G+
Gasoline (RBOB)	N	H	J	K	M	N	Q	U	V	X	Z	F+	G+
Gold	GC	J	J	M	M	Q	Q	Z	Z	Z	Z	G+	G+
Lean Hogs	LH	J	J	M	M	N	Q	V	V	Z	Z	G+	G+
Live Cattle	LC	J	J	M	M	Q	Q	V	V	Z	Z	G+	G+
Natural Gas	NG	H	J	K	M	N	Q	U	V	X	Z	F+	G+
Nickel	LN	H	J	K	M	N	Q	U	V	X	Z	F+	G+
Silver	SI	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Soybean	S	H	K	K	N	N	X	X	X	X	F+	F+	H+
Soybean Meal	SM	H	K	K	N	N	Z	Z	Z	Z	Z	F+	H+
Sugar	SB	H	K	K	N	N	V	V	V	H+	H+	H+	H+
Wheat	W	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Zinc	LX	H	J	K	M	N	Q	U	V	X	Z	F+	G+

The **Roll Period** is the first 15 Business Days of the month. A **Roll Day** means (a) a day within the Roll Period or (b) a day beyond the 15th Business Day in which rolling will occur due to a Market Disruption Event which caused a delay in the roll. A **Non-Roll Day**, consequently, is any Business Day that is not a Roll-Day.

In the event that a Selected Exchange is not open for trading on a Roll Day, the Reference Price used for purposes of calculating the MLCX, and effecting the relevant portion of the roll, will be the most recent available Reference Price for the relevant MLCX Contract. If no Reference Price is published as a result of a Market Disruption Event or other unscheduled closure of the relevant Selected Exchange, and the Index Advisory Committee determines that the use of the most recent available Reference Price would have a material adverse effect on the Index, the rolling of the MLCX Contracts or market participants using the Index, the Index Advisory Committee retains the discretion (but is not obligated) to delay the rolling of the relevant portion of the MLCX attributable to that MLCX Contract or to use a different Reference Price in order to effect that portion of the roll. It is anticipated, however, that the Index Advisory Committee will exercise this discretion only under extraordinary circumstances.

The Roll-Out and Roll-In Contracts are determined by the Underlying Contract Table and the rolling of MLCX Contracts during a Roll Period is effected through the use of Roll Weights. (Note that not all contracts roll in every Roll Period.) On each Business Day during a Roll Period, the CPW of each Eligible Contract is divided between the contract expiration it is being rolled out of (the “**Roll-Out Contract**”) and the contract expiration it is being rolled into (the “**Roll-In Contract**”). The weight allocated to the Roll-Out Contract for commodity c on day t of the Roll Period is referred to as the **Roll Weight** (W_t^c) (and the weight allocated to the Roll-In Contract will therefore be equal to 1 minus the Roll Weight).

On the first day of the Roll Period, 14/15 of the Contract Production Weight of each Eligible Contract is allocated to the Roll-Out Contract and 1/15 of the Contract Production Weight is allocated to the Roll-In Contract. These proportions are changed by 1/15 on each day of the Roll Period until, at the end of the Period, 100% of the exposure of the Index to the Eligible Contract is in the Roll-In Contract.

If a roll occurs at the start of an Index Period, and the Index is therefore rolling into new Contract Production Weights, then on the first day of the Roll Period, 14/15 of the old Index basket of each Eligible Contract is allocated to the **Roll-Out Contract** (ROC) and 1/15 of the new Index basket is allocated to the **Roll-In Contract** (RIC). These proportions are changed by 1/15 on each day of the Roll Period. Table 4 below illustrates the Roll Weights during a roll period containing no market disruption events.

Table 4: Roll weights with no market disruption event

Roll day	Market Disruption Event	ROC	RIC
-1	None	15/15	0
1	None	14/15	1/15
2	None	13/15	2/15
3	None	12/15	3/15
4	None	11/15	4/15
5	None	10/15	5/15
6	None	9/15	6/15
7	None	8/15	7/15
8	None	7/15	8/15
9	None	6/15	9/15
10	None	5/15	10/15
11	None	4/15	11/15
12	None	3/15	12/15
13	None	2/15	13/15
14	None	1/15	14/15
15	None	0	15/15

If a Market Disruption Event occurs on a Roll Day, then each contract in the affected commodity will have its rolling postponed, while contracts in the unaffected commodities will roll as previously defined. The postponed portion will roll on the first Business Day not affected by Market Disrupted Events. In the event of a Market Disruption Event index calculations are adjusted to reflect the postponed roll. Table 5 below illustrates the Roll Weights during a roll period containing one market disruption event

Table 5: Roll weights with market disruption event

Roll day	Market Disruption Event	ROC	RIC
-1	None	15/15	0
1	None	14/15	1/15
2	None	13/15	2/15
3	None	12/15	3/15
4	Settle Limit Price	12/15	3/15
5	None	10/15	5/15
6	None	9/15	6/15
7	None	8/15	7/15
8	None	7/15	8/15
9	None	6/15	9/15
10	None	5/15	10/15
11	None	4/15	11/15
12	None	3/15	12/15
13	None	2/15	13/15
14	None	1/15	14/15
15	None	0	15/15

In the event that the Roll Period ends without the Roll Weight being fully redistributed into the Roll-In Contract, then the Roll Period is extended until there is no Market Disruption Event. If the Roll Period is extended 5 days, then the Index Advisory Committee retains the discretion (but is not obligated) to delay the rolling of the relevant portion of the MLCX attributable to that MLCX Contract or to use a different Reference Price in order to effect that portion of the roll. It is anticipated, however, that the Index Advisory Committee will exercise this discretion only under extraordinary circumstances.

In Calendar Month m , the price in dollars and Roll Weight on day t of the Roll-Out Contract for commodity c is denoted by $F_{m(t),t}^c$ and W_t^c , respectively. Similarly, the price of the Roll-In Contract is denoted by $F_{m(t)+1,t}^c$, which is the settlement price of the futures contract on commodity c in the Calendar Month $m(t)+1$ on the Business Day t .

Section 3.3 Total Dollar Weight Normalizing Constants and the Spot Index

On a Non-Roll Day, the Total Dollar Weight (TDW) for a Market Sector S , TDW_t^S , is the sum of the Dollar Weights for all MLCX Contracts included in S . On such day, the Dollar Weight (DW) of an MLCX Contract is the product of its Contract Production Weight and the underlying futures price.

On a Non-Roll Day the Total Dollar Weight is calculated as:

$$TDW_t^S = \sum_{c \in S} CPW_{p(t)}^c \times F_{m(t)+1,t}^c.$$

On a Non-Roll Day, the Spot Index (SP) of Market Sector S is defined by:

$$SP_t^S = \frac{TDW_t^S}{NC_{p(t)}^S},$$

where $NC_{p(t)}^S$ is the Normalizing Constant for period $p(t)$ for Market Sector S . Spot Index values are rounded to 2 decimal places.

The purpose of the Normalizing Constant is to assure continuity of the Spot Index whenever there is a change in the CPWs, and it is recalculated for each new period as:

$$NC_{p(t^*)+1}^S = NC_{p(t^*)}^S \times \frac{\sum_{c \in S} CPW_{p(t^*)+1}^c \times F_{m(t^*)+1,t^*}^c}{\sum_{c \in S} CPW_{p(t^*)}^c \times F_{m(t^*)+1,t^*}^c},$$

where t^* is the last Business Day of Period p and $CPW_{p(t^*)+1}^c$ are the new CPWs for the following period. Initially, the Normalizing Constant is set so that the Spot Index for the Market Sector S starts at 100:

$$NC_1^S = \frac{TDW_{m(t_0),t_0}^S}{100}.$$

On a Roll Day t , the Total Dollar Weight for a Market Sector S is calculated as:

$$TDW_t^S = TDW_{m(t),t}^S + TDW_{m(t)+1,t}^S,$$

where

$$TDW_{m(t),t}^S = \sum_{c \in S} W_t^c \times CPW_{p(m(t)-1)}^c \times F_{m(t),t}^c.$$

and

$$TDW_{m(t)+1,t}^S = \sum_{c \in S} (1 - W_t^c) \times CPW_{p(m(t))}^c \times F_{m(t)+1,t}^c.$$

If there are changes in the composition of the Index, i.e. changes in any of the CPWs, then the calculation of the Total Dollar Weight requires additional components to account for the change in the Normalizing Constant and the shift from the old to the new CPWs. These changes are implemented as follows:

$$TDW_t^S = \frac{NC_{p(t)}^S}{NC_{p(t)-1}^S} \times TDW_{m(t),t}^S + TDW_{m(t)+1,t}^S$$

On a Roll Day or any Business Day t where there have been changes in the composition of the Index, the Spot Index of Market Sector S is again calculated as

$$SP_t^S = \frac{TDW_t^S}{NC_{p(t)}^S}$$

1.1. Section 3.4 Excess and Total Return Indices

If Business Day t is a Non-Roll Day, then define the Daily Commodity Return of a Market Sector S by

$$DCR_t^S = \frac{TDW_t^S}{TDW_{t-1}^S} - 1.$$

The Daily Commodity Return of a Market Sector S represents the return of a portfolio of commodity futures contracts from $t-1$ to t .

On a Roll-Day t , the Daily Commodity Return is calculated by:

$$DCR_t^S = \frac{TDWP_{m(t),t}^S + TDWP_{m(t)+1,t}^S}{TDW_{m(t),t-1}^S + TDW_{m(t)+1,t-1}^S} - 1,$$

where

$$TDWP_{m(t),t}^S = \sum_{c \in S} W_{t-1}^c \times CPW_{p(m(t)-1)}^c \times F_{m(t),t}^c$$

$$TDWP_{m(t)+1,t}^S = \sum_{c \in S} (1 - W_{t-1}^c) \times CPW_{p(m(t))}^c \times F_{m(t)+1,t}^c$$

and

$$TDW_{m(t),t-1}^S = \sum_{c \in S} W_{t-1}^c \times CPW_{p(m(t)-1)}^c \times F_{m(t),t-1}^c$$

$$TDW_{m(t)+1,t-1}^S = \sum_{c \in S} (1 - W_{t-1}^c) \times CPW_{p(m(t))}^c \times F_{m(t)+1,t-1}^c.$$

Note that the only difference between $TDWP_{m(t),t}^S$ and $TDW_{m(t),t}^S$ is that in $TDWP_{m(t),t}^S$, the weights of individual commodities are from previous day W_{t-1}^c and not W_t^c as in the latter. In the special case when there are changes to any of the CPWs it is given by:

$$DCR_t^S = \frac{\frac{NC_{p(t)}^S}{NC_{p(t)-1}^S} \times TDWP_{m(t),t}^S + TDWP_{m(t)+1,t}^S}{\frac{NC_{p(t)}^S}{NC_{p(t)-1}^S} \times TDW_{m(t),t-1}^S + TDW_{m(t)+1,t-1}^S} - 1.$$

If t is the first Business Day of the month, we define $W_{t-1}^c = 1$ for all c and the TDWs are calculated as described in Section 3.3 above.

The Excess Return Index of Market Sector S is defined as:

$$ER_t^S = ER_{t-1}^S (1 + DCR_t^S)$$

where $ER_{t_0}^S = 100$. Excess Return Index values are rounded to 2 decimal places.

The Treasury Bill Rate (TBR(t)) is the 91-day auction high rate for U.S. Treasury Bills as reported by the Department of the Treasury on the most recent of the weekly auction dates prior to the calendar day t .

The Interest Rate Return (IRR(t)) is the daily return on calendar day t of the “Treasury Bill Rate” using a 360 day per year convention and a period of 91 days. The IRR is calculated as:

$$IRR_t = \left[\frac{1}{1 - \frac{91}{360} TBR_t} \right]^{91} - 1.$$

The Total Return Index of Market Sector S is defined as:

$$TR_t^S = TR_{t-1}^S (1 + DCR_t^S + IRR_t) \prod_{t-1 < \tau < t} (1 + IRR_\tau)$$

where $TR_{t_0}^S = 100$. The Total Return Index reflects the Excess Return Index plus the Interest Rate Return. Total Return Index values are rounded to 2 decimal places.

Chapter 4: Special Index Rules

ICE BofAML Commodity Index extra Biofuels Exchange Series

General Description

The ICE BofAML Commodity index eXtra Biofuels Exchange Series (MLCXBX) is a modified version of the ICE BofAML index eXtra (MLCX). The modifications consist of different set of underlying commodities (some of which are MLCX components and some of which are not) and different Percentage Target Weights from the MLCX at the beginning of each year (Table 6). MLCXBX rebalances back to its percentage target weights for the coming year during the first fifteen Business Days of the year. MLCXBX is calculated using the same methodologies as MLCX modified as described below. Both excess return (MLCXBXER) and total return (MLCXBXTR) versions of the index are produced.

Definitions

The MLCX Biofuels Exchange Series Contracts are the futures contracts included in the Index.

The Percentage Target Weights are the weights of the relevant MLCX Biofuels Exchange Series Contracts in the Index, for purposes of Index calculation. They are given in Table 6 below. The Percentage Target Weights are chosen such that the non-US exchange traded contracts in total account for at most 10%. See Table 9 for a list of the sources of production data used for determining weights.

The Contract Production Weights (CPWs) are the weights of the relevant MLCXBX Contracts in the Index, for purposes of Index calculation.

The Exchange rates are the currency prices used to convert an MLCX Biofuels Exchange Series Contract price from its original currency to US dollars which is the currency in which the index is quoted as described below.

As described in the handbook, MLCXBX index rolls in the first fifteen Business Days of the month.

Weights

Note: Barley was one of the MLCX Biofuels Exchange Series Contracts prior to May 2010. Due to lack of sufficient liquidity for Barley contracts in the markets, it was removed from the Index and ceased to be in the Index after the May 2010 roll period.

The list of MLCX Biofuels Exchange Series Contracts and their respective Percentage Target Weights for 2019 are given in Table 6 below:

Table 6: MLCX Biofuels Exchange Series weights

Contract	Code	Exchange	Percentage Target Weights
Soybean	S	CBOT	37.058223%
Corn	C	CBOT	21.681493%
Sugar #11	SB	ICE Futures U.S.	19.554431%
Soybean Oil	BO	CBOT	11.717636%
Rapeseed	ECO	Euronext	7.439574%
Canola	RS	ICE Futures U.S.	2.548643%

Exchange Rates

For Canola and Rapeseed contracts, the Reference Price used for the purpose of index calculation will be as described by the MLCX Handbook converted to USD at the WM/Reuters London close mid exchange rates for CAD and EUR, respectively.

Roll Schedule

Table 7: Underlying Contract Table (contracts held in the beginning of each month for the Index)

Contract	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Canola	H	K	K	N	N	X	X	X	X	F+	F+	H+
Corn	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Rapeseed	G	K	K	Q	Q	Q	X	X	X	X	G+	G+
Soybean	H	K	K	N	N	X	X	X	X	F+	F+	F+
Soybean Oil	H	K	K	N	N	Q	U	Z	Z	Z	F+	H+
Sugar	H	K	K	N	N	V	V	V	H+	H+	H+	H+

Month Letter Code: January F, February G, March H, April J, May K, June M, July N, August Q, September U, October V, November X and December Z. A '+' following the letter code indicates a contract of the following year.

Table 8: Sources used to calculate world production weights for MLCX Biofuels contracts

Commodity	Parameter	Unit	Source
Corn	PSD: World Total Summary: FSI Consumption of Corn	1000 MT	USDA
Sugar	PSD: World Total Summary: Production of Cane Sugar	1000 MT	USDA
Soybeans	PSD: World Total Summary: Production of Soybean Oilseed	1000 MT	USDA
Soybean Oil	PSD: World Total Summary: Production of Soybean Oil	1000 MT	USDA
Canola	PSD: North American Total Summary: Production of Rapeseed Oilseed	1000 MT	USDA
Rapeseed	PSD: World Total Summary: Production of Rapeseed Oilseed minus Canola production	1000 MT	USDA

ICE BofAML Commodity Index eXtra Grains

General Description

The ICE BofAML Commodity index eXtra Grains (MLCXGR) is a sub-index of the ICE BofAML Commodity index eXtra (MLCX) that includes all constituents from the Grains & Oil Seeds sector. MLCXGR is calculated using the same methodologies as MLCX modified as described below. Both excess return (MLCXGRER) and total return (MLCXGRTR) versions of the index are produced.

Definitions

The **MLCX Grains Contracts** are the futures contracts included in the Index, which is currently comprised of four commodities from the Grains & Oil Seeds sector – corn, wheat, soybeans, and soybean meal.

The **Percentage Target Weights** are the target weights of the relevant MLCX Grains Contracts in the Index, used to determine the Contract Production Weights (CPW) for purposes of Index calculation.

As described in the handbook, MLCXGR contracts roll in the first fifteen Business Days of the month.

Weights

The Percentage Target Weights for 2019 are given in Table 9 below.

Table 9: MLCX Grains weights

Contract	Code	Exchange	Percentage Target Weights
Corn	C	CBOT	36.768563%
Chicago Soft Red Winter Wheat	W	CBOT	34.645466%
Soybean Meal	SM	CBOT	18.193089%
Soybean	S	CBOT	10.392882%

Roll Schedule

Table 10: Underlying Contract Table (contract held in the beginning of each month for the Index)

Contract	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wheat	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Corn	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Soybean	H	K	K	N	N	X	X	X	X	F+	F+	H+
Soybean Meal	H	K	K	N	N	Z	Z	Z	Z	Z	F+	H+

Month Letter Code: January F, February G, March H, April J, May K, June M, July N, August Q, September U, October V, November X and December Z. A “+” following the letter indicates the contract is for the following year.

ICE BofAML Commodity Index eXtra 03

General Description

The ICE BofAML Commodity index eXtra 03 (MLCX03) is a modified version of the ICE BofAML Commodity index eXtra (MLCX). MLCX03 uses the same constituent contracts as MLCX but with different Percentage Target Weights at the beginning of each year (Table 12), a monthly rebalancing and a different Roll Schedule. In addition, Contract Production Weights are recalculated monthly. Other than these modifications, described in more detail below, MLCX03 is calculated using the same methodologies as MLCX. Both excess return (MLCX03ER) and total return (MLCX03TR) versions of the index are produced.

Definitions

The **Contract Production Weights (CPWs)** are the weights of the relevant MLCX03 Contracts in the Index, for purposes of Index calculation. They are recalculated every month according to the methodology described below.

The **Percentage Target Weights** are the weights of the relevant MLCX03 Contracts in the Index, for purposes of Index calculation.

The **MLCX03 Contracts** are the futures contracts included in the Index.

Contracts and Weights

The target weights for MLCX03 are computed by considering MLCX target weights and applying caps on the sector weights. The maximum allowed weight for the largest sector is 35% and 20% all other sectors. The methodology of the redistribution of weights to satisfy the caps is explained in detail in Section 2.3.3 of the Handbook. The list of MLCX03 Contracts along with their sectors and their respective Percentage Target Weights for 2019 are given in Table 11 below.

Table 11: MLCX03 Target Weights

Contracts	Code	Exchange	MLCX 03 Sectors	Percentage Target Weights
Brent	B	ICE Futures Europe	Energy	16.143099%
Gold	GC	COMEX	Precious Metals	11.009016%
Copper	LP	LME	Base Metals	8.984412%
Corn	C	CBOT	Grains & Oilseeds	7.353713%
Aluminum	LA	LME	Base Metals	6.998273%
Gasoil	G	ICE Futures Europe	Energy	6.991639%
Wheat	W	CBOT	Grains & Oilseeds	6.929093%
Gasoline (RBOB)	N	NYMEX	Energy	6.659911%
Sugar	SB	ICE Futures U.S.	Soft Commodities	4.487357%
Live Cattle	LC	CME	Livestock	4.158241%
Crude Oil (WTI)	T	NYMEX	Energy	3.694863%
Soybean Meal	SM	CBOT	Grains & Oilseeds	3.638618%
Zinc	LX	LME	Base Metals	2.549090%
Coffee	KC	ICE Futures U.S.	Soft Commodities	2.231288%
Soybean	S	CBOT	Grains & Oilseeds	2.078576%
Lean Hogs	LH	CME	Livestock	1.860162%
Natural Gas	NG	NYMEX	Energy	1.510488%
Nickel	LN	LME	Base Metals	1.468225%
Silver	SI	COMEX	Precious Metals	1.253936%

The resulting sector level weights are given in Table 12 below:

Table 12: MLCX03 Sector Target Weights

Sector	Percentage Target Weights
Energy	35.000000%
Grains & Oilseeds	20.000000%
Base Metals	20.000000%
Precious Metals	12.262952%
Soft Commodities	6.718645%
Livestock	6.018403%

Rolling Mechanism

The rolling mechanism is described in Chapter 3 of the Handbook, where a complete mathematical formulation also can be found. In summary, during the 15 first business days of each month, contracts are reallocated in increments of 1/15 parts from the contract listed in Table 13 for the current month to the contract listed for the following month.

Table 13: Underlying Contract Table (contracts held in the beginning of each month for the Index)

Contract	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Aluminium	J	K	M	N	Q	U	V	X	Z	F+	G+	H+
Brent	J	K	M	N	Q	U	V	X	Z	F+	G+	H+
Cocoa	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Coffee	N	N	N	N	N+	N+	N+	N+	N+	N+	N+	N+
Copper	J	K	M	N	Q	U	V	X	Z	F+	G+	H+
Corn	U	U	U	U	U	U	U+	U+	U+	U+	U+	U+
Cotton	H	K	K	N	N	V	Z	Z	Z	Z	H+	H+
Gasoil	J	K	M	N	Q	U	V	X	Z	F+	G+	H+
Gasoline (RBOB)	J	K	M	N	Q	U	V	X	Z	F+	G+	H+
Gold	J	M	M	Q	Q	Z	Z	Z	Z	G+	G+	J+
Lean Hogs	J	M	M	N	Q	V	V	Z	Z	G+	G+	J+
Live Cattle	J	M	M	Q	Q	V	V	Z	Z	G+	G+	J+
Natural Gas	M	M	M	M	Z	Z	Z	Z	Z	Z	M+	M+
Nickel	J	K	M	N	Q	U	V	X	Z	F+	G+	H+
Silver	K	K	N	N	U	U	Z	Z	Z	H+	H+	H+
Soybean	N	N	N	N	N+	N+	N+	N+	N+	N+	N+	N+
Soybean Meal	H	K	K	N	N	Z	Z	Z	Z	Z	F+	H+
Sugar	K	K	K	K+	K+	K+	K+	K+	K+	K+	K+	K+
Wheat	K	K	K	K	K+	K+	K+	K+	K+	K+	K+	K+
Zinc	J	K	M	N	Q	U	V	X	Z	F+	G+	H+

Month Letter Code: January F, February G, March H, April J, May K, June M, July N, August Q, September U, October V, November X and December Z. A “+” following the letter indicates a contract of the following year.

Contract Production Weights Calculation

According to Section 3.3 of the MLCX Handbook, we calculate the index Total Dollar Weights (TDW) on the first business day preceding the start of the roll period of month j . Based on this TDW, the Contract Production Weight for commodity i on month j is calculated according to the formula:

$$CPW_{ij} = \frac{TDW \times PTW_{ij}}{P_{ij}},$$

where P_{ij} denotes the price of the contract described in Table 11 for commodity i , on the first business day preceding the start of the roll period of month j .

ICE BofAML Commodity Index eXtra Precious Metals Plus

General Description

The ICE BofAML Commodity index eXtra Precious Metals Plus (MLCXPMP) tracks four Precious Metals commodities. MLCXPMP rebalances at the beginning of each year to a specified set of Percentage Target Weights (Table 21). Other than these criteria, described in more detail below, MLCXPMP is calculated using the same methodologies as MLCX. Both excess return (MLCXPMPPE) and total return (MLCXPMPPT) versions of the index are produced.

Definitions

The **MLCX Precious Metals Plus** Contracts are the futures contracts included in the Index, which is currently comprised of four commodities – gold, silver, platinum and palladium.

The **Percentage Target Weights** are the target weights of the relevant MLCXPMP Contracts in the Index, used to determine the Contract Production Weights (CPW) for purposes of Index calculation. See Table 23 for a list of the sources of production data used for determining weights.

As described in the handbook, MLCXPMP index rolls in the first fifteen Business Days of the month.

Weights

The weight of each MLCX Contract in MLCXPMP is determined on the basis of the Global Production Value of each Commodity. The exact procedure will follow the general rules and principles described in Section 3.3 of the MLCX Handbook, aiming to provide a non-biased reflection of the relative economic importance of each MLCXPMP Commodity in the global economy. The index is composed of two Market Sectors: the MLCX Precious Metals - Core Market Sector, consisting of gold and silver; and the MLCX Precious Metals - Platinum Group Metals Market Sector, consisting of platinum and palladium. The Production Dollar Weights for each Market Sector represented in the Index are limited to a maximum of 60% and a minimum of 3%. The Percentage Target Weights for 2019 are given in Table 20 below.

Table 20: MLCX Precious Metals Plus weights

MLCXPMP Contract	Ticker	Exchange	Percentage Target Weights
Gold	GC	COMEX	53.864758%
Palladium	PA	NYMEX	21.713476%
Platinum	PL	NYMEX	18.286524%
Silver	SI	COMEX	6.135242%

Roll Schedule

Table 21: Underlying Contract Table (contract held in the beginning of each month for the Index)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gold	J	J	M	M	Q	Q	Z	Z	Z	Z	G+	G+
Silver	H	K	K	N	N	U	U	Z	Z	Z	H+	H+
Platinum	J	J	N	N	N	V	V	V	F+	F+	F+	J+
Palladium	H	M	M	M	U	U	U	Z	Z	Z	H+	H+

Month Letter Code: January F, February G, March H, April J, May K, June M, July N, August Q, September U, October V, November X and December Z. A “+” following the letter indicates the contract is for the following year.

Table 22: Sources used to calculate world production weights for MLCXPMP contracts

Commodity	Parameter	Unit	Source
Gold	Minerals yearbook: World Mine Production of Gold	Kg	USGS
Silver	Minerals yearbook: World Mine Production of Silver	MT	USGS
Platinum	Minerals yearbook: World Production of Platinum	Kg	USGS
Palladium	Minerals yearbook: World Production of Palladium	Kg	USGS

ICE BofAML Commodity Index eXtra CLA Index

General Description

The ICE BofAML Commodity index eXtra CLA Index (MLCXCLAE) is a modified excess return version of the ICE BofAML index eXtra (MLCX). The modifications consist of the inclusion of only one commodity (WTI Light Sweet Crude Oil traded on the ICE Futures Europe exchange) and a different roll schedule (Table 23). Other than these modifications, described in more detail below, MLCXCLAE is calculated using the same methodologies as MLCX.

Rolling Mechanism

The rolling mechanism is described in Chapter 3 of the Handbook, where a complete mathematical formulation also can be found. In summary, during the 15 first business days of each month, contracts are reallocated in increments of 1/15 parts from the contract listed in Table 24 for the current month to the contract listed for the following month.

Table 23: Rolling schedule of MLCX contracts

Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Crude Oil (WTI)	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z+	Z+

Month Letter Code: December Z. A “+” following the letter indicates a contract of the following year.

Appendix A: Selected Exchanges

On the basis of the criteria listed on Section 2.1, exchanges were considered for inclusion in the MLCX. The Exchanges that were selected and that have contracts included in the MLCX, according to criteria described in Section 2.2, are:

The Chicago Mercantile Exchange (CME), the Chicago Board of Trade (CBOT), the New York Mercantile Exchange (NYMEX), and the Commodity Exchange (COMEX) are subsidiaries of the CME Group, Inc.

20 South Wacker Drive, Chicago Illinois 60606, USA, Tel: +1 (312) 930 1000
www.cmegroup.com

London Metal Exchange (LME)

56 Leadenhall Street, London EC3A 2DX, Tel: +44 (0) 20 7264 5555
www.lme.com

ICE Futures Europe

5th Floor , Milton Gate, 60 Chiswell Street, London, UK EC1Y 4SA, Tel: +44 (0) 20 7065 7700
www.theice.com/homepage.jhtml

ICE Futures US

One North End Avenue, New York, NY, USA 10282-1101, Tel:+1 (212) 748 4000
www.theice.com/homepage.jhtml

Appendix B: Preliminary List of MLCX Constituent Contracts

The following Table lists the preliminary set of contracts, in ranked order, selected for the index in accordance with Section 2.2.2. The final list of selected contracts and their weights are presented in Table 2 of this report.

Table 24: Preliminary List of MLCX Contracts

Contract	Contract Code	Exchange	Total Trading Volume (July 17- June 18)	ARP in USD	Contract Size in units	LIQ in USD	Included in MLCX	Reason for exclusion
1 WTI Light Sweet Crude Oil	CL	NYMEX	330,581,938	59	1,000	19,364,844,568,878	Yes	
2 Brent Crude Oil	B	ICE Futures Europe	240,256,847	64	1,000	15,361,938,660,541	Yes	
3 Gold	GC	COMEX	84,772,497	1,297	100	10,991,554,488,422	Yes	
4 Copper Grade A	LP	LME	37,124,493	6,759	25	6,273,029,258,249	Yes	
5 Low-Sulfur Gasoil	G	ICE Futures Europe	81,560,806	573	100	4,675,409,732,506	Yes	
6 RBOB Gasoline Physical	XB	NYMEX	49,738,775	2	42,000	3,823,399,144,253	Yes	
NY Harbor ULSD	HO	NYMEX	47,065,757	2	42,000	3,789,341,313,914	No	Redundant
WTI Light Sweet Crude Oil	T	ICE Futures Europe	56,991,226	59	1,000	3,337,625,732,746	No	Redundant
7 Aluminium	LA	LME	59,711,984	2,135	25	3,186,687,007,070	Yes	
8 Henry Hub Natural Gas	NG	NYMEX	109,855,194	3	10,000	3,172,079,668,502	Yes	
9 Soybean	S	CBOT	62,031,932	10	5,000	3,057,157,887,758	Yes	
10 Special High Grade Zinc	LX	LME	33,812,007	3,174	25	2,682,897,219,123	Yes	
Copper	HG	COMEX	32,297,345	3	25,000	2,466,041,169,334	No	Redundant
11 Silver	SI	COMEX	24,917,767	17	5,000	2,076,272,935,275	Yes	
12 Corn	C	CBOT	98,808,851	4	5,000	1,796,411,833,509	Yes	
13 Primary Nickel	LN	LME	23,641,605	12,466	6	1,768,260,758,658	Yes	
Brent Crude Oil Last Day Financial	BZA	NYMEX	20,694,561	64	1,000	1,323,999,107,005	No	Sector at max
14 Soybean Meal	SM	CBOT	30,493,260	338	100	1,030,340,528,240	Yes	
15 Chicago Soft Red Winter Wheat	W	CBOT	36,493,387	5	5,000	835,300,551,755	Yes	
Standard Lead	LL	LME	12,790,033	2,435	25	778,516,493,300	No	Sector at max
16 Live Cattle	LC	CME	16,066,562	1	40,000	739,502,242,225	Yes	
Brent Crude Oil Financial	YNW	Nasdaq NFX	10,792,145	64	1,000	690,058,149,856	No	Redundant
Soybean Oil	BO	CBOT	32,201,732	0	60,000	631,067,477,210	No	Sector at max
WTI Crude Oil Penultimate Financial	QMT	Nasdaq NFX	9,480,186	59	1,000	555,174,078,434	No	Redundant
17 Coffee C	KC	ICE Futures U.S.	11,191,452	1	37,500	519,682,709,222	Yes	
18 Sugar #11	SB	ICE Futures U.S.	34,210,647	0	112,000	515,503,366,025	Yes	
Heating Oil	NV	ICE Futures Europe	6,332,248	2	42,000	509,685,184,275	No	Sector at max
KC Hard Red Winter Wheat	KW	CBOT	14,845,648	5	5,000	345,040,806,009	No	Sector at max
19 Lean Hogs	LH	CME	12,456,391	1	40,000	344,978,508,069	Yes	

Appendix C: Conversion Rates and Sources Used in the Calculation of MLCX Individual Contract Weights

Table 25: Sources used to calculate world production weights for the MLCX contracts

Commodity	Parameter	Unit	Source
Crude oil	Total oil production (Total World Supply), yearly	1000 barrels/day	IEA
Gas oil	Refinery Gross Output (jet fuel types, other kerosenes, gasoil and diesel oil), OECD total, yearly	1000 barrels/day	IEA
Gasoline	Refinery Gross Output (naphtha, mogas, aviation gas), OECD total, yearly	1000 barrels/day	IEA
Natural gas	Nat Gas Balance: Indigenous production ; US, UK, CA, MX combined, yearly	billion cubic meters/yr	IEA
Aluminum	Minerals yearbook: World Production of Primary Aluminum	1000 MT	USGS
Copper	Minerals yearbook: World Production of Refined Copper	1000 MT	USGS
Nickel	Minerals yearbook: World Nickel Plant Production	1000 MT	USGS
Zinc	Minerals yearbook: World Smelter Production of Zinc	1000 MT	USGS
Gold	Minerals yearbook: World Mine Production of Gold	Kg	USGS
Silver	Minerals yearbook: World Mine Production of Silver	MT	USGS
Corn	PSD: World Total Summary: World Production of Corn	1000 MT	USDA
Wheat	PSD: World Total Summary: World Production of Wheat	1000 MT	USDA
Soybeans	PSD: World Total Summary: World Production of Soybeans	1000 MT	USDA
Soybean Meal	PSD: World Total Summary: World Production of Soybean Meal	1000 MT	USDA
Coffee	PSD: World Total Summary: World Production of Green Coffee	1000 60 kg bags	USDA
Sugar	PSD: World Total Summary: Production of Centrifugal Sugar	1000 MT	USDA
Live Cattle	PSD: US Production, Calf Crop	1000 head	USDA
Lean Hogs	PSD: US Production, Pig Crop	1000 head	USDA
Cocoa	FAOSTAT: World Production quantity of Cocoa beans	MT	FAOSTAT

Table 26: Standard units and conversion measures

Commodity	Formulae	Source
Crude	$\$/\text{bbl} * 1000\text{bbl}/\text{day} * 365 \text{ days}/\text{year} = \$/\text{year}$	United States Department of Energy
Gas oil	$\$/\text{MT} * 1000 \text{ bbl}/\text{day} * 0.1342 \text{ MT}/\text{bbl} * 365 \text{ days}/\text{yr} = \$/\text{year}$ Since 1 MT of distillate fuel = 7.45 bbls	International Energy Agency
RBOB gasoline	$\text{Cents}/\text{gallon} * 1000 \text{ bbl}/\text{day} * 42 \text{ gallons}/\text{bbl} * 365 \text{ days}/\text{yr} * 1/100 = \$/\text{year}$	International Energy Agency
Natgas	$\$/\text{trillion Btu} * \text{bn m}^3/\text{year} * 37.08 \text{ trillion BTU}/\text{bn m}^3 = \$/\text{year}$ 1bn m ³ = 37.08 trillion BTU	International Energy Agency
Aluminium	$\$/\text{MT}$	United States Geological Survey
Copper	$\$/\text{MT}$	United States Geological Survey
Zinc	$\$/\text{MT}$	United States Geological Survey
Nickel	$\$/\text{MT}$	United States Geological Survey
Gold	$\$/\text{oz} * \text{kg}/\text{year} * 32.1507 \text{ oz}/\text{kg} = \$/\text{year}$	United States Geological Survey
Silver	$\$/\text{oz} * \text{kg}/\text{year} * 32.1507 \text{ oz}/\text{kg} = \$/\text{year}$	United States Geological Survey
Cocoa	$\$/\text{MT}$	United States Geological Survey
Soybeans	$\text{Cents}/\text{bushel} * \text{k tons}/\text{year} * 36.7430923 \text{ bushels}/\text{tons} * 1/100 = \$/\text{year}$ Since 1 soybean bushel = 27.21554 kg (60 pounds) = 0.027216 tons	US Department of Agriculture
Soybean meal	$1\text{MT}/\text{year} * (1/0.90718474) \text{ short ton}/\text{MT} * \$/\text{short ton} = \$/\text{year}$	US Department of Agriculture
Wheat	$\text{Cents}/\text{bushel} * \text{KMT}/\text{year} * 36.68244012 \text{ bushels}/\text{tons} * 1/100 = \$/\text{year}$ Since 1 wheat bushel = 27.21554 kg (60 pounds) = 0.027216 tons	US Department of Agriculture

Table 26: Standard units and conversion measures

Commodity	Formulae	Source
Corn	Cents/bushel * KMT/year * 39.3675989 bushels/tons *1/100 = \$/year Since 1 corn bushel = 25.401 kg (56 pounds) = 0.0254016tons	US Department of Agriculture US Department of Agriculture
Coffee	Cents/pound * 60k kg/year *2.20462 pound/kg *1/100 = \$/year	US Department of Agriculture
Sugar	Cents/pound * 2204.62 pounds/MT *1/100= \$/MT	US Department of Agriculture
Live Cattle	Cents/pound * 1222 pounds/head *1/100= \$/head	US Department of Agriculture, CME
Lean Hogs	Cents/pound * 262 pounds/head *1/100= \$/head	US Department of Agriculture, CME

USDA, Economic Research Service, Agricultural Handbook Number 697, Weights, Measures, and Conversion Factors for Agricultural Commodities and Their Products.
 USDOE, Energy Information Administration, Thermal Conversion Factors, Approximate Heat Content of Natural Gas, BTU per cubic foot, Marketed Production average.
http://www.eia.doe.gov/emeu/aer/append_a.html

Appendix D: Commodity Production Chains

Table 27: Commodity production chains

Commodity Family	Conversion units applied	Source
Intermediate commodity (c): crude oil (WTI) Final commodity (n): heating oil, gasoline CMc:n= WTI production / (WTI + Brent production)	A fraction of OECD gasoline and heating oil production (in barrels) is subtracted from North American crude oil production (in barrels). The resulting number is the production weight assigned to crude oil (WTI). An equivalency of one-to-one in the crude oil-to-product relationship is assumed for simplicity, although it is acknowledged that actual refinery yields could be lower. Only a percentage equal to the production share of North American crude oil of total world production is assumed to be used in refined products and the number is adjusted appropriately.	International Energy Agency
Intermediate commodity (c): Brent Final commodity (n): heating oil, gasoline CMc:n= Brent production / (WTI + Brent production)	A fraction of OECD gasoline and heating oil production (in barrels) is subtracted from the World (ex North America) crude oil production (in barrels). The resulting number is the production weight assigned to Brent. An equivalency of one-to-one in the crude oil-to-product relationship is assumed for simplicity, although it is acknowledged that actual refinery yields could be lower. Only a percentage equal to the production share of World (ex North America) crude oil production oil of total world production is assumed to be used in refined products and the number is adjusted appropriately.	International Energy Agency
Intermediate commodity (c): soybeans Final commodity (n): soybean meal CMc:n= 1	World soybean meal production is subtracted from world soybean production. The resulting number is the production weight assigned to soybeans. An equivalency of one-to-one in the soybean to soybean meal relationship is assumed for simplicity, although it is acknowledged that actual crush yields are lower.	USDA and various sources
Intermediate commodity (c): corn, soymeal Final commodity (n): live cattle, lean hogs CMc:n= 1 (soybean meal) CMc:n= 2.8 (corn)	It is assumed that the average animal eats 2.8 times its weight in corn and 1 time its weight in soybean meal. It is acknowledged that many other inputs are used in livestock production, and that the production process is very complex, particularly in the case of live cattle.	USDA, CME and various sources

Source: USDA, IEA

Note: These measures are necessarily approximations, but these will remain fixed for the purpose of calculating the MLCX

Appendix E: Glossary of Terms

Adjusted Average Global Production Quantity (AAGPQ): the global quantity of an MLCX Commodity that is used for purposes of calculating the weight of each MLCX Contract in the Index, after adjustment for quantities attributable to inputs into or derivatives of the MLCX Commodity that are also included in the Index, in accordance with Appendix D.

Adjusted Average Global Production Value (AAGPV): the Adjusted Average Global Production Quantity multiplied by the Average Reference Price.

Average Global Production Quantity (AGPQ): the annual average of the three most recent available years of GPV data with respect to all MLCX Commodities underlying the MLCX Contracts, expressed in the same units as the specifications of the MLCX Contract.

Average Reference Price (ARP): the average of the Reference Price of the Front Month Contract for an MLCX Commodity on each Trading Day of such contract in the period beginning on July 1 and ending on June 30 of each year.

Business Day: any New York Mercantile Exchange Trading Day, with the Trading Day being defined for this purpose in accordance with New York Mercantile Exchange rules (which may define a “trading day” as beginning with the opening of electronic trading during the preceding evening).

Calendar Month (m(t)): the month during which an Business Day t falls.

Contract Production Value (CPV): the modified commodity production values for each MLCX Commodity, after applying the requirements and limits for aggregate Market Sector weights.

Contract Production Weight (CPW): the weight of the relevant MLCX Contract in the Index, for purposes of Index calculation. The Contract Production Weight is equal to the CPV divided by the LCP for a particular MLCX Contract applied in an Index Period.

Contract Size (CS): with respect to a contract is the number of standard physical units of the commodity represented by one contract. For example, a crude oil futures contract size is 1,000 barrels.

Conversion Measure (CMc:n): the conversion factor used to convert the units in which an MLCX Commodity is expressed, and which constitutes an input into another MLCX Commodity, or from which another MLCX Commodity is derived, into the units of the MLCX Commodity derived from the first MLCX Commodity. The Conversion Measures used in calculating the GPQ adjustments are set forth in Appendix D.

Daily Commodity Return (DCRt): represents the return of a commodity portfolio from $t-1$ to t with respect to the Index and each Market Sector.

Day Count (DCt): the order of the Business Days in a Roll Period t of the MLCX (which will therefore be between 1 and 15).

Dollar Weight (DW): the product of the Contract Production Weight and the underlying futures price for any given MLCX Commodity.

Eligible Contract (EC): a futures contract traded on a Selected Exchange that satisfies the requirements specified in the Handbook for inclusion in the MLCX, before taking into account the effect of the Market Sector limits.

Excess Return Index: reflects the Daily Commodity Return on the Spot Index excluding the effect of rolling the MLCX Contracts.

Front Month Contract (FMC): the first available contract expiration month after the date on which the determination is made.

Global Production Value (GPV_{c,y}): the value of the global production for each MLCX Commodity during Index Period *y* in U.S. Dollars. The GPV is calculated by multiplying the AGPQ of the relevant MLCX Commodity by the ARP of the MLCX Contract over the preceding one year period from July 1 to June 30.

Handbook: the document that describes the philosophy behind the composition of, and the methodology for computing value of, the MLCX.

Index: the ICE BofAML Commodity index eXtra or, the MLCX.

Index Administrator: ICE Data Indices, LLC

Index Period: a period of time during which there are no changes in the list of MLCX Contracts or in the Contract Production Weights of the MLCX Contracts. The purpose of the Index Period is to identify each time period within which a particular Index composition and set of Contract Production Weights remains in effect.

Interest Rate Return (IRR(t)): is the daily return on calendar day *t* of the Treasury Bill Rate using a 360 day per year convention and a period of 91 days.

Last available Contract Price (LCP): the last available closing price for each MLCX Contract on the last day of the Index Period that the MLCX is rolling out of.

Liquidity (LIQ): for purposes of determining the selection of Eligible Contracts, LIQ is equal to the Total Trading Volume (TTV), multiplied by the Contract Size with respect to each contract, and multiplied by the Average Reference Price (ARP) for each contract.

Market Sectors: the six economic sectors that constitute the MLCX, which can also serve as separately calculated sub-indices of the MLCX. The six Market Sectors currently included in MLCX are: Energy, Base Metals, Precious Metals, Grains & Oil Seeds, Livestock and Soft Commodities & Others.

MLCX: the ICE BofAML Commodity index eXtra or, the Index.

MLCX Commodity: any commodity or group of commodities that essentially function as a single commodity, based on their production, consumption or delivery characteristics, the nature of their trading markets or other features that make them substitutes for each other for various purposes, as determined by the Index Advisory Committee in its sole discretion.

MLCX Contract: an Eligible Contract that is selected for inclusion in the MLCX, after application of the requirements for a minimum and maximum number of contracts from each Market Sector.

Non-Roll Day: any Business Day that is not a Roll-Day.

Normalizing Constant: the divisor that assures continuity of the Spot Index whenever there is a change in the CPWs and is recalculated for each new period *p*(*t*) for the Index and each Market Sector. Initially, the Normalizing Constant is set so that the Spot Index for the Market Sector *S* starts at 100.

Percentage Dollar Weight (PDW): the percentage dollar weight of an MLCX Commodity, or Market Sector, in the MLCX, calculated on the basis of the AAGPQ of the MLCX Commodity multiplied by the ARP of such Commodity, with the product divided by the aggregate AAGPQ multiplied by the ARP of all MLCX Commodities (with the PDW of a Market Sector calculated as the aggregate of the PDWs of the MLCX Commodities included in that Market Sector).

Redundant Contracts: less liquid contracts on the same MLCX Commodity. For instance, the list of MLCX Contracts includes an Eligible Contract on Wheat but excludes Kansas as a Redundant Contract.

Reference Prices: the official settlement or similar prices posted by the relevant Selected Exchange or its clearing house with respect to a contract and against which positions in such contract are margined or settled.

Roll Day: a Business Day within the Roll Period.

Roll Period: the first 15 Business Days of the month.

Roll Weight (Wt): the weight allocated to the Roll-Out Contract on each day of the Roll Period. On each Business Day during a Roll Period, the CPW of each Eligible Contract is divided between the contract expiration it is being rolled out of (the Roll-Out Contract) and the contract expiration it is being rolled into (the Roll-In Contract).

Selected Exchanges: the group of exchanges from which contracts included in the MLCX will be selected. To be considered for inclusion in this list, the exchange must be located in a country that is a member of the Organization for Economic Co-operation and Development (OECD). Also, the exchange must be one of the principal trading forums, based on relative liquidity, for US dollar-denominated futures contracts on major physical commodities.

Spot Index: the TDW for the Index and each Market Sector divided by the Normalizing Constant for that particular Market Sector for period $p(t)$.

Total Dollar Weight (TDW): the sum of the Dollar Weights for all MLCX Contracts included in a Market Sector.

Total Return Index: reflects the Excess Return Index plus the Interest Rate Return.

Total Trading Volume (TTV): the sum of the daily trading volume in all expiration months of the contract with respect to each commodity contract traded on a Selected Exchange, on each day during the most recent twelve month period beginning on July 1 and ending on June 30.

Trading Day: any day on which the relevant Selected Exchange is open for trading.

Treasury Bill Rate (TBR(t)): is the 91-day auction high rate for U.S. Treasury Bills as reported by the Department of the Treasury on the most recent of the weekly auction dates prior to the calendar day t.

Underlying Contract Table: a table that lists which futures contract expirations are to be included in the Index (see Section 3.2, Table 3).

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