DBLCI Optimum Yield Indices

Summary

Deutsche Bank Liquid Commodities Indices Optimum Yield (DBLCI-OY) are designed to maximize potential roll returns by selecting, for each commodity, the futures contract with the highest implied roll yield. The DBLCI-OY indices are available for twenty-six commodities, drawn from the energy, precious metals, industrial metals, agriculture sectors.

The Deutsche Bank Liquid Commodities Indices Optimum Yield (DBLCI-OY) employs a rule based approach when it 'rolls' from one futures contract to another for each commodity in the index. Rather than select the new future based on a predefined schedule (e.g. monthly) the index rolls to that future (from the list of tradable futures which expire in the next thirteen months) which generates the maximum implied roll yield. The index aims to maximize the potential roll benefits in backwardated markets and minimize the loss from rolling down the curve in contango markets.

If the price of a future is greater than the spot price, the market is in contango. If the price of a future is below the spot price, the market is in backwardation. In a contango market, as the futures time to expiry decreases in general, the price will tend towards the spot price. This results in the future price falling assuming a flat roll price. The opposite is true for a market in backwardation. A contango market will tend to cause a drag on an index while a market in backwardation will tend to cause a push on an index.

The selected DBLCI-OY index future contract is rolled to a new contract, when the existing contract is close to expiry. For full details on the roll convention refer to Contract Selection section.

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Deutsche Bank

Index Suite

Two sets of indices are calculated and published to Bloomberg. The first set are the DBIQ Optimum Yield Indices, the second set are the DBLCI Optimum Yield Indices. Both versions follow similar rules.

Table 1: DBIQ Optimum Yield Indices Index Suite

Commodity	Symbol	Exchange	Excess Return	Total Return
Light Crude	CL	NYMEX	DBCMOCLE	DBCMOCLT
Gold	GC	COMEX	DBCMOGCE	DBCMOGCT
Silver	SI	COMEX	DBCMYESI	DBCMYTSI

Table 2: DBLCI Optimum Yield Indices Index Suite

Commodity	Symbol	Exchange	Excess Return	Total Return
Light Crude	CL	NYMEX	DBLCOCLE	DBLCOCLT
Heating Oil	HO	NYMEX	DBLCOHOE	DBLCOHOT
RBOB Gasoline	RB	NYMEX	DBLCYERB	DBLCYTRB
Natural Gas	NG	NYMEX	DBLCYENG	DBLCYTNG
Brent Crude	LCO	IPE	DBLCYECO	DBLCYTCO
Gasoil	LGO	IPE	DBLCYEGO	DBLCYTGO
Gold	GC	COMEX	DBLCOGCE	DBLCOGCT
Silver	SI	COMEX	DBLCYESI	DBLCYTSI
Aluminum	MAL	LME	DBLCOALE	DBLCOALT
Zinc	MZN	LME	DBLCYEZN	DBLCYTZN
Copper-Grade A	MCU	LME	DBLCYECU	DBLCYTCU
Primary Nickel	MNI	LME	DBLCYENI	DBLCYTNI
Standard Lead	MPB	LME	DBLCYEPB	DBLCYTPB
Corn	C	CBOT	DBLCOCNE	DBLCOCNT
Wheat	W	CBOT	DBLCOWTE	DBLCOWTT
Soybeans	S	CBOT	DBLCYESS	DBLCYTSS
Sugar # 11	SB	NYBOT	DBLCYESB	DBLCYTSB
Coffee C	KC	NYBOT	DBLCYEKC	
Cotton #2	CT	NYBOT	DBLCYECE	
Cocoa	CC	NYBOT	DBLCYECC	
Kansas Wheat	KW	KBOT	DBLCYEKW	DBLCYTKW
Minneapolis Wheat	MW	MGEX	DBLCOMWE	
Soybean Meal	SM	CBOT	DBLCYESM	

Source: DBIQ

Key Index Information

Index Live Date	Index Business Day
31-May-06	Prior to 1 January 2010, "DBLCI Business Day" means a day (other than a Saturday or Sunday) on which Commercial banks and foreign exchange markets settle payments and are open for general business in New York City. Since 1 January 2010,"DBLCI Business Day" means a day (other than a Saturday or Sunday) which is not a holiday in the CME Group New York Floor holiday calendar for the relevant year as published on the CME Group website.

Index Selection Day

Table 3: Index Selection Day

Index Name	Index Selection Day
All Indices	On the first DBLCI business day of each month (the "Verification Date") each commodity futures contract currently in the index is tested for continued inclusion in the index based on the month in which the contract delivery of the underlying commodity can start (the "Delivery Month")

Source: DBIQ

Index Rebalancing Day

Table 4: Index Rebalancing Day

Index Name	Index Rebalancing Day
All Indices	This takes place between the 2nd and 6th business day of the month

Source: DBIQ

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The Index Administrator has implemented and maintains the DBIQ User Guidance and Administrator Handbook Overview (the "Overview"), which sets out a summary of the policies, procedures and controls implemented by the management of the Index Administrator to promote sound business practices for the lifecycle management of the Index Owner's proprietary benchmarks by the Index Administrator. The Overview also includes the Index Administrator's policy related to quality of benchmarks and input data management. Additional issues related to governance, controls, benchmark classification and risk controls, periodic reviews and conflicts of interest are also addressed.

The Overview is available on the DBIQ homepage under the following URL (the "DBIQ Website"):

https://index.db.com

Index Publication

The level of each Index on each relevant Index Business Day shall be published:

1) on the DBIQ Website; and

2) where applicable, on Bloomberg under the Bloomberg ticker in respect of such Index as set out in Table 1 above.

Any such publication may be restricted by means determined as appropriate for such purpose by the Index Administrator in its sole and absolute discretion including, but not limited to, password protection on the DBIQ Website restricting access to a limited set of persons in accordance with arrangements agreed between the Index Administrator and such person. The Index Administrator may, at any time and without notice, change the frequency or method publication of an Index, as the case may be. The Index Administrator accepts no legal liability to any person for publishing or not continuing to publish for any period of time and level in respect of an Index at any particular place or any particular time.

Index Rules and Calculations

DBLCI-OY Excess Return Index Calculation

The following calculations apply to all the Excess Return indices listed in table 1 and 2. The excess return is based on the percentage change of the underlying commodity futures market values. The indices have two contracts throughout roll periods and one contract on other days. The index return is equal to the change in current futures contracts price in the index multiplied by the relevant holdings. The index is calculated on all valid DBLCI Business days[1]. The excess return index level in USD is expressed as;

$$ILer_{(t)} = \frac{\sum_i PC_{(t,i)} * N_{(t-1,i)}}{\sum_i PC_{(t-1,i)} * N_{(t-1,i)}} * ILer_{(t-1)}$$

Where:

$ILer_{(t)}$	= Excess Return Index level on index calculation day t
$ILer_{(t-1)}$	= Excess Return Index level on index calculation day t-1
$PC_{(t,i)}$	= Close Price of commodity future on i on index calculation day t
$PC_{(t-1,i)}$	= Close Price of commodity future i on index calculation day t-1
$N_{(t-1,i)}$	= Notional holding of commodity future i on index calculation day t-1

Total Return USD Calculation

The following calculations apply to all the Total Return indices. The total return index level in USD is expressed as;

$$ILBtr_{(t)} = \left(\frac{ILB_{(t)}}{ILB_{(t-1)}} + Rt_{(t)}\right) * (1 + Rt_{(t)})^{d_{(t,t-1)}} * ILBtr_{(t-1)}$$

$$Rt_{(t)} = \left(1 - \frac{91}{360} y(t-1)\right)^{-\left(\frac{1}{91}\right)} - 1$$

[1] Prior to 1 January 2010, "DBLCI Business Day" means a day (other than a Saturday or Sunday) on which Commercial banks and foreign exchange markets settle payments and are open for general business in New York City. Since 1 January 2010, "DBLCI Business Day" means a day (other than a Saturday or Sunday) which is not a holiday in the CME Group New York Floor holiday calendar for the relevant year as published on the CME Group website.

Where:

$ILBtr_{(t)}$ = Total Return Index level on index calculation day t

$ILBtr_{(t-1)}$ = Total Return Index level on index calculation day t-1

$Rt_{(t)}$ = T-Bill return on index calculation day t

$d_{(t,t-1)}$ = Number of calendar days between index calculation day t and index calculation day t-1 excluding day t

$y_{(t-1)}$ = 3-month benchmark T-bill yield on index calculation day t-1

Index Selection

Contract Selection

On the first DBLCI business day of each month (the "Verification Date") each commodity futures contract currently in the index is tested for continued inclusion in the index based on the month in which the contract delivery of the underlying commodity can start (the "Delivery Month"). If, on the Verification Date, the Delivery Month is the next month, a new contract is selected ("Selection event"). For example, if the first New York business day is May 3, 2021, and the Delivery Month of a contract currently in the index is June 2021, a new contract with a later Delivery Month will be selected. As the Brent Crude Oil delivery is based on Exchange Futures for physical method and the exchange do not define a delivery schedule, DBIQ have determined the Delivery Month will be the calendar month following the last trading day of the contract. For the avoidance of doubt Table 5 to 11 defines the contract eligible for selection for each calendar month for different commodities[2] in case of a Selection event

For each commodity in the index, the new commodity futures contract selected will be the contract with the maximum "implied roll yield" based on the closing price for each eligible contract. Eligible contracts are any contracts having a Delivery Month (i) no sooner than the month after the Delivery Month of the commodity future currently in the index, and (ii) no later than the 13th month after the Verification Date[3]. For example, if the first New York business day is May 3, 2021 and the Delivery Month of the contract currently in the index is therefore June 2021, the Delivery Month of an eligible new contract must be between July 2021 and June 2022. The roll yield is expressed as:

$$Y_{(t,i)} = \left(\frac{PC_{(t,b)})}{PC_{(t,i)}}\right)^{\left(\frac{1}{F_{(t,i,b)}}\right)} - 1$$

Where:

$Y_{(t,I)}$ = On any day t, the implied roll yield for entering into the commodity futures contract with exchange expiration month i

$PC_{(t,b)}$ = Closing price of the base commodity future b on index calculation day t

$PC_{(t,i)}$ = Closing price of any eligible futures contract i on index calculation day t

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[2] For Soybean Meal, only the contracts which expire in January, March, May, July and December are considered as eligible contracts.

$F_{(t,i,B)}$	= Fraction of year between the base futures contract b and the futures contract with exchange expiration month i. Calculated as number of calendar days between dates divided by 365
b	= Base commodity future is the commodity future currently in the index

The contract with the maximum roll yield is selected. If two contracts have the same roll yield the contract with the minimum number of months to the exchange expiry month is selected.

Index Roll Period

If the current index holding no longer meets the inclusion criteria the index unwinds the old contract holding and enters a position in the new contract. This takes place between the 2nd and 6th business day of the month. On each day during the roll period the new notional holdings are calculated. The calculations for the old commodities that are leaving the index and the new commodities that are entering are different. The notional of the old commodity i is expressed as:

$$N_{(t,1)} = N_{(t-1,i)} * \frac{6 - db_{(t)}}{7 - db_{(t)}}$$

The notional of the new commodity contract j is expressed as:

$$N_{(t,j)} = N_{(t-1,j)} + \frac{PC_{(t,i)} * N_{(t-1,i)}}{PC_{(t,j)} * (7 - db_{(t)})}$$

Where

$N_{(t-1,i)}$	= Notional holding of old commodity future i on index calculation day t-1
$N_{(t,i)}$	= Notional holding of old commodity future i on index calculation day t
$N_{(t-1,j)}$	= Notional holding of new commodity future j on index calculation day t-1
$N_{(t,j)}$	= Notional holding of new commodity future j on index calculation day t
$db_{(t)}$	= Number of index business days in the month up to and including day t
$PC(t,\mathrm{i})$	= Closing price of the old commodity future on index calculation day t
$PC(t,\mathrm{j})$	= Closing price of the new commodity future on index calculation day t

On all days that are not index roll days the notional holding of each commodity future remains constant.

$$N_{(t,i)} = N_{(t-1,i)}$$

Table 5: Contract Eligibility Schedule Brent Optimum Yield Index

Rebalancing Month	Current Contract	Eligible Contracts											
		1	2	3	4	5	6	7	8	9	10	11	12
Jan	H	J	K	M	N	Q	U	V	X	Z	F*	G*	H*
Feb	J	K	M	N	Q	U	V	X	Z	F*	G*	H*	J*
Mar	K	M	N	Q	U	V	X	Z	F*	G*	H*	J*	K*
Apr	M	N	Q	U	V	X	Z	F*	G*	H*	J*	K*	M*
May	N	Q	U	V	X	Z	F*	G*	H*	J*	K*	M*	N*
Jun	Q	U	V	X	Z	F*	G*	H*	J*	K*	M*	N*	Q*
Jul	U	V	X	Z	F*	G*	H*	J*	K*	M*	N*	Q*	U*
Aug	V	X	Z	F*	G*	H*	J*	K*	M*	N*	Q*	U*	V*
Sep	X	Z	F*	G*	H*	J*	K*	M*	N*	Q*	U*	V*	X*
Oct	Z	F*	G*	H*	J*	K*	M*	N*	Q*	U*	V*	X*	Z*
Nov	F*	G*	H*	J*	K*	M*	N*	Q*	U*	V*	X*	Z*	F**
Dec	G*	H*	J*	K*	M*	N*	Q*	U*	V*	X*	Z*	F**	G**

** Represents a contract for the next calendar year, for example in January 2024 the 10^{th} eligible contract is January 2025*

*** Represents a contract for the second next calendar year, for example in December 2024 the 11^{th} eligible contract is January 2026*

Source: DBIQ

Table 6: Contract Eligibility Schedule for Light Crude, Heating Oil, Gold, Silver, RBOB Gasoline, Natural Gas, Gasoil, Primary Nickel, Lead, Aluminum, Zinc, Copper Optimum Yield Indices

Rebalancing Month	Current Contract	Eligible Contracts											
		1	2	3	4	5	6	7	8	9	10	11	12
Jan	G	H	J	K	M	N	Q	U	V	X	Z	F*	G*
Feb	H	J	K	M	N	Q	U	V	X	Z	F*	G*	H*
Mar	J	K	M	N	Q	U	V	X	Z	F*	G*	H*	J*
Apr	K	M	N	Q	U	V	X	Z	F*	G*	H*	J*	K*
May	M	N	Q	U	V	X	Z	F*	G*	H*	J*	K*	M*
Jun	N	Q	U	V	X	Z	F*	G*	H*	J*	K*	M*	N*
Jul	Q	U	V	X	Z	F*	G*	H*	J*	K*	M*	N*	Q*
Aug	U	V	X	Z	F*	G*	H*	J*	K*	M*	N*	Q*	U*
Sep	V	X	Z	F*	G*	H*	J*	K*	M*	N*	Q*	U*	V*
Oct	X	Z	F*	G*	H*	J*	K*	M*	N*	Q*	U*	V*	X*
Nov	Z	F*	G*	H*	J*	K*	M*	N*	Q*	U*	V*	X*	Z*
Dec	F*	G*	H*	J*	K*	M*	N*	Q*	U*	V*	X*	Z*	F**

** Represents a contract for the next calendar year, for example in January 2024 the 11^{th} eligible contract is January 2025*

*** Represents a contract for the second next calendar year, for example in December 2024 the 12^{th} eligible contract is January 2026*

Source: DBIQ

Table 7: Contract Eligibility Schedule for Minneapolis Wheat, Kansas Wheat, Wheat, Corn, Coffee, Cocoa Optimum Yield Indices

Rebalancing Month	Current Contract	Eligible Contracts 1	2	3	4	5
Jan						
Feb	H	K	N	U	Z	H*
Mar						
Apr	K	N	U	Z	H*	K*
May						
Jun	N	U	Z	H*	K*	N*
Jul						
Aug	U	Z	H*	K*	N*	U*
Sep						
Oct						
Nov	Z	H*	K*	N*	U*	Z*
Dec						

** Represents a contract for the next calendar year, for example in February 2024 the last eligible contract is March 2025*

Source: DBIQ

Table 8: Contract Eligibility Schedule for Cotton Optimum Yield Index

Rebalancing Month	Current Contract	Eligible Contracts 1	2	3	4	5
Jan						
Feb	H	K	N	V	Z	H*
Mar						
Apr	K	N	V	Z	H*	K*
May						
Jun	N	V	Z	H*	K*	N*
Jul						
Aug						
Sep	V	Z	H*	K*	N*	V*
Oct						
Nov	Z	H*	K*	N*	V*	Z*
Dec						

** Represents a contract for the next calendar year, for example in February 2024 the last eligible contract is March 2025*

Source: DBIQ

Table 9: Contract Eligibility Schedule for Soyabean Optimum Yield Index

Rebalancing Month	Current Contract	Eligible Contracts 1	2	3	4	5	6	7
Jan								
Feb	H	K	N	Q	U	X	F*	H*
Mar								
Apr	K	N	Q	U	X	F*	H*	K*
May								

Jun	N	Q	U	X	F*	H*	K*	N*
Jul	Q	U	X	F*	H*	K*	N*	Q*
Aug	U	X	F*	H*	K*	N*	Q*	U*
Sep								
Oct	X	F*	H*	K*	N*	Q*	U*	X*
Nov								
Dec	F*	H*	K*	N*	Q*	U*	X*	F**

** Represents a contract for the next calendar year, for example in February 2024 the last eligible contract is March 2025*
*** Represents a contract for the second next calendar year, for example in December 2024 the last eligible contract is January 2026*
Source: DBIQ

Table 10: Contract Eligibility Schedule for Soyabean Meal Optimum Yield Index

Rebalancing Month	Current Contract	Eligible Contracts 1	2	3	4	5
Jan						
Feb	H	K	N	Z	F*	H*
Mar						
Apr	K	N	Z	F*	H*	K*
May						
Jun	N	Z	F*	H*	K*	N*
Jul						
Aug						
Sep						
Oct						
Nov	Z	F*	H*	K*	N*	Z*
Dec	F*	H*	K*	N*	Z*	F**

** Represents a contract for the next calendar year, for example in February 2024 the last eligible contract is March 2025*
*** Represents a contract for the second next calendar year, for example in December 2024 the last eligible contract is January 2026*
Source: DBIQ

Table 11: Contract Eligibility Schedule for Sugar Optimum Yield Index

Rebalancing Month	Current Contract	Eligible Contracts 1	2	3	4
Jan					
Feb	H	K	N	V	H*
Mar					
Apr	K	N	V	H*	K*
May					
Jun	N	V	H*	K*	N*
Jul					
Aug					
Sep	V	H*	K*	N*	V*
Oct					
Nov					
Dec					

** Represents a contract for the next calendar year, for example in February 2024 the last eligible contract is March 2025*
Source: DBIQ

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