Deutsche Bank DBIQ Optimum Yield Commodity 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-five commodities, drawn from the energy, precious metals, industrial metals, agriculture and livestock 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 on page 3.

The DBLCI-OY indices are available for twenty-five commodities drawn from the energy, precious metals, industrial metals, agriculture and livestock sectors. Exhibit 1 details all the DBLCI-OY commodities. Both excess return (unfunded) and total return (funded) index levels based in USD are available. Further to this, hedged and un-hedged levels are available in EUR, GBP and JPY. DBLCI-OY index is also available for a basket of wheat indices. For details on this index refer to DBLCI-OY Wheat Basket Calculation on page 5.

Index Development Contacts:

London: +44 (0)207 545 0505
New York: +1 212 250 8998

Figure 1. DBLCI Optimum Yield Indices

Commodity	Symbol	Exchange	Excess Return	Total Return
Light Crude	CL	NYMEX	DBCMOCLE	DBCMOCLT
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	DBCMOGCE	DBCMOGCT
Silver	SI	COMEX	DBCMYESI	DBCMYTSI
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	DBLCYTKC
Cotton #2	CT	NYBOT	DBLCYECE	DBLCYTCT
Cocoa	CC	NYBOT	DBLCYECC	DBLCYTCC
Kansas Wheat	KW	KBOT	DBLCYEKW	DBLCYTKW
Minneapolis Wheat	MW	MGEX	DBLCOMWE	DBLCOMWT
Live Cattle	LC	CME	DBLCYELC	DBLCYTLC
Lean Hogs	LH	CME	DBLCYELH	DBLCYTLH
Feeder Cattle	FC	CME	DBLCYEFC	DBLCYTFC

Source : DBIQ

Index Calculation

DBLCI-OY Excess Return Index Calculation

The following calculations apply to all the Excess Return indices listed in figure 1. The excess return is equal to 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 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 day t
ILer(t-1)	= Excess Return Index level on index calculation day t-1
PC(t,i)	= Close price of commodity future i on 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

[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.

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. For example, if the first New York business day is May 1, 2012, and the Delivery Month of a contract currently in the index is June 2012, a new contract with a later Delivery Month will be selected.

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. For example, if the first New York business day is May 1, 2012 and the Delivery Month of the contract currently in the index is therefore June 2012, the Delivery Month of an eligible new contract must be between July 2012 and June 2013. 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
PC(t,i)	= Closing price of any eligible futures contract i
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.

Monthly Index Roll Period

If the current index holding no longer meets the inclusion criteria the monthly index roll 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:

$$N(t,i) = N(t-1,i) * \left(\frac{6 - db(t)}{7 - db(t)}\right)$$

The notional of the new commodity 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

If the current index holding continues to meet the inclusion criteria, no roll occurs and the notional holding is kept constant.

$$N(t,i) = N(t-1,i)$$

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

$$N(t,i) = N(t-1,i)$$

Historical Analysis

Historic daily index levels are available from the index inception date. The index inception date was based on the availability of price data for the relevant contracts. For CL, HO, W, C, GC and MAL from March 2003, closing price data for the underlying Commodities have been captured from the exchanges via Reuters. The closing price for MW have been captured from MWEX exchange via Reuters from Jan 2012. For all other commodities from June 2006, closing price data for the underlying commodities have been captured from the exchanges via Reuters. Prior to these dates, the sources LIM, Bloomberg, and Reuters were used to obtain close price data. For some contracts, incomplete price histories were available. In the event prices were missing for a contract on a contract selection day, the contract was excluded from the selection process. The index calculation methodology and commodity future selection are the same prior to and following March 2003 and June 2006 respectively.

Pricing for all MAL futures is not available prior to September 1997. Prior to this date the returns for the DBLCI MAL index were used as a proxy.

The DBLCI-OY RB index reflects the return of Gasoline. From the November 2005 roll period NYMEX RBOB Gasoline contracts are selected for the index. Prior to the November 2005 roll period NYMEX Unleaded Gasoline contracts were selected for the index. The DBLCI-OY index has tended to outperform the DBLCI index historically. The energy indices benefit most from the optimum yield technology.

Total Return USD Calculation

The following calculations apply to all the Total Return indices listed in figure 1. The total return index level in USD is expressed as;

$$ILBtr(t) = \left(\frac{ILB(t)}{ILB(t-1)} + Rt(t)\right) * \left(1 + Rt(t)\right)^{d(t,t-1)} * ILBtr(t-1)$$

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

Where:

ILBtr(t)	= Total Return Index level on day t
ILBtr(t-1)	= Total Return Index level on index calculation day t-1
Rt(t)	= T-bill return on day t
d(t,t-1)	= Number of calendar days between 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

Hedged and Un-Hedged Index Calculation

The total return hedged and un-hedged index levels are calculated based on WM FX data. The return from the FX hedge is accrued over the month on an ACT/ACT basis. The hedged index is expressed as

$$ILh(t) = \left[1 + \mathrm{Re}tIL(t) + \mathrm{Re}tIL(t) * FXr(t) + FXhr(t)\right] * ILh(r)$$

The un-hedged index is expressed as

$$ILuh(t) = \left[1 + \mathrm{Re}tIL(t)) * (1 + FXr(t))\right] * ILuh(r)$$

Where:

ILh(t)	= Hedged total return index level on day t
ILh(r)	= Hedged total return index level on last business day of last month r
ILuh(t)	= Un-hedged total return index level on day t
ILuh(r)	= Un-hedged total return index level on last business day of last month r

$$\mathrm{Re}tIL(t) = \frac{ILBtr(t)}{ILBtr(r)} - 1$$

$$FXr(t) = \frac{FX(t)}{FX(r)} - 1$$

FX(t) = FX rate on day t quoted Index Currency: Hedge Currency

FX(r) = FX rate on last business day of last month r quoted Index Currency: Hedge Currency

$$FXhr(t) = \left(\frac{FXh(r)}{FX(r)} - 1\right) * \frac{dy(t)}{TD}$$

FXh(r) = One-month FX forward rate on last business day of last month r quoted Index Currency: Hedge Currency

dy(t) = Number of calendar days between t and last business day of last month r

TD = Number of calendar days from last business day of immediately preceding month up to but excluding last business day in current month

Excess return hedged index levels are calculated based on WM FX data. The excess return hedged index levels represent the returns of the USD excess returns converted into the target currency. Excess return un-hedged index levels are not calculated.

The hedged index is expressed as

$$ILher(t) = \left(1 + \mathrm{Re}tIL(t) + \mathrm{Re}tILer(t) * FXr(t)\right) * ILher(r)$$

Where:

ILher(t) = Hedged excess return index level on day t

ILher(r) = Hedged excess return index level on last business day of last month r

$$\mathrm{Re}tILer(t) = \frac{ILB(t)}{ILB(r)} - 1$$

ILler(t) = Local excess return index level on day t

ILler(r) = Local excess return index level on last business day of last month r

$$FXr(t) = \frac{FX(t)}{FX(r)} - 1$$

FX(t) = FX rate on day t quoted Index Currency: Hedge Currency

FX(r) = FX rate on last business day of last month r quoted Index Currency: Hedge Currency

DBLCI-OY Wheat Basket Calculation

The DBLCI-OY Wheat Basket is based on the performance of the DBLCI-OY Chicago Wheat, Kansas Wheat and Minneapolis Wheat indices. The ER index is published on Bloomberg as DBLCOWUE <index>. It is calculated in USD ER from 08-NOV-1990 on all valid DBLCI business days. The index return is equal to the change in current atoms index levels multiplied by the relevant holdings. The excess return index level in USD is expressed as

$$ILB(t) = ILB(t-1) + \sum_i \left(ILa(t,i) - ILa(t-1,i)\right) * Ua(t,i)$$

where

ILB(t) = DBLCI-OY Wheat Basket Index level on day t

ILa(t,i) = Wheat atom i index level on day t

Ua(t,i) = Wheat atom i index holding on day t

Unit Holding Calculation

The weights for the wheat atoms are fixed at thirty three percent and one third each. The index is re-weighted on the 6th business day of November. The new holdings for each atom are calculated.

$$Ua(t+1,i) = \frac{ILB(t) * \frac{1}{3}}{ILa(t,i)}$$

For all other days the holding remains constant.

$$Ua(t+1,i) = Ua(t,i)$$

Index Guide Disclaimers

This document is intended for information only and does not create any legally binding obligations on the part of Deutsche Bank AG and/or its affiliates ("DB"). This document is intended to provide a summary of the index it purports to describe. No warranty or representation is made as to the correctness, completeness and accuracy of the information.

Without limitation, this document does not constitute an offer, an invitation to offer or a recommendation to enter into any transaction. When making an investment decision, you should rely solely on the final documentation relating to the transaction. Products based on the index or indices described in this document may not be appropriate for all investors and before entering into any transaction you should take steps to ensure that you fully understand the transaction and have made an independent assessment of the appropriateness of the transaction in the light of your own objectives and circumstances, including the possible risks and benefits of entering into such transaction. Refer to your DB Sales person for product related information. For general information regarding the nature and risks of the proposed transaction and types of financial instruments please go to www.globalmarkets.db.com/riskdisclosures. You should also consider seeking advice from your own advisers in making this assessment. If you decide to enter into a transaction with DB, you do so in reliance on your own judgment. Past performance is no indication of future results.

This material was prepared by DBIQ. It is not investment research, and has not been prepared in accordance with legal requirements designed to promote the independence of such. Any opinions expressed herein may differ from the opinions expressed by other DB departments including the Research Department. DB may engage in transactions in a manner inconsistent with any views discussed herein. DB trades or may trade as principal in instruments (or related derivatives) linked to the index or indices described in this document, and may have proprietary positions in the instruments (or related derivatives). DB may make a market in such instruments (or related derivatives), which may in extreme circumstances affect the levels of the index or indices described.

In no event shall DB have any liability (whether in negligence or otherwise) to any person in connection with such person's use of the Index, unless such use is pursuant to a transaction between that party and DB relating to the Index and such liability results from wilful default and/or gross negligence on the part of DB.

The distribution of this document and availability of related products and services in certain jurisdictions may be restricted by law. You may not distribute this document, in whole or in part, without our express written permission. DB specifically disclaims all liability for any direct, indirect, consequential or other losses or damages including loss of profits incurred by you or any third party that may arise from any reliance on this document or for the reliability, accuracy, completeness or timeliness thereof. DB is authorized by Bundesanstalt für Finanzdienstleistungsaufsicht under German Banking Law (competent authority: BaFin - Federal Financial Supervising Authority) and regulated in the UK by the Financial Services Authority for the conduct of UK business.

Unless governing law provides otherwise, all transactions should be executed through the Deutsche Bank entity in the investor's home jurisdiction. In the U.S. this report is approved and/or distributed by Deutsche Bank Securities Inc., a member of the NYSE, the NASD, NFA and SIPC. In Germany this report is approved and/or communicated by Deutsche Bank AG Frankfurt authorized by the BaFin. In the United Kingdom this report is approved and/or communicated by Deutsche Bank AG London, a member of the London Stock Exchange and regulated by the Financial Services Authority for the conduct of investment business in the UK and authorized by the BaFin. This report is distributed in Hong Kong by Deutsche Bank AG, Hong Kong Branch, in Korea by Deutsche Securities Korea Co. This report is distributed in Singapore by Deutsche Bank AG, Singapore Branch, and recipients in Singapore of this report are to contact Deutsche Bank AG, Singapore Branch in respect of any matters arising from, or in connection with, this report. Where this report is issued or promulgated in Singapore to a person who is not an accredited investor, expert investor or institutional investor (as defined in the applicable Singapore laws and regulations), Deutsche Bank AG, Singapore Branch accepts legal responsibility to such person for the contents of this report. In Japan this report is approved and/or distributed by Deutsche Securities Inc. The information contained in this report does not constitute the provision of investment advice. In Australia, retail clients should obtain a copy of a Product Disclosure Statement (PDS) relating to any financial product referred to in this report and consider the PDS before making any decision about whether to acquire the product. Deutsche Bank AG Johannesburg is incorporated in the Federal Republic of Germany (Branch Register Number in South Africa: 1998/003298/10). Additional information relative to securities, other financial products or issuers discussed in this report is available upon request. This report may not be reproduced, distributed or published by any person for any purpose without Deutsche Bank's prior written consent. Please cite source when quoting.