DB Commodity Vol Premium Index

Summary

The DB Commodity Vol Premium index aims to extract the volatility risk premium in commodity markets by implementing a fully rules-based and systematic strategy of selling delta-hedged straddles on a universe of 6 commodities selected from the energy, industrial and precious metals sectors. The commodities include Brent Crude, WTI, Natural Gas, Copper, Nickel and Gold.

The weights allocated to the individual commodity components are shown in Table 2 on the next page. The rationale for these weights is to ensure that the index represents a diversified universe of liquid commodities in the energy, precious metals and industrial metals sectors. The commodity sector allocations are similar to those seen in other ex-agriculture commodity benchmark indices.

The DB Commodity Vol Premium index assigns fixed weights to each of the individual commodity short vol component indices. Each underlying commodity short volatility index, except for gold, is a composite of 3 equally weighted sub-indices based on different rolling schedules. Each such sub-index replicates a strategy to sell straddles on 3 month futures on the underlying. The gold short volatility index comprises of 2 equally weighted sub indices which sell straddles on 4 months futures on the underlying.

The delta of the straddles in each sub-index is calculated on a daily basis and hedged by the corresponding futures contract daily at the market close. The straddle position is held to option expiry and then rolled forward. For further details on any of the sub indices please refer to the index guide for corresponding index.

Index Suite

The index is calculated and published to Bloomberg:

Index Name	Return Type	Currency	Bloomberg Ticker
DB Commodity Vol Premium Index	ER	USD	DBCMCVPU

Index Development Contacts:

London: +44 (0)207 545 0505
Hong Kong: +852 2203 6786
New York: +1 212 250 8998

Key Index Information

Index Inception Date

11- Dec-2007

Index Live Date

12-Sep-2014

Index Calculation Holiday Calendar

LDN, NYM

Index Rebalancing Date

The index rebalances on the day corresponding to the relevant Option Expiry date of Brent Options. If such day is a holiday for index, the index will rebalance on next business day.

Index Rules and Calculations

Market Data Sources

Commodity future and option prices are based on exchange close settlement prices for the relevant contract and exchange.

Underlying Indices and the weights

Table 2

Index	BBG Ticker	Weight
DB Commodity Brent Short Vol II Index	DBCMBSV2	16%
DB Commodity WTI Short Vol II Index	DBCMWSV2	16%
DB Commodity Natural Gas Short Vol II Index	DBCMHSV2	14%
DB Commodity Copper Short Vol II Index	DBCMCSV2	18%
DB Commodity Nickel Short Vol II Index	DBCMNSV2	18%
DB Commodity Gold Short Vol II Index	DBCMGSV2	18%

Index Calculation

DB Commodity Vol Premium Index is calculated on each valid business day as follows,

$$IL(t,ER) = IL(t-1,ER) + \sum_{i=1}^{6}[I(i,t,ER) - I(i,t-1,ER)] \times N(t-1,i)$$

Where:

IL(t,ER) = Index level of DB Commodity Vol Premium Index on day t

I(i,t,ER) = Index level of Short vol index for commodity i on day t

N(t,i) = Notional holdings of Short vol index for commodity i on day t

Notional Holdings

On any day apart from the rebalancing day the notional holdings remain constant,

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

It t is the rebalancing date

$$N(t,i) = W(i) * \frac{IL(t,ER)}{I(i,t,ER)}$$

Where, W(i) is the weight of commodity i on the rebalance date as given in table 2.

DB Commodity Brent Short Volatility II Index

Summary

The DB Commodity Brent Short Volatility index is based on a systematic short volatility strategy. The Index comprises of 3 equally weighted sub-indices reweighted on an annual basis. Each sub-index replicates a strategy to sell straddles on 3 month futures on Brent. The delta of the straddles in each sub-index is calculated on a daily basis and hedged at the market close. The straddle position is held to option expiry and then rolled for further 3 months. The index return is based on the return from straddle position and the delta hedged position.

Index Suite

The index is calculated and published to Bloomberg in the following versions;

Index Name	Return Type	Currency	Bloomberg Ticker
DB Commodity Brent Short Volatility II Index	ER	USD	DBCMBSV2
DB Commodity Brent Short Volatility II Sub index I	ER	USD	DBCMBS12
DB Commodity Brent Short Volatility II Sub index II	ER	USD	DBCMBS22
DB Commodity Brent Short Volatility II Sub index III	ER	USD	DBCMBS32

Key Index Information

Index Inception Date

11- Dec-2007

Index Live Date

24-Mar-2014

Index Calculation Holiday Calendar

London City

Index Rebalancing Date

Business day corresponding to the relevant December Option Expiry Date

Sub Index Rebalancing Date

Business Day corresponding to the relevant Option Expiry Date of option based on every third month future

Index Rules and Calculations

Market Data Sources

Commodity future and option prices are based on exchange close settlement prices for the relevant contract and exchange.

Sub index Calculation

Each of the three sub-indices will have an identical construction with the exception of the Rebalance Date.

Each of the sub indices sells an equal number of call options and put options on the rebalance date (Straddle position). Every day the delta position implied by these options is hedged by buying the delta amount of underlying future. At the expiry date of the option, the index rolls into the next future contract in the index.

The 3 sub indices roll their position based on following month's futures on rebalance dates

Index Name	Future Contract Roll schedule
DB Commodity Brent Short Volatility II Sub Index 1	H-M-U-Z
DB Commodity Brent Short Volatility II Sub Index 2	G-K-Q-X
DB Commodity Brent Short Volatility II Sub Index 3	F-J-N-V

The index Level for each of the sub index on a day t is sum of 1)the index level on previous day, 2) the sum product of a)number of options sold on previous rebalance date and b) the change in option price from previous day, for each of the call and put, 3) product of a) Number of options sold, b) The implied delta position on previous day, c) The change in underlying future price from previous day

We calculate each of the sub Index ER level on all valid London City business days as follows.

$$IL(t) = IL(t-1) + U_{S,r,t} \times [(S_t - S_{t-1})]$$
$$+ U_{O,r,t} \times [C(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC}) + P(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})]$$

Where:

IL(t) = Index level on day t

r = Rebalancing Date immediately preceding t. In case t is a rebalancing day, r will be the previous rebalancing date.

S_t = The respective future price for the Brent future on day t

$U_{S,r,t}$ = Unit holdings for the underlying future for the respective sub index.

On any day t, the new unit holdings for the underlying future are adjusted by the delta of the options on previous day. This amount is calculated as,

$$U_{S,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r} \times (\Delta^{call}_{t-1} + \Delta^{put}_{t-1})$$

$$\Delta^{call}_{t} = \Phi(d_1)$$

$$\Delta^{Put}_{t} = \Phi(d_1) - 1$$

Φ is the standard normal cumulative distribution function and d_1 is defined in section Option Price Calculation.

$U_{O,r,t}$ = Unit holdings for the call and put options for the respective sub index.

On the rebalance day r the amount of call and put options to be sold are calculated as,

$$U_{O,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r}$$

T is equal to the time to maturity(ACT/365 basis) of the option on rebalance date r. It is calculated as,

$$T = \frac{E - r}{365}$$

T_{r+1} = The next rebalancing date of the sub index (also the expiry of the option)

S_r = The respective future price for the Brent future on rebalance day r

$C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a call option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its call option price, which is calculated as max (0,S_r - K_r). The prices for old security on the expiry date are not published by exchange.

$P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a put option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its put option price, which is calculated as max (0,K_r - S_r).. The prices for old security on the expiry date are not published by exchange.

Option Price Calculation

For each sub index the strike of the option on the rebalance date is calculated as the closest integer strike to the at the money future price on such date. The index sells a call and a put at this strike on rebalance date for the option related to respective future. The expiry of these options is the option expiry corresponding to the future.

The exchange publishes the option prices corresponding to each integer strike. The below formulae are used to calculate the price using the after cost volatility.

$$C\left(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}\right) = S_t\Phi(d_1) - K_r\Phi(d_2)$$

$$P\left(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}\right) = K_r\Phi(-d_2) - S_t\Phi(-d_1)$$

$$d_1 = \frac{\ln\left(\frac{S_t}{K_r}\right) + \frac{1}{2}(\sigma_t^{AC})^2(T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

$$d_2 = \frac{\ln\left(\frac{S_t}{K_r}\right) - \frac{1}{2}(\sigma_t^{AC})^2(T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

σ_t^{AC} is the after cost implied volatility of the relevant option and it is obtained from the implied volatility of the relevant exchange traded option. Details about the cost calculation are available from us on request. Please contact index.data@db.com for any such request.

σ_t is the volatility of the call option which has strike K_r and is calculated using standard Black's model.

K_r = Option strike. It is the integer value closest to the at the money forward future price on the rebalance date r. For avoidance of any doubt, the strike will be rounded up in case of a tie.

Main index Calculation

DB Commodity Brent Short Volatility II Index is calculated on each valid London city business day as follows,

$$IL(t, ER) = IL(t-1, ER) + \sum_{i=1}^{3}[I(i,t,ER) - I(i,t-1,ER)] \times N(t-1,i)$$

Where:

IL(t,ER) = Index level of DB Commodity Brent Short Volatility II Index on day t

I(i,t,ER) = Index level of sub index i on day t

N(t,i) = Notional holdings of sub index i on day t

Notional Holdings

The index rebalances on the option expiry date of Z contract of Brent Crude every year. On any other day the notional holdings remain constant,

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

It t is the rebalancing date

$$N(t,i) = \frac{IL(t,ER)}{3*(I(i,t,ER)}$$

DB Commodity WTI Short Volatility II Index

Summary

The DB Commodity WTI Short Volatility index is based on a systematic short volatility strategy. The Index comprises of 3 equally weighted sub-indices reweighted on an annual basis. Each sub-index replicates a strategy to sell straddles on 3 month futures on WTI. The delta of the straddles in each sub-index is calculated on a daily basis and hedged at the market close. The straddle position is held to option expiry and then rolled for further 3 months. The index return is based on the return from straddle position and the delta hedged position.

Index Suite

The index is calculated and published to Bloomberg in the following versions;

Index Name	Return Type	Currency	Bloomberg Ticker
DB Commodity WTI Short Volatility II Index	ER	USD	DBCMWSV2
DB Commodity WTI Short Volatility II Sub index I	ER	USD	DBCMWS12
DB Commodity WTI Short Volatility II Sub index II	ER	USD	DBCMWS22
DB Commodity WTI Short Volatility II Sub index III	ER	USD	DBCMWS32

Key Index Information

Index Inception Date

14- Dec-2006

Index Live Date

11-Jul-2014

Index Calculation Holiday Calendar

NYM

Index Rebalancing Date

Business day corresponding to the relevant December Option Expiry Date

Sub Index Rebalancing Date

Business Day corresponding to the relevant Option Expiry Date of option based on every third month future

Index Rules and Calculations

Market Data Sources

Commodity future and option prices are based on exchange close settlement prices for the relevant contract and exchange.

Sub index Calculation

Each of the three sub-indices will have an identical construction with the exception of the Rebalance Date.

Each of the sub indices sells an equal number of call options and put options on the rebalance date (Straddle position). Every day the delta position implied by these options is hedged by buying the delta amount of underlying future. At the expiry date of the option, the index rolls into the next future contract in the index.

The 3 sub indices roll their position based on following month's futures on rebalance dates

Index Name	Future Contract Roll schedule
DB Commodity WTI Short Volatility II Sub Index 1	H-M-U-Z
DB Commodity WTI Short Volatility II Sub Index 2	G-K-Q-X
DB Commodity WTI Short Volatility II Sub Index 3	F-J-N-V

The index Level for each of the sub index on a day t is sum of 1)the index level on previous day, 2) the sum product of a)number of options sold on previous rebalance date and b) the change in option price from previous day, for each of the call and put, 3) product of a) Number of options sold, b) The implied delta position on previous day, c) The change in underlying future price from previous day

We calculate each of the sub Index ER level on all valid London City business days as follows.

$$IL(t) = IL(t-1) + U_{S,r,t} \times [(S_t - S_{t-1})]$$
$$+ U_{O,r,t} \times [C(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC}) + P(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})]$$

Where:

IL(t) = Index level on day t

r = Rebalancing Date immediately preceding t. In case t is a rebalancing day, r will be the previous rebalancing date.

S_t = The respective future price for the WTI future on day t

$U_{S,r,t}$ = Unit holdings for the underlying future for the respective sub index.

On any day t, the new unit holdings for the underlying future are adjusted by the delta of the options on previous day. This amount is calculated as,

$$U_{S,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r} \times (\Delta^{call}_{t-1} + \Delta^{put}_{t-1})$$

$$\Delta^{call}_{t} = \Phi(d_1)$$

$$\Delta^{Put}_{t} = \Phi(d_1) - 1$$

Φ is the standard normal cumulative distribution function and d_1 is defined in section Option Price Calculation.

$U_{O,r,t}$ = Unit holdings for the call and put options for the respective sub index.

On the rebalance day r the amount of call and put options to be sold are calculated as,

$$U_{O,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r}$$

T is equal to the time to maturity(ACT/365 basis) of the option on rebalance date r. It is calculated as,

$$T = \frac{E - r}{365}$$

T_{r+1} = The next rebalancing date of the sub index (also the expiry of the option)

S_r = The respective future price for the WTI future on rebalance day r

$C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a call option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its call option price, which is calculated as max (0,S_r - K_r). The prices for old security on the expiry date are not published by exchange.

$P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a put option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its put option price, which is calculated as max (0,K_r - S_r).. The prices for old security on the expiry date are not published by exchange.

Option Price Calculation

For each sub index the strike of the option on the rebalance date is calculated as the closest integer strike to the at the money future price on such date. The index sells a call and a put at this strike on rebalance date for the option related to respective future. The expiry of these options is the option expiry corresponding to the future.

The exchange publishes the option prices corresponding to each integer strike. The below formulae are used to calculate the price using the after cost volatility.

$$C(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = S_t\Phi(d_1) - K_r\Phi(d_2)$$

$$P(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = K_r\Phi(-d_2) - S_t\Phi(-d_1)$$

$$d_1 = \frac{\ln\left(\frac{S_t}{K_r}\right) + \frac{1}{2}(\sigma_t^{AC})^2(T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

$$d_2 = \frac{\ln\left(\frac{S_t}{K_r}\right) - \frac{1}{2}(\sigma_t^{AC})^2(T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

σ_t^{AC} is the after cost implied volatility of the relevant option and it is obtained from the implied volatility of the relevant exchange traded option. Details about the cost calculation are available from us on request. Please contact index.data@db.com for any such request.

σ_t is the volatility of the call option which has strike K_r and is calculated using standard Black's model.

K_r = Option strike. It is the integer value closest to the at the money forward future price on the rebalance date r. For avoidance of any doubt, the strike will be rounded up in case of a tie.

Main index Calculation

DB Commodity WTI Short Volatility II Index is calculated on each valid London city business day as follows,

$$IL(t, ER) = IL(t-1, ER) + \sum_{i=1}^{3}[I(i,t,ER) - I(i,t-1,ER)] \times N(t-1,i)$$

Where:

IL(t,ER) = Index level of DB Commodity WTI Short Volatility II Index on day t

I(i,t,ER) = Index level of sub index i on day t

N(t,i) = Notional holdings of sub index i on day t

Notional Holdings

The index rebalances on the option expiry date of Z contract of WTI Crude every year. On any other day the notional holdings remain constant,

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

It t is the rebalancing date

$$N(t,i) = \frac{IL(t,ER)}{3 * (I(i,t,ER)}$$

DB Commodity Natural Gas Short Volatility II Index

Summary

The DB Commodity Natural Gas Short Volatility index is based on a systematic short volatility strategy. The Index comprises of 3 equally weighted sub-indices reweighted on an annual basis. Each sub-index replicates a strategy to sell straddles on 3 month futures on Natural Gas. The delta of the straddles in each sub-index is calculated on a daily basis and hedged at the market close. The straddle position is held to option expiry and then rolled for further 3 months. The index return is based on the return from straddle position and the delta hedged position.

Index Suite

The index is calculated and published to Bloomberg in the following versions;

Index Name	Return Type	Currency	Bloomberg Ticker
DB Commodity Natural Gas Short Volatility II Index	ER	USD	DBCMHSV2
DB Commodity NG Short Volatility II Sub index I	ER	USD	DBCMHS12
DB Commodity NG Short Volatility II Sub index II	ER	USD	DBCMHS22
DB Commodity NG Short Volatility II Sub index III	ER	USD	DBCMHS32

Key Index Information

Index Inception Date

14- Dec-2006

Index Live Date

27-Aug-2014

Index Calculation Holiday Calendar

NYM

Index Rebalancing Date

Business day corresponding to the relevant December Option Expiry Date

Sub Index Rebalancing Date

Business Day corresponding to the relevant Option Expiry Date of option based on every third month future

Index Rules and Calculations

Market Data Sources

Commodity future and option prices are based on exchange close settlement prices for the relevant contract and exchange.

Sub index Calculation

Each of the three sub-indices will have an identical construction with the exception of the Rebalance Date.

Each of the sub indices sells an equal number of call options and put options on the rebalance date (Straddle position). Every day the delta position implied by these options is hedged by buying the delta amount of underlying future. At the expiry date of the option, the index rolls into the next future contract in the index.

The 3 sub indices roll their position based on following month's futures on rebalance dates

Index Name	Future Contract Roll schedule
DB Commodity NG Short Volatility II Sub Index 1	H-M-U-Z
DB Commodity NG Short Volatility II Sub Index 2	G-K-Q-X
DB Commodity NG Short Volatility II Sub Index 3	F-J-N-V

The index Level for each of the sub index on a day t is sum of 1)the index level on previous day, 2) the sum product of a)number of options sold on previous rebalance date and b) the change in option price from previous day, for each of the call and put, 3) product of a) Number of options sold, b) The implied delta position on previous day, c) The change in underlying future price from previous day

We calculate each of the sub Index ER level on all valid London City business days as follows.

$$IL(t) = IL(t-1) + U_{S,r,t} \times [(S_t - S_{t-1})]$$
$$+ U_{O,r,t} \times [C(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC}) + P(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})]$$

Where:

IL(t) = Index level on day t

r = Rebalancing Date immediately preceding t. In case t is a rebalancing day, r will be the previous rebalancing date.

S_t = The respective future price for the NG future on day t

$U_{S,r,t}$ = Unit holdings for the underlying future for the respective sub index.

On any day t, the new unit holdings for the underlying future are adjusted by the delta of the options on previous day. This amount is calculated as,

$$U_{S,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r} \times (\Delta^{call}_{t-1} + \Delta^{put}_{t-1})$$

$$\Delta^{call}_{t} = \Phi(d_1)$$

$$\Delta^{Put}_{t} = \Phi(d_1) - 1$$

Φ is the standard normal cumulative distribution function and d_1 is defined in section Option Price Calculation.

$U_{O,r,t}$ = Unit holdings for the call and put options for the respective sub index.

On the rebalance day r the amount of call and put options to be sold are calculated as,

$$U_{O,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r}$$

T is equal to the time to maturity(ACT/365 basis) of the option on rebalance date r. It is calculated as,

$$T = \frac{E - r}{365}$$

T_{r+1} = The next rebalancing date of the sub index (also the expiry of the option)

S_r = The respective future price for the NATURAL GAS future on rebalance day r

$C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a call option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its call option price, which is calculated as max (0,S_r - K_r). The prices for old security on the expiry date are not published by exchange.

$P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a put option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its put option price, which is calculated as max (0,K_r - S_r).. The prices for old security on the expiry date are not published by exchange.

Option Price Calculation

For each sub index the strike of the option on the rebalance date is calculated as the closest integer strike to the at the money future price on such date. The index sells a call and a put at this strike on rebalance date for the option related to respective future. The expiry of these options is the option expiry corresponding to the future.

The exchange publishes the option prices corresponding to each integer strike. The below formulae are used to calculate the price using the after cost volatility.

$$C(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = S_t\Phi(d_1) - K_r\Phi(d_2)$$

$$P(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = K_r\Phi(-d_2) - S_t\Phi(-d_1)$$

$$d_1 = \frac{\ln\left(\frac{S_t}{K_r}\right) + \frac{1}{2}(\sigma_t^{AC})^2(T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

$$d_2 = \frac{\ln\left(\frac{S_t}{K_r}\right) - \frac{1}{2}(\sigma_t^{AC})^2(T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

σ_t^{AC} is the after cost implied volatility of the relevant option and it is obtained from the implied volatility of the relevant exchange traded option. Details about the cost calculation are available from us on request. Please contact index.data@db.com for any such request.

σ_t is the volatility of the call option which has strike K_r and is calculated using standard Black's model.

K_r = Option strike. It is the integer value closest to the at the money forward future price on the rebalance date r. For avoidance of any doubt, the strike will be rounded up in case of a tie.

Main index Calculation

DB Commodity Natural Gas Short Volatility II Index is calculated on each valid London city business day as follows,

$$IL(t, ER) = IL(t-1, ER) + \sum_{i=1}^{3}[I(i,t,ER) - I(i,t-1,ER)] \times N(t-1,i)$$

Where:

IL(t,ER) = Index level of DB Commodity NATURAL GAS Short Volatility II Index on day t

I(i,t,ER) = Index level of sub index i on day t

N(t,i) = Notional holdings of sub index i on day t

Notional Holdings

The index rebalances on the option expiry date of Z contract of Natural Gas every year. On any other day the notional holdings remain constant,

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

It t is the rebalancing date

$$N(t,i) = \frac{IL(t,ER)}{3 * (I(i,t,ER)}$$

DB Commodity Copper Short Volatility II Index

Summary

The DB Commodity Copper Short Volatility index is based on a systematic short volatility strategy. The Index comprises of 3 equally weighted sub-indices reweighted on an annual basis. Each sub-index replicates a strategy to sell straddles on 3 month futures on Copper. The delta of the straddles in each sub-index is calculated on a daily basis and hedged at the market close. The straddle position is held to option expiry and then rolled for further 3 months. The index return is based on the return from straddle position and the delta hedged position.

Index Suite

The index is calculated and published to Bloomberg in the following versions;

Index Name	Return Type	Currency	Bloomberg Ticker
DB Commodity Copper Short Volatility II Index	ER	USD	DBCMCSV2

Key Index Information

Index Inception Date

7- Dec-2005

Index Live Date

24-Aug-2014

Index Calculation Holiday Calendar

London City

Index Rebalancing Date

Business day corresponding to the relevant December Option Expiry Date

Sub Index Rebalancing Date

Business Day corresponding to the relevant Option Expiry Date of option based on every third month future

Index Rules and Calculations

Market Data Sources

Commodity future and option prices are based on exchange close settlement prices for the relevant contract and exchange.

Sub index Calculation

Each of the three sub-indices will have an identical construction with the exception of the Rebalance Date.

Each of the sub indices sells an equal number of call options and put options on the rebalance date (Straddle position). Every day the delta position implied by these options is hedged by buying the delta amount of underlying future. At the expiry date of the option, the index rolls into the next future contract in the index.

The 3 sub indices roll their position based on following month's futures on rebalance dates,

Index Name	Future Contract Roll schedule
DB Commodity Copper Short Volatility II Sub Index 1	G-K-Q-X
DB Commodity Copper Short Volatility II Sub Index 2	F-J-N-V
DB Commodity Copper Short Volatility II Sub Index 3	H-M-U-Z

The index Level for each of the sub index on a day t is sum of 1)the index level on previous day, 2) the sum product of a)number of options sold on previous rebalance date and b) the change in option price from previous day, for each of the call and put, 3) product of a) Number of options sold, b) The implied delta position on previous day, c) The change in underlying future price from previous day

We calculate each of the sub Index ER level on all valid London City business days as follows.

$$IL(t) = IL(t-1) + U_{S,r,t} \times [(S_t - S_{t-1})]$$
$$+ U_{O,r,t} \times [C(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC}) + P(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})]$$

Where:

IL(t) = Index level on day t

r = Rebalancing Date immediately preceding t. In case t is a rebalancing day, r will be the previous rebalancing date.

S_t = the respective future price for the Copper future on day t

$U_{S,r,t}$ = Unit holdings for the underlying future for the respective sub index.

On any day t, the new unit holdings for the underlying future are adjusted by the delta of the options on previous day. This amount is calculated as,

$$U_{S,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r} \times (\Delta^{call}_{t-1} + \Delta^{put}_{t-1})$$

$$\Delta^{call}_{t} = \Phi(d_1)$$

$$\Delta^{Put}_{t} = \Phi(d_1) - 1$$

Φ is the standard normal cumulative distribution function and d_1 is defined in section Option Price Calculation.

$U_{O,r,t}$ = Unit holdings for the call and put options for the respective sub index.

On the rebalance day r the amount of call and put options to be sold are calculated as,

$$U_{O,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r}$$

T is equal to the time to maturity (ACT/365 basis) of the option on rebalance date r. It is calculated as,

$$T = \frac{E - r}{365}$$

T_{r+1} = The next rebalancing date of the sub index (also the expiry of the option)

S_r = The respective future price for the Copper future on rebalance day r

$C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a call option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its call option price, which is calculated as max (0,S_r - K_r). The prices for old security on the expiry date are not published by exchange.

$P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a put option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its put option price, which is calculated as max (0,K_r - S_r).. The prices for old security on the expiry date are not published by exchange.

Option Price Calculation

For each sub index the strike of the option on the rebalance date is calculated as the strike in multiples of 25 which is closest to the at the money future price on such date. The index sells a call and a put at this strike on rebalance date for the option related to respective future. The expiry of these options is the option expiry corresponding to the future.

The LME exchange publishes the volatilities corresponding to 10% delta and 25% delta for call and -10% delta and -25% delta for put along with 50% delta option (ATM). We calculate the strike corresponding to each of these option volatilities in following manner.

For call options

$$K_{t,i} = S_t * \exp\left[\frac{\sigma_t^2 * (T_{R+1} - t)}{2} - \Phi^{-1}(\Delta_i) * \sigma_t * \sqrt{(T_{R+1} - t)}\right]$$

For put options

$$K_{t,i} = S_t * \exp\left[\frac{\sigma_t^2 * (T_{R+1} - t)}{2} + \Phi^{-1}(-\Delta_i) * \sigma_t * \sqrt{(T_{R+1} - t)}\right]$$

On the rebalance date the strike of the straddle options is calculated and fixed until the next rebalance as the strike in multiple of 25 which is closest to the at the money future price on that date.

On any index day t (excluding the rebalance date), the implied volatility σ_t corresponding to the strike fixed on the previous rebalance date is calculated using a linear interpolation (in strike) from LME published "delta" volatilities. If the fixed strike has a delta greater than -10% for puts or less than 10% for calls, the respective LME 10 delta implied volatility will be used.

On any day t, a linear interpolation is done on the volatilities captured for the 5 different delta options with the strikes calculated as above on the straddle strike (K_r). This gives us the volatility σ_t which is used in calculating σ_t^{AC} .

σ_t^{AC} is the after cost implied volatility of the relevant option and it is obtained from the implied volatility of the relevant exchange traded option. Details about the cost calculation are available from us on request. Please contact index.data@db.com for any such request.

σ_t is the volatility of the call option which has strike K_r and is calculated using standard Black's model.

The below formulae are used to calculate the price using the after cost volatility.

$$C(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = \exp\left[-r_t * (T_{R+1} - t)\right] * \left[S_t * \Phi(d1) - K_r * \Phi(d_2)\right]$$

$$P(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = \exp\left[-r_t * (T_{R+1} - t)\right] * \left[K_r * \Phi(-d_2) - S_t * \Phi(-d1)\right]$$

where

$$d_1 = \frac{\ln\left(\frac{S_t}{K_r}\right) + \frac{1}{2}(\sigma_t^{AC})^2 (T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

$$d_2 = \frac{\ln\left(\frac{S_t}{K_r}\right) - \frac{1}{2}(\sigma_t^{AC})^2 (T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

K_r = Option strike. It is a value in multiple of 25, which is closest to the at the money forward future price on the rebalance date r. For avoidance of any doubt, the strike will be rounded up in case of a tie.

r_r = 3 month Libor interest rate on day t as published by ICE (US0003M Index on Blooomberg)

Main index Calculation

DB Commodity Copper Short Volatility II Index is calculated on each valid London city business day as follows,

$$IL(t, ER) = IL(t-1, ER) + \sum_{i=1}^{3} [I(i, t, ER) - I(i, t-1, ER)] \times N(t-1, i)$$

Where:

IL(t,ER) = Index level of DB Commodity Copper Short Volatility II Index on day t

I(i,t,ER) = Index level of sub index i on day t

N(t,i) = Notional holdings of sub index i on day t

Notional Holdings

The index rebalances on the option expiry date of Z contract of LME Copper every year. On any other day the notional holdings remain constant,

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

It t is the rebalancing date

$$N(t,i) = \frac{IL(t,ER)}{3*(I(i,t,ER)}$$

DB Commodity Nickel Short Volatility II Index

Summary

The DB Commodity Nickel Short Volatility index is based on a systematic short volatility strategy. The Index comprises of 3 equally weighted sub-indices reweighted on an annual basis. Each sub-index replicates a strategy to sell straddles on 3 month futures on Nickel. The delta of the straddles in each sub-index is calculated on a daily basis and hedged at the market close. The straddle position is held to option expiry and then rolled for further 3 months. The index return is based on the return from straddle position and the delta hedged position.

Index Suite

The index is calculated and published to Bloomberg in the following versions;

Index Name	Return Type	Currency	Bloomberg Ticker
DB Commodity Nickel Short Volatility II Index	ER	USD	DBCMNSV2

Key Index Information

Index Inception Date

7- Dec-2005

Index Live Date

24-Aug-2014

Index Calculation Holiday Calendar

London City

Index Rebalancing Date

Business day corresponding to the relevant December Option Expiry Date

Sub Index Rebalancing Date

Business Day corresponding to the relevant Option Expiry Date of option based on every third month future

Index Rules and Calculations

Market Data Sources

Commodity future and option prices are based on exchange close settlement prices for the relevant contract and exchange.

Sub index Calculation

Each of the three sub-indices will have an identical construction with the exception of the Rebalance Date.

Each of the sub indices sells an equal number of call options and put options on the rebalance date (Straddle position). Every day the delta position implied by these options is hedged by buying the delta amount of underlying future. At the expiry date of the option, the index rolls into the next future contract in the index.

The 3 sub indices roll their position based on following month's futures on rebalance dates,

Index Name	Future Contract Roll schedule
DB Commodity Nickel Short Volatility II Sub Index 1	G-K-Q-X
DB Commodity Nickel Short Volatility II Sub Index 2	F-J-N-V
DB Commodity Nickel Short Volatility II Sub Index 3	H-M-U-Z

The index Level for each of the sub index on a day t is sum of 1)the index level on previous day, 2) the sum product of a)number of options sold on previous rebalance date and b) the change in option price from previous day, for each of the call and put, 3) product of a) Number of options sold, b) The implied delta position on previous day, c) The change in underlying future price from previous day

We calculate each of the sub Index ER level on all valid London City business days as follows.

$$IL(t) = IL(t-1) + U_{S,r,t} \times [(S_t - S_{t-1})]$$
$$+ U_{O,r,t} \times [C(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC}) + P(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})]$$

Where:

IL(t) = Index level on day t

r = Rebalancing Date immediately preceding t. In case t is a rebalancing day, r will be the previous rebalancing date.

S_t = the respective future price for the Nickel future on day t

$U_{S,r,t}$ = Unit holdings for the underlying future for the respective sub index.

On any day t, the new unit holdings for the underlying future are adjusted by the delta of the options on previous day. This amount is calculated as,

$$U_{S,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r} \times (\Delta^{call}_{t-1} + \Delta^{put}_{t-1})$$

$$\Delta^{call}_{t} = \Phi(d_1)$$

$$\Delta^{Put}_{t} = \Phi(d_1) - 1$$

Φ is the standard normal cumulative distribution function and d_1 is defined in section Option Price Calculation.

$U_{O,r,t}$ = Unit holdings for the call and put options for the respective sub index.

On the rebalance day r the amount of call and put options to be sold are calculated as,

$$U_{O,r,t} = \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r}$$

T is equal to the time to maturity (ACT/365 basis) of the option on rebalance date r. It is calculated as,

$$T = \frac{E - r}{365}$$

T_{r+1} = The next rebalancing date of the sub index (also the expiry of the option)

S_r = The respective future price for the Nickel future on rebalance day r

$C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a call option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its call option price, which is calculated as max (0,S_r - K_r). The prices for old security on the expiry date are not published by exchange.

$P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a put option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its put option price, which is calculated as max (0,K_r - S_r).. The prices for old security on the expiry date are not published by exchange.

Option Price Calculation

For each sub index the strike of the option on the rebalance date is calculated as the strike in multiples of 25 which is closest to the at the money future price on such date. The index sells a call and a put at this strike on rebalance date for the option related to respective future. The expiry of these options is the option expiry corresponding to the future.

The LME exchange publishes the volatilities corresponding to 10% delta and 25% delta for call and -10% delta and -25% delta for put along with 50% delta option (ATM). We calculate the strike corresponding to each of these option volatilities in following manner.

For call options

$$K_{t,i} = S_t * \exp\left[\frac{\sigma_t^2 * (T_{R+1} - t)}{2} - \Phi^{-1}(\Delta_i) * \sigma_t * \sqrt{(T_{R+1} - t)}\right]$$

For put options

$$K_{t,i} = S_t * \exp\left[\frac{\sigma_t^2 * (T_{R+1} - t)}{2} + \Phi^{-1}(-\Delta_i) * \sigma_t * \sqrt{(T_{R+1} - t)}\right]$$

On the rebalance date the strike of the straddle options is calculated and fixed until the next rebalance as the strike in multiple of 25 which is closest to the at the money future price on that date.

On any index day t (excluding the rebalance date), the implied volatility σ_t corresponding to the strike fixed on the previous rebalance date is calculated using a linear interpolation (in strike) from LME published "delta" volatilities. If the fixed strike has a delta greater than -10% for puts or less than 10% for calls, the respective LME 10 delta implied volatility will be used.

On any day t, a linear interpolation is done on the volatilities captured for the 5 different delta options with the strikes calculated as above on the straddle strike (K_r). This gives us the volatility σ_t which is used in calculating σ_t^{AC} .

σ_t^{AC} is the after cost implied volatility of the relevant option and it is obtained from the implied volatility of the relevant exchange traded option. Details about the cost calculation are available from us on request. Please contact index.data@db.com for any such request.

σ_t is the volatility of the call option which has strike K_r and is calculated using standard Black's model.

The below formulae are used to calculate the price using the after cost volatility.

$$C(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = \exp\left[-r_t * (T_{R+1} - t)\right] * \left[S_t * \Phi(d1) - K_r * \Phi(d_2)\right]$$

$$P(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = \exp\left[-r_t * (T_{R+1} - t)\right] * \left[K_r * \Phi(-d_2) - S_t * \Phi(-d1)\right]$$

where

$$d_1 = \frac{\ln\left(\frac{S_t}{K_r}\right) + \frac{1}{2}(\sigma_t^{AC})^2 (T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

$$d_2 = \frac{\ln\left(\frac{S_t}{K_r}\right) - \frac{1}{2}(\sigma_t^{AC})^2 (T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

K_r = Option strike. It is a value in multiple of 25, which is closest to the at the money forward future price on the rebalance date r. For avoidance of any doubt, the strike will be rounded up in case of a tie.

r_r = 3 month Libor interest rate on day t as published by ICE (US0003M Index on Blooomberg)

Main index Calculation

DB Commodity Nickel Short Volatility II Index is calculated on each valid London city business day as follows,

$$IL(t, ER) = IL(t-1, ER) + \sum_{i=1}^{3} [I(i, t, ER) - I(i, t-1, ER)] \times N(t-1, i)$$

Where:

IL(t,ER) = Index level of DB Commodity Nickel Short Volatility II Index on day t

I(i,t,ER) = Index level of sub index i on day t

N(t,i) = Notional holdings of sub index i on day t

Notional Holdings

The index rebalances on the option expiry date of Z contract of LME Nickel every year. On any other day the notional holdings remain constant,

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

It t is the rebalancing date

$$N(t,i) = \frac{IL(t,ER)}{3*(I(i,t,ER)}$$

DB Commodity Gold Short Volatility II Index

Summary

The DB Commodity Gold Short Volatility index is based on a systematic short volatility strategy. The Index comprises of 2 equally weighted sub-indices reweighted on an annual basis. Each sub-index replicates a strategy to sell straddles on 4 month futures on Gold. The delta of the straddles in each sub-index is calculated on a daily basis and hedged at the market close. The straddle position is held to option expiry and then rolled for further 4 months. The index return is based on the return from straddle position and the delta hedged position.

Index Suite

The index is calculated and published to Bloomberg in the following versions;

Index Name	Return Type	Currency	Bloomberg Ticker
DB Commodity Gold Short Volatility II Index	ER	USD	DBCMGSV2
DB Commodity Gold Short Volatility II Sub index I	ER	USD	NA
DB Commodity Gold Short Volatility II Sub index II	ER	USD	NA

Key Index Information

Index Inception Date

25-Jan-2007

Index Live Date

07-July-2014

Index Calculation Holiday Calendar

London City

Index Rebalancing Date

Business day corresponding to the relevant December Option Expiry Date

Sub Index Rebalancing Date

Business Day corresponding to the relevant Option Expiry Date of option based on every fourth month future

Index Rules and Calculations

Market Data Sources

Commodity future and option prices are based on exchange close settlement prices for the relevant contract and exchange.

Sub index Calculation

Each of the two sub-indices will have an identical construction with the exception of the Rebalance Date.

Each of the sub indices sells an equal number of call options and put options on the rebalance date (Straddle position). Every day the delta position implied by these options is hedged by buying the delta amount of underlying future. At the expiry date of the option, the index rolls into the next future contract in the index.

The 2 sub indices roll their position based on following month's futures on rebalance dates,

Index Name	Future Contract Roll schedule
DB Commodity Gold Short Volatility II Sub Index 1	J-Q-Z
DB Commodity Gold Short Volatility II Sub Index 2	G-M-V

The index Level for each of the sub index on a day t is sum of 1)the index level on previous day, 2) the sum product of a)number of options sold on previous rebalance date and b) the change in option price from previous day, for each of the call and put, 3) product of a) Number of options sold, b) The implied delta position on previous day, c) The change in underlying future price from previous day

We calculate each of the sub Index ER level on all valid London City business days as follows.

$$IL(t) = IL(t-1) + U_{S,r,t} \times [(S_t - S_{t-1})]$$
$$+ U_{O,r,t} \times [C(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC}) + P(t-1, T_{r+1}, S_t, K_r, \sigma_t^{AC}) - P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})]$$

Where:

IL(t) = Index level on day t

r = Rebalancing Date immediately preceding t. In case t is a rebalancing day, r will be the previous rebalancing date.

S_t = The respective future price for the Gold future on day t

$U_{S,r,t}$ = Unit holdings for the underlying future for the respective sub index.

On any day t, the new unit holdings for the underlying future are adjusted by the delta of the options on previous day. This amount is calculated as,

$$U_{S,r,t} = 1.5 \times \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r} \times (\Delta^{call}_{t-1} + \Delta^{put}_{t-1})$$

$$\Delta^{call}_{t} = \Phi(d_1)$$

$$\Delta^{Put}_{t} = \Phi(d_1) - 1$$

Φ is the standard normal cumulative distribution function and d_1 is defined in section Option Price Calculation.

$U_{O,r,t}$ = Unit holdings for the call and put options for the respective sub index.

On the rebalance day r the amount of call and put options to be sold are calculated as,

$$U_{O,r,t} = 1.5 \times \sqrt{\frac{\pi}{2*T}} \times \frac{IL(r)}{S_r}$$

T is equal to the time to maturity (ACT/365 basis) of the option on rebalance date r. It is calculated as,

$$T = \frac{E - r}{365}$$

T_{r+1} = The next rebalancing date of the sub index (also the expiry of the option)

S_r = The respective future price for the Gold future on rebalance day r

$C(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a call option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its call option price, which is calculated as max $(0, S_r - K_r)$. The prices for old security on the expiry date are not published by exchange.

$P(t, T_{r+1}, S_t, K_r, \sigma_t^{AC})$ = The price on day t of a put option with expiry T_{r+1}, strike K_r, evaluated using Black's model with volatility σ_t^{AC}, future price S_t, and discount factor equal to 1. These are calculated as given in section Option price calculation except for the rebalance date for the old security. For the old security on rebalance date, the intrinsic value of the option is considered as its put option price, which is calculated as max $(0, K_r - S_r)$.. The prices for old security on the expiry date are not published by exchange.

Option Price Calculation

For each sub index the strike of the option on the rebalance date is calculated as the closest integer strike to the at the money future price on such date. The index sells a call and a put at this strike on rebalance date for the option related to respective future. The expiry of these options is the option expiry corresponding to the future.

The exchange publishes the option prices corresponding to each integer strike. The below formulae are used to calculate the price using the after cost volatility.

$$C(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = S_t \Phi(d_1) - K_r \Phi(d_2)$$

$$P(t, T_{R+1}, S_t, K_r, \sigma_t^{AC}) = K_r \Phi(-d_2) - S_t \Phi(-d_1)$$

$$d_1 = \frac{\ln\left(\frac{S_t}{K_r}\right) + \frac{1}{2}(\sigma_t^{AC})^2(T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

$$d_2 = \frac{\ln\left(\frac{S_t}{K_r}\right) - \frac{1}{2}(\sigma_t^{AC})^2(T_{R+1} - t)}{\sigma_t^{AC}\sqrt{T_{R+1} - t}}$$

σ_t^{AC} is the after cost implied volatility of the relevant option and it is obtained from the implied volatility of the relevant exchange traded option. Details about the cost calculation are available from us on request. Please contact index.data@db.com for any such request.

σ_t is the volatility of the call option which has strike K_r and is calculated using standard Black's model.

K_r = Option strike. It is the integer value closest to the at the money forward future price on the rebalance date r. For avoidance of any doubt, the strike will be rounded up in case of a tie.

Main index Calculation

DB Commodity Gold Short Volatility II Index is calculated on each valid London city business day as follows,

$$IL(t, ER) = IL(t-1, ER) + \sum_{i=1}^{2}[I(i,t,ER) - I(i,t-1,ER)] \times N(t-1,i)$$

Where:

IL(t,ER) = Index level of DB Commodity Gold Short Volatility II Index on day t

I(i,t,ER) = Index level of sub index i on day t

N(t,i) = Notional holdings of sub index i on day t

Notional Holdings

The index rebalances on the option expiry date of Z contract of Gold every year. On any other day the notional holdings remain constant,

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

It t is the rebalancing date

$$N(t,i) = \frac{IL(t,ER)}{2 * (I(i,t,ER)}$$

"**Index Disruption Event**" means, in respect of a relevant exchange instrument, an event that would require the Index Administrator to calculate any Index Level which relies on the relevant exchange instrument on an alternative basis were such event to occur or exist on a day that is an index business day.

If an Index Disruption Event in relation to an exchange instrument continues for a period of five successive index business days, the Index Administrator will, in its discretion, either (i) continue to calculate the relevant Index Level by reference to the closing price of the relevant exchange instrument on the immediately preceding index business day for a further period of five successive index business days or (ii) select a replacement exchange instrument.

In the case of (i) above, if an Index Disruption Event in relation to the relevant exchange instrument continues for the further period of five successive index business days, on the expiry of such period the provisions of (ii) above shall apply.

In the case of a replacement of an exchange instrument as described in (ii) above, the Index Administrator will make such adjustments to the methodology and calculation of the DB Commodity Vol Premium Index as it determines to be appropriate to account for the relevant replacement and will publish such adjustments on its website http://index.db.com or any successor thereto.

Changes in the index methodology

The Index Administrator will, subject as provided below, employ the methodology described above and its application of such methodology shall be conclusive and binding. While the Index Administrator currently employs the above described methodology to calculate the DB Commodity Vol Premium Index, no assurance can be given that fiscal, market, regulatory, juridical or financial circumstances (including, but not limited to, any changes to or any suspension or termination of or any other events affecting any Index Commodity or an Exchange Traded Instrument) will not arise that would, in the view of the Index Administrator, necessitate a modification of or change to such methodology and in such circumstances the Index Administrator may make any such modification or change as it determines appropriate. The Index Administrator may also make modifications to the terms of the DB Commodity Vol Premium Index in any manner that it may deem necessary or desirable, including (without limitation) to correct any manifest or proven error or to cure, correct or supplement any defective provision contained in this Index Guide. The Index Administrator will publish notice of any such modification or change and the effective date thereof on its website http://index.db.com or any successor thereto.

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