

Index Methodology

Bloomberg Representative Agriculture Index

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Table of Contents

Section 1. Index Overview	4
Section 2. Index Limitations	6
Section 3. Index Calculation.....	8
Section 4. Market Disruption Events	13
Section 5. Benchmark Governance and Review.....	14
Section 6. Index Terms.....	18
Section 7. Disclaimer.....	19

Version Tracker

Date	Update
10/15/2021	Bloomberg Representative Agriculture Index methodology written.
10/21/2021	Methodology updated to include the Bloomberg Representative Agriculture 2X Leveraged & Inverse Indices.
6/7/2024	Publication in new format

Section 1: Index Overview

The Bloomberg Representative Agriculture Index aims to track the performance of holding a long position of the three largest weighted agriculture commodities derived from the Bloomberg Agriculture Subindex (ticker: BCOMAG). The index rebalances annually selecting top three commodity weights based on the BCOM annual target weights for the Bloomberg Agriculture Subindex. The Bloomberg Agriculture Subindex is derived from the commodities constituents included in the BCOM grains and softs commodity group. The **Grains Group** includes the follow BCOM commodity future contracts: Corn, Chicago Wheat, Kansas City Wheat, Soybeans, Soybean Oil, and Soybean Meal. The **Softs Group** includes the follow BCOM commodity future contracts: Coffee, Cotton, and Sugar. The Total Return versions are calculated using the returns of the underlying excess return index and the return of cash collateral invested in the 3-Month T-Bill. Both the Excess and Total Return Indices will have a zero floor. The Index will also be calculated in leveraged and inverse versions.

Table 1: Bloomberg Representative Agriculture Index

Index Names	Ticker	Currency	Index Commencement Date
Bloomberg Representative Agriculture ER Index	BAGB3E	USD	10/15/2021
Bloomberg Representative Agriculture TR Index	BAGB3T	USD	10/15/2021
Bloomberg Representative Agriculture 2X Inverse ER Index	BAGB2IE	USD	10/21/2021
Bloomberg Representative Agriculture 2X Inverse TR Index	BAGB2IT	USD	10/21/2021
Bloomberg Representative Agriculture 2X Leveraged ER Index	BAGB2LE	USD	10/21/2021
Bloomberg Representative Agriculture 2X Leveraged TR Index	BAGB2LT	USD	10/21/2021

To maintain the long position of the basket, contracts are 'rolled' from the expiring futures contract to a new contract farther down the futures curve with a longer expiry date. All commodities will roll on the sixth through the tenth **Business Day** of each calendar month. An **Index Level** or Business Day is determined on a day in which BCOM is calculated.

The Bloomberg Representative Agriculture Index is denominated in U.S. dollars. The Representative Agriculture Index all have a **Base Date** of January 4th, 2010 with a **Base Index Level** of 100.

Section 2: Index Limitations

Though the Indices are designed to be representative of the markets they measure or otherwise align with their stated objective, they may not be representative in every case or achieve their stated objective in all instances. They are designed and calculated strictly to follow the rules of this Methodology, and any Index Level or other output is limited in its usefulness to such design and calculation.

Markets can be volatile, including those commodity market interests which the Indices intend to measure or upon which the Indices are dependent in order to achieve their stated objective. For example, trading in futures contracts on physical commodities, including trading in the Index components, is speculative and can be extremely volatile. Market prices of the Index components and the underlying physical commodities may fluctuate rapidly based on numerous factors, including changes in supply and demand relationships (whether actual, perceived, anticipated, unanticipated or unrealized); weather; agriculture; trade; fiscal, monetary and exchange control programs; domestic and foreign political and economic events and policies; disease; pestilence; technological developments; changes in interest rates, whether through government action or market movements; and monetary and other government policies, action and inaction.

The current or "spot" prices of the underlying physical commodities may also affect, in a volatile and inconsistent manner, the prices of futures contracts in respect to the relevant commodity. These factors may affect the value of the Indices in varying ways, and different factors may cause the prices of the Index components, and the volatilities of their prices, to move in inconsistent directions at inconsistent rates.

In addition, market trends and changes to market structure may render the objective of the Index unachievable or to become impractical to replicate by investors.

In particular, the Bloomberg Representative Agriculture Index aims to track the performance of holding a long position of three agriculture commodity futures contracts. The Index are therefore subject to risk of holding a commodity futures contract which may fluctuate rapidly and may be subject to temporary distortions or other market disruptions based on numerous factors, including changes in supply and demand relationships (whether actual, perceived, anticipated, unanticipated or unrealized), weather, agriculture, trade, fiscal, monetary and exchange control programs, domestic and foreign political and economic events and policies, disease, pestilence, technological developments, changes in interest rates, whether through governmental action or market movements, and monetary and other governmental policies, action and inaction.

Historical Index Levels published prior to the Index launch date are considered hypothetical. Historical Index Levels should not be considered as an indication of future performance.

The Bloomberg Representative Agriculture Index is comprised of liquid commodity future contracts. If any commodity future contract is terminated or replaced in accordance with the rules of the Index methodology, a comparable commodity futures contract may be selected by BISL. The replacement of a commodity future contract may cause the level of the Index to change or be adjusted.

In the event the Bloomberg Representative Agriculture Index level falls at or below zero due to an at any point intraday and/or end-of-day negative futures settlement price(s), the Index level will be closed at zero and terminated same day, in which case the Index may cease to accurately measure its underlying market interest (see Handling of Negative and or Zero Pricing). Index users should therefore consider such possibility in connection with any financial instrument or financial contract based on the index to the extent the index level diverges from exposure to the underlying market.

BISL may discontinue or suspend calculation or publication of the Indices defined in this methodology. If this happens, BISL shall use reasonable efforts to provide advance notice through an Index announcement made available via bloombergindices.com and on the Bloomberg Terminal via INP <GO>.

Section 3: Index Calculation

The Bloomberg Representative Agriculture Index aims to track the performance of holding a long position of the three largest weighted agriculture commodities derived from the Bloomberg Agriculture Subindex (ticker: BCOMAG). The index rebalances annually during the January Roll Period, using BCOM Target Weights.

BCOM Agriculture Subindex

BCOM Group	Commodity	Commodity Contract	Ticker	Price Conversion
Grains	Wheat	Chicago Wheat	W	100
Grains	Wheat	Kansas City Wheat	KW	100
Grains	Soybean Oil	Soybean Oil	BO	100
Grains	Corn	Corn	C	100
Grains	Soybeans	Soybeans	S	100
Grains	Soybean Meal	Soybean Meal	SM	1
Softs	Sugar	Sugar	SB	100
Softs	Cotton	Cotton	CT	100
Softs	Coffee	Coffee	KC	100

Index Target Weight Calculations

Each year, the index is rebalanced after the close of business on the fourth business day in January. To derive the top three commodities, constituents and to derive the **Target Weights** of the index the following steps are preformed;

- 1) Using the annual BCOM target weights for both the BCOM 'Grains' and 'Softs' groups (BCOM Agriculture Subindex), list and rank by target weight. If two commodity constituents are the same commodity, add them together (i.e. Wheat).
- 3) Select the top 3 annual commodity weights using the constituents in the BCOMAG Index, if for any circumstance there are identical weights for the third ranking, BISL will determine the 3 commodities in the index.
- 4) Proportionally, reweight and calculate the target weights of the index, using the BCOM annual target weights for the selected commodity constituents.

Representative Agriculture Index target weights are calculated using the following formula:

$$ATW = \frac{ITW}{\sum_x BTW}$$

ATW= Representative Agriculture Index Annual Target Weight; rounded to 8 decimal places.

ITW= Individual BCOM Target Weight

BTW= sum of BCOM Target Weights

x= Number of Commodities/Constituents (3)

Index Rebalancing

The Indices are rebalanced annually after the close of business on the fourth business day in January. The annual target weights are applied to the index by calculating index units call Commodity Index Multipliers (CIMs). The Index Base Date CIM and the ongoing CIMs are used maintain continuity in the Index.

CIM's are calculated using the following formulas:

Base Date CIM Calculation:

$$CIM = \frac{ATW_i * 1000}{NCSP_t}$$

Where:

- CIM is the Commodity Index Multiplier used to apply the Target Weight of the individual commodity futures contract, rounded to 8 decimal places.
- ATW_i is the Representative Agriculture Annual Target Weight of commodity futures contract i.
- $NCSP_t$ is the **Next Contract Settlement Price** on Business Day t, using price conversion.

CIM Calculation

$$CIM = \frac{ATW_i * 1000}{NCSP_t} * AF$$

Where:

- CIM is the Commodity Index Multiplier used to apply the Target Weight of the individual commodity futures contract, rounded to 10 decimal places.
- ATW_i is the Representative Agriculture Target Weight of commodity futures contract i for each Rebalancing Day.
- $NCSP_t$ is the Next Contract Settlement Price on Business Day t, using price conversion.
- AF is the Adjustment Factor.

$$AF = \frac{\sum_i CIM_r * NCSP}{1000}$$

Where:

- CIM_r is the previous Commodity Index Multiplier.
- $NCSP$ is the Next Contract Settlement Price on Business Day t using price conversion.

Index Rolling

The Index hold a long positions in commodity futures. To maintain a long position, contracts are 'rolled' from the expiring futures contract to a new contract farther down the futures curve with a longer expiry date. The calculation of the Representative Agriculture Index follows the roll schedule based on the commodity contract calendar listed in Table 3. The mapping for the contract letters and months are defined in Table 2.

Table 2: Contract Month Codes

Contract Code	Month
F	January
G	February
H	March
J	April
K	May
M	June
N	July
Q	August
U	September
V	October
X	November
Z	December

The Contract Calendar Table (Table 3) represents the **Lead Contract** on the first Business Day of each month.

Table 3: Contract Calendar

Commodity	Exchange	Bloomberg Code	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Chicago Wheat	CME	W	H	H	K	K	N	N	U	U	Z	Z	Z	H*
Corn	CME	C	H	H	K	K	N	N	U	U	Z	Z	Z	H*
Kansas Wheat	CME	KW	H	H	K	K	N	N	U	U	Z	Z	Z	H*
Soybean Meal	CME	SM	H	H	K	K	N	N	Z	Z	Z	Z	F*	F*
Soybean Oil	CME	BO	H	H	K	K	N	N	Z	Z	Z	Z	F*	F*
Soybeans	CME	S	H	H	K	K	N	N	X	X	X	X	F*	F*
Coffee	ICE	KC	H	H	K	K	N	N	U	U	Z	Z	Z	H*
Cotton	ICE	CT	H	H	K	K	N	N	Z	Z	Z	Z	Z	H*
Sugar	ICE	SB	H	H	K	K	N	N	V	V	V	H*	H*	H*

The Indices will roll from the Lead Contract to the Next Contract from the sixth to tenth Business Day of each month at 20% (1/5) each Business Day. If a Market Disruption Event ("MDE") occurs during the roll period (Business Days 5 through 9), the roll weight will be "held". The roll weight will catch up on the next Business Day when a MDE is not present. Table 3 is an example of the rolling process during the March Roll Period of 2010.

Table 4: Rolling Example March 2010

Date	Ticker	Day Count	Lead Contract	Next Contract	Yesterday Roll Weight		Today Roll Weight	
					% Lead	% Next	% Lead	% Next
3/5/2010	C	5	W K10	W K10	100.00%	0.00%	80.00%	20.00%
3/5/2010	S	5	S K10	S K10	100.00%	0.00%	80.00%	20.00%
3/5/2010	W	5	W K10	W K10	100.00%	0.00%	80.00%	20.00%
3/8/2010	C	6	W K10	W K10	80.00%	20.00%	60.00%	40.00%
3/8/2010	S	6	S K10	S K10	80.00%	20.00%	60.00%	40.00%
3/8/2010	W	6	W K10	W K10	80.00%	20.00%	60.00%	40.00%
3/9/2010	C	7	W K10	W K10	60.00%	40.00%	40.00%	60.00%
3/9/2010	S	7	S K10	S K10	60.00%	40.00%	40.00%	60.00%
3/9/2010	W	7	W K10	W K10	60.00%	40.00%	40.00%	60.00%
3/10/2010	C	8	W K10	W K10	40.00%	60.00%	20.00%	80.00%
3/10/2010	S	8	S K10	S K10	40.00%	60.00%	20.00%	80.00%
3/10/2010	W	8	W K10	W K10	40.00%	60.00%	20.00%	80.00%
3/11/2010	C	9	W K10	W K10	20.00%	80.00%	0.00%	100.00%
3/11/2010	S	9	S K10	S K10	20.00%	80.00%	0.00%	100.00%
3/11/2010	W	9	W K10	W K10	20.00%	80.00%	0.00%	100.00%
3/12/2010	C	10	W K10	W K10	0.00%	100.00%	0.00%	100.00%
3/12/2010	S	10	S K10	S K10	0.00%	100.00%	0.00%	100.00%
3/12/2010	W	10	W K10	W K10	0.00%	100.00%	0.00%	100.00%

Index Calculation

Index Levels are determined on a day on which BCOM is open for business. If a commodity futures contract **Settlement Price** is unavailable on a Business Day when BCOM is open, the last available official Settlement Price will be used for the calculation of the Index. The official Index Level precision is eight decimal places.

The ER Index Level is calculated as follows:

$$IndexER_t = IndexER_{t-1} * (1 + DER)$$

Where:

- $IndexER_t$ is the ER Index Level on Business Day t, rounded to 8 decimal places.
- $IndexER_{t-1}$ is the ER Index Level on the Business Day immediately preceding Business Day t.
- DER is the Daily ER of the commodity futures contracts.

The Daily ER is calculated as:

$$DER = \left(\frac{WAV}{PWAV} - 1 \right)$$

Total Return Index Level (leveraged, and inverse indices) is calculated as follows:

$$IndexTR_t = IndexTR_{t-1} \times \left(\frac{IndexER_t}{IndexER_{t-1}} + IR_t \right)$$

Where:

$IndexTR_t$ is the Total Return Index Level on Business Day t, rounded to 8 decimal places.

$IndexTR_{t-1}$ is the Total Return Index Level on the Business Day immediately preceding Business Day t.

$IndexER_t$ is the ER Index Level on Business Day t.

$IndexER_{t-1}$ is the ER Index Level on the Business Day immediately preceding Business Day t.

IR_t is the Treasury Bill Daily Return, calculated as

$$IR_t = \left[\frac{1}{1 - \frac{91}{360} \times TBR_{t-1}} \right]^{\frac{D}{91}} - 1$$

Where:

TBR_{t-1} is the 13-week (3 -month) US Treasury Bill ("T-Bill") Rate, the rate used is the most recent weekly auctioned high discount rate (ticker: USB3MTA Index).

D is the number of calendar days between Business Day t, and the previous Business Day (i.e. 3 for weekend)

Weighted Average Value ("WAV") on Business Day t is calculated as:

$$WAV = \sum CIM1 * YLRW * \frac{LCSP_t}{L} + CIM2 * YNRW * \frac{NCSP_t}{L}$$

Where:

$CIM1$ is the Commodity Index Multiplier for Lead Contract.

$YLRW$ is the Yesterday Lead Roll Weight, i.e., the roll weight of commodity futures contract i on the Business Day immediately preceding Business Day t.

$LCSP_t$ is the Lead Contract settlement price on Business Day t, using price conversion.

$CIM2$ is the Commodity Index Multiplier for Next Contract.

$YNRW$ is the Yesterday Next Roll Weight, i.e., the roll weight of commodity futures contract i on the Business Day immediately preceding Business Day t.

$NCSP_t$ is the Next Contract settlement price on Business Day t using price conversion.

L is the lot size of the futures contract.

Previous Weighted Average Value ("PWAV") on Business Day t is calculated as:

$$PWAV = \sum CIM1_{t-1} * YLRW * \frac{LCSP_{t-1}}{L} + CIM2_{t-1} * YNRW * \frac{NCSP_{t-1}}{L}$$

Where:

$CIM1_{t-1}$	is the Commodity Index Multiplier for Lead Contract on the Business Day immediately preceding Business Day t.
$YLRW$	is the Yesterday Lead Roll Weight, i.e., the roll weight of commodity futures contract i on the Business Day immediately preceding Business Day t.
$LCSP_{t-1}$	is the Lead Contract settlement price on the Business Day immediately preceding Business Day t using price conversion.
$CIM2_{t-1}$	is the Commodity Index Multiplier for Lead Contract on the Business Day immediately preceding Business Day t.
$YNRW$	is the Yesterday Next Roll Weight, i.e., the roll weight of commodity futures contract i on the Business Day immediately preceding Business Day t.
$NCSP_{t-1}$	is the Next Contract settlement price on the Business Day immediately preceding Business Day t using price conversion.
L	is the lot size.

Index Calculation of ER Leveraged and Inverse Indices

The Leveraged and Inverse indices are calculated using a defined leverage or inverse factor. The Leveraged Indices aim to capture two times the daily return of underlying of the and the Inverse Indices aim to capture the inverse or two times inverse daily return.

The level of the $Index_t$ will be determined in accordance with the following formula each Business Day;

$$Index_t = Index_r \times \left[1 + (Factor \times \left(\frac{BCOM_UnderlyingIndex_t}{BCOM_UnderlyingIndex_r} - 1 \right)) \right]$$

Where:

r is the Rebalancing Date, if BCOM Index Business Day is t, then r is the Index Business Day immediately prior to Index Business Day t.

Factor is the leveraged or inverse ratio

- $Factor = 2$; leveraged is two times the return or 200%
- $Factor = -1$; inverse daily return or -100%
- $Factor = -2$; inverse daily return or -200%

Underlying Index is the index level of the Bloomberg Representative Agriculture ER Index.

Total Return Leveraged and Inverse calculations refer to Section 3.

Leveraged and Inverse indices are rounded to 8 decimal places.

Handling of Negative and or Zero Pricing

In the event the Index level (Representative Agriculture) falls at or below zero during real-time index market hours and or by a published exchange settlement price, the Index Level will close at zero and the Index will be terminated on the same day.

All Indices will be thoroughly reviewed before termination. If the negative official Index Level is calculated using an incorrect exchange price or as a result of a technical issue, the Index will be recalculated. If the recalculated Index Level is positive, the Index will not be terminated and will continue to calculate going forward.

Section 4: Market Disruption Events

Market Disruption Events (MDE) can occur to commodity futures for several reasons:

- a) The termination or suspension of, or material limitation or disruption in, the trading of any future contract used in the calculation of the Index on that day
- b) The settlement price of any such contract reflect the maximum permitted price change from the previous day's settlement price, based on limits set by commodity exchanges
- c) The failure of an exchange to publish settlement prices.

If a MDE occurs with respect to the Representative Agriculture Index family during the "Roll Period" for either the lead or next contract, the daily roll of the relevant futures contract will be held for that Business Day. On the following Business Day on which a Market Disruption Event does not occur, the roll weight will account for the current days roll weight and the previous Business Day (MDE's) roll weight.

If a MDE persists for four consecutive Index Business Days immediately following the original Index Business Day on which a MDE occurs, then the Index Administrator shall determine what further actions it may reasonably take.

If, on any Index Business Day, a MDE occurs or is occurring that the Index Administrator determines, in its sole discretion, materially affects the Index, the Index Administrator may defer or suspend the calculation and publication of the Index Value and any other information relating to the Index until the next Index Business Day on which such disruption event is not continuing.

Section 5: Benchmark Governance and Review

Data Providers and Data Extrapolation

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

Benchmark Governance, Audit and Review Structure

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

Internal and External Reviews

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

Index and Data Reviews

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

Exchange Settlement Price Delays

In the event an exchange delays the pricing of future settlements pertaining to the Bloomberg Representative Agriculture Index Indices, BISL will delay the publication of Index Levels to vendors and delivery of index data files.

Error Corrections/Restatement Policy

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

Exchange Settlement Price Amendments

On the occasion when an exchange amends the Settlement Price of a contract used in the Bloomberg Representative Agriculture Index Indices prior to 7 PM EST, BISL will send an index announcement following the discovery to inform all clients of the correction. BISL will then recalculate, republish, and redistribute end-of day files.

Real-time Distribution

BISL strives to provide accurate real-time calculation of its indices, however the following circumstances may occur during real-time dissemination hours.

- Incorrect index levels can be disseminated.
- Indices may stop disseminating.
- Indices may disseminate stale prices.

Expert Judgment

Please refer to the BISL Benchmark Procedures Handbook available [here](#).

Reinvestment of Dividends and Coupons

Dividends and coupon payments play no direct role in this Index Methodology Handbook, and are therefore not accounted for by the Index.

Section 6: Index Terms

“Base Index Level” means the starting Index Level of 100 for each of the Indices.

“BISL” means Bloomberg Index Services Limited.

“BOC” means the Benchmark Oversight Committee.

“Business Day” means any day on which BCOM is open for business.

“Commodity Index Multiplier (CIM)” means the value of one as described in Section 3.

“Grains Group” means the following commodity future contracts; Corn, Chicago Wheat, Kansas City Wheat, Soybeans, Soybean Oil, and Soybean Meal

“Index Administrator” means BISL.

“Index Base Date” means the first date of the Index history as described in Section 1.

“Index Commencement Date” means the date each of the Indices is first made available on the relevant Bloomberg Page, i.e., June xxth, 2021.

“Index Level” means, in respect of the Index and a Business Day, the value of the Index on such Business Day, calculated in accordance with the methodology described in Section 3.

“PROC” means the Product, Risk and Operations Committee.

“Lead Contract” means the rolling out commodity futures contract as defined in Table 5.

“Lead Contract Settlement Price” means the official settlement prices provided by the exchange of the rolling out commodity futures contract defined in Table 5.

“Market Disruption Event (MDE)” has the meaning given to such term in Section 4.

“Next Contract” means the rolling in commodity futures contract as defined in Table 5.

“Next Contract Settlement Price” means the official settlement prices provided by the exchange of the rolling in commodity futures contract as defined in Table 5.

“Rolling” means the commodity futures contracts are ‘rolled’ during the Roll Period from the expiring futures contract (Lead Contract) to a new contract farther down the futures curve with a longer expiry date (Next Contract). After the Roll Period, the former Next Contract becomes the new Lead Contract.

“Roll Period” means the sixth to tenth Business Day of each month, at 20% (1/5) each Business Day

“Settlement Price” means the official settlement prices provided by an exchange.

“Softs Group” means the following commodity future contracts; : Coffee, Cotton, and Sugar.

“Treasury Bill Daily Return” means the return of cash collateral invested in the 3-Month T-Bill.

Accessing Index Data

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