

INDEX GUIDELINE

DB Trend Intraday Equity Index

Version 1.3

15 July 2019

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INTRODUCTION

This document (the "Guideline") is to be used as a guideline with regard to the composition, calculation and maintenance of the Index. Any changes made to the Guideline are initiated by the Committee specified in Section 1.6. The Index is calculated and published by Solactive AG. The name "Solactive" is trademarked.

It contains the underlying principles and rules regarding the structure and operation of the DB Trend Intraday Equity Index (the "Index"). Solactive AG shall make every effort to implement the applicable regulations. Solactive AG does not offer any explicit or tacit guarantee or assurance, neither pertaining to the results from the use of the Index nor the Index value at any certain point in time nor in any other respect. The Index is merely calculated and published by Solactive AG and it strives to the best of its ability to ensure the correctness of the calculation. There is no obligation for Solactive AG – irrespective of possible obligations to issuers – to advise third parties, including investors and/or financial intermediaries, of any errors in the Index. The publication of the Index by Solactive AG does not constitute a recommendation for capital investment and does not contain any assurance or opinion of Solactive AG regarding a possible investment in a financial instrument based on this Index.



1 INDEX SPECIFICATIONS

- > The DB Trend Intraday Equity Index is an Index of Deutsche Bank AG and is calculated, distributed and administrated by Solactive AG.
- > The Index is a proprietary index of Deutsche Bank AG intended to track the performance of a strategy that trades the daily trend of the S&P 500 (the Underlying Index). In each of three times during an Index Business Day, the Index notionally buys or sells the Futures in a size proportional to the Signal measured at such time and unwinds all Futures notionally bought or sold on such day at the market close. The Signal is proportional to the percentage difference between the closing level of the Underlying Index on the immediately preceding Index Business Day and the level of the Underlying Index at the time the Signal is measured. The Index will not trade any Futures if the Signal does not meet a minimum variable threshold. Each of the three Signals is determined using a five minute TWAP process applied to the level of the Underlying Index starting at 11:45 a.m., 12:45 p.m. and 2:15 p.m. New York City time, respectively. Unless the Signal is zero, the Futures are traded at prices determined by a 15 minute TWAP process starting 12:00 p.m., 1:00 p.m. and 2:30 p.m. New York City time, respectively. All Futures notionally bought or sold during an Index Business Day will be unwound at the end of the day at a price based on the closing level of the Underlying Index on such day adjusted by the Futures Cash Basis.
- > The Index will not trade any Futures on an Index Business Day that is a half trading day on the Futures Exchange.
- > The Index is calculated as an Excess Return Index and published in US Dollar.

1.1 SHORT NAME AND ISIN

The Index is distributed under ISIN DE000SLA5R25; the WKN is SLA5R2. The Index is published in Bloomberg under the code <DBTIDEUU Index>. The currency hedged versions of the index are published as follows:

Name	Ticker	BBG ID	Currency	WKN
DB Trend Intraday Equity Index EUR	DBTIDEUE	DBTIDEUE Index	EUR	SLA7S5
DB Trend Intraday Equity Index JPY	DBTIDEUJ	DBTIDEUJ Index	JPY	SLA7S4



The notional indices get published as follows:

Name	Ticker	BBG ID	Currency	WKN
DB TIDE Notional	DBTIDEUN	DBTIDEUN Index	USD	SLA5L0
DBTIDEUE Dollar Notional	DBTIDEEN	DBTIDEEN Index	USD	SLA7N5

1.2 INITIAL VALUE

The Index is based on a starting level of 451.2258 as of December 31, 2003.

The DBTIDEUE has a starting level of 1095.303 as of August 17, 2018.

The DBTIDEUJ has a starting level of 1095.303 as of August 17, 2018.

1.3 DISTRIBUTION

The Index is published via the price marketing services of Boerse Stuttgart AG and is distributed to all affiliated vendors. Each vendor decides on an individual basis as to whether it will distribute/display the Index via its information systems.

1.4 PRICES AND CALCULATION FREQUENCY

The price of the Index is calculated on each Business Day based on the prices on the respective Exchanges on which the Index Components are listed. The most recent prices of all Index Components are used. Prices of Index Components not listed in the Index Currency are translated using spot foreign exchange rates quoted by Reuters. Should there be no current price available on Reuters, the most recent price or the Trading Price on Reuters for the preceding Trading Day is used in the calculation. During the backtest of the DBTIDEUE and for all dates prior to August 17th 2018 the Reuters calculated spot rate at 16:00 ET with RIC UERUSD=R has been used. For any backtest data of DBTIDEUE before 2nd January 2013 and for any backtest data of DBTIDEUJ before 17th August 2018 the 4pm London time WMCO fixings have been used.

The Index is calculated every Business Day on a next day basis before 11AM Frankfurt local time. In the event that data cannot be provided to Bloomberg or to the pricing services of Boerse Stuttgart AG, the Index cannot be distributed.

1.5 OVERSIGHT

A Committee composed of staff from Solactive AG (the "Committee" or the "Index Committee") is responsible for decisions regarding the composition of the Index as well as any amendments to the rules.

Members of the Committee can recommend changes to the Guideline and submit them to the Committee for approval.



1.6 PUBLICATION

All specifications and information relevant for calculating the Index are made available on the <http://www.solactive.com> web page and sub-pages.

1.7 HISTORICAL DATA

Historical data will be maintained from the launch of the Index on Nov 9th 2018.

1.8 LICENSING

Licenses to use the Index as the underlying value for derivative instruments are issued to stock exchanges, banks, financial services providers and investment houses by Solactive AG.

2 CALCULATION OF THE INDEX

2.1 INDEX FORMULA

In order to calculate the Index Level, on each Index Business Day, the Index Administrator will observe the intraday market data specified in Section 2.1 i) (Data required for the calculation of the Index) below from the relevant Price Source, subject to the provisions set out in Section 3 (Disruption Events and Recalculation).

"Price Source" means either (i) Reuters or (ii) any other market price information source, selected by the Index Administrator in its sole discretion.

"RIC" means Reuters Instrument Code.

(i) Data required for the calculation of the Index:

"TWAP Observation Periods" or "TWAP Observation Period(i)" means 15 minute windows starting at 12:00 p.m. New York City time when $i=1$, 1:00 p.m. New York City time when $i=2$ and 2:30 p.m. New York City time when $i=3$.

"Signal TWAP Observation Period" or "Signal TWAP Observation Period(i)" means 5 minute windows starting at 11:45 a.m. New York City time when $i=1$, 12:45 p.m. New York City time when $i=2$ and 2:15 p.m. New York City time when $i=3$.

"TWAP Process" means a process of establishing a time-weighted average level on any Index Business Day(t). During any of the TWAP Observation Periods or Signal TWAP Observation Periods, the relevant level will be recorded at every 15 second interval (each interval being a "TWAP Observation Interval"). In respect of each TWAP Observation Interval, the level will be the most recent level at exactly the same time as such TWAP Observation Interval.

"SPX Level" or "SPX(t)" means, in respect of any date(t), the closing level of the Underlying Index.

"SPX TWAP" or "SPXTWAP(t,i)" means in respect of any date(t) and Signal TWAP Observation Period(i), the result of applying the TWAP process to the Underlying Index during the Signal TWAP Observation Period(i).



"Futures TWAP" or "FuturesTWAP(t,i)" means in respect of any date (t), and TWAP Observation Period (i), the result of applying the TWAP Process to the average "bid" and "ask" prices for the Relevant Futures Contract during the TWAP Observation Period(i).

"Relevant Futures Contract" means in respect of any date (t) the Futures with the nearest expiration after date (t).

"Futures" means each E-Mini futures contract on the Underlying Index, which is listed and traded on the Futures Exchange.

"Futures Exchange" means the Chicago Mercantile Exchange, or any successor to such exchange or quotation system or any substitute exchange or quotation system to which trading in futures contracts on the Underlying Index has temporarily relocated; provided that the Index Administrator has determined that there is comparable liquidity relative to futures contracts on the Underlying Index on such temporary substitute exchange or quotation system as on the original Futures Exchange.

"Underlying Index" has the meaning given in the Introduction.

"Futures Basis TWAP" or "Futures Basis TWAP(t)" is the result of applying the TWAP Process during the period starting 25 minutes before the close of the NYSE and ending 5 minutes before the close of the NYSE on date(t) to the difference between the results of (a) the average "bid" and "ask" prices for the Relevant Futures Contract minus (b) the level of the Underlying Index.

"Futures Close" or "Futures Close(t)" means in respect of any date(t), the sum of the SPX Level and the Futures Basis TWAP.

"TWAP Disruption Event" means, in respect of any relevant Index Calculation Date, an event or circumstance that makes it impossible or not practicable to carry out a TWAP Process for such Index Calculation Date, or the TWAP Process does not return a price for such Index Calculation Date including, without limitation, owing to the relevant bid or ask prices not being available or published.

If a calculated TWAP in respect to the *TWAP Observation Period* or *Signal TWAP Observation Period* is subject to a TWAP Disruption Event, the respective TWAP shall be set to zero.

2.2 CALCULATION OF THE SIGNAL

(i) Percentage Change

The "Percentage Change" or "PChange(t,i)" in respect of any Index Business Day(t) and Signal TWAP Observation Period(i) is calculated according to the following equation:

$$PChange(t, i) = \frac{SPXTWAP(t, i) - SPX(t - 1)}{SPX(t - 1)}$$

If PChange(t, i) should be subject to a Market Disruption Event or TWAP Disruption Event as specified in section 2.1 i) and section 3.2 it shall be set to zero.



(ii) Signal Threshold

In respect of each Index Business Day(t), the "Signal Threshold" or "Thresh(t)" is:

$$Thresh(t) = 0.50 \times \sqrt{\frac{1}{22} \sum_{i=1}^{22} \ln^2 \left(\frac{SPX(t-i)}{SPX(t-1-i)} \right)}$$

(iii) Signal

In respect of each Index Business Day(t) and Signal TWAP Observation Period(i), the Signal and the notional number of Futures to be traded with respect to such Signal TWAP Observation Period or "n(t,i)" is determined in three steps.

First, a "Multiplier" or "Mult(t,i)" based on the Signal Threshold and the absolute value of the Percent Change for such Index Business Day(t) is calculated using the following formula:

$$Mult(t,i) = \begin{cases} 1 & \text{if } |PChange(t,i)| \geq Thresh(t) + 0.1\% \\ (|PChange(t,i) - Thresh(t) + 0.1\%| / 0.20\%) & \text{if } Thresh(t) + 0.1\% > |PChange(t,i)| > Thresh(t) - 0.1\% \\ 0 & \text{Otherwise} \end{cases}$$

Second, the "Notional Amount" or "N(t,i)" to trade is then determined based on the previous Index Business Day's Index Level(t-1), the Percentage Change and the Multiplier.

$$N(t,i) = IL(t-1) \times \text{Max}(-33\%, \text{Min}(33\%, 20 \times PChange(t,i) \times Mult(t,i)))$$

Third, the notional number of Futures to trade or n(t,i) is a fraction equal to the Notional Amount divided by the SPX TWAP for that Index Business Day and Signal TWAP Observation Period.

$$n(t,i) = \frac{N(t,i)}{SPXTWAP(t,i)}$$

The notional number of Futures to trade n(t,i) will be rounded to two decimal places. If n(t,i) should be subject to a Market Disruption Event or TWAP Disruption Event as specified in section 2.1 i) and section 3.2 it shall be set to zero.

2.3 CALCULATION OF INDEX LEVEL

The Index Level is determined on each Index Business Day(t) as the sum of the gains or losses implied by any notional Futures trades executed on that Index Business Day.

$$IL(t) = IL(t-1) + MtM(t)$$

If the Index Business Day(t) is a day on which the Futures Exchange is scheduled to close at 1:00 p.m. ("Half Day"), then

$$MtM(t) = 0$$

If the Index Business Day(t) is not a Half Day:



$$MtM(t) = \sum_{i=1}^3 n(t, i) \times (FuturesClose(t) - FuturesTWAP(t, i)) - 2 \times TC \sum_{i=1}^3 |N(t, i)|$$

where:

IL(t) means the Index Level as of Index Business Day(t)

TC means the Transaction Cost of 0.015%

FuturesClose(t) has the meaning given in Section 2.1

FuturesTWAP(t,i) has the meaning given in Section 2.1

Prior to (and excluding) January 1, 2013 (the "Index TWAP Date"), the observation time for all relevant data will be set to the beginning of the relevant TWAP observation window. The data used both for SPX TWAP and Futures TWAP levels will be a single value of the Underlying Index or Futures taken at the beginning of the corresponding TWAP Observation Period or Signal TWAP Observation Period, as applicable.

2.4 CALCULATION OF HEDGED INDEX LEVEL

In respect of the Index Commencement Date, the Index Level (the "Index Closing Level") is 1000.00 units of the Underlying Currency. In respect of each subsequent Index Calculation Day, the Index Level will be determined in accordance with the following formula:

$$HedgedIL_t = HedgedIL_{t-1} + HedgedUnit_{t-1} \times (IL_t - IL_{t-1}) \times FX_t$$

Where:

HedgedUnit_t describes the Unit Exposure, calculated in respect of Index Calculation Date *t* defined as:

$$HedgeUnit_t = \begin{cases} \frac{HedgedIL_t}{IL_t \times FX_t}, & \text{if } t \text{ is a Rebalancing Day} \\ HedgedUnit_{t-1}, & \text{Otherwise} \end{cases}$$

t = the relevant Index Calculation Date

t – 1 = in respect of Index Calculation Date *t*, the Index Calculation Date immediately preceding Index Calculation Date *t*

FX_t = the Closing Exchange Rate in respect of Index Calculation Date *t*



Closing Exchange Rate = relative to Index calculation date t , the Closing Exchange Rate means:

- a) in respect of an Index Calculation Date falling prior to and excluding the Index Live Date, the currency exchange rate, expressed as the amount of EUR for which USD 1 may be exchanged, prevailing at 16:00 New York City time on such Index Calculation Date, all as determined by the Index Administrator or, if such rate does not appear, the rate (the "Fallback Rate") determined by the Index Administrator from such source(s) and at such time as it deems appropriate; and
- b) in respect of an Index Calculation Date falling on and after the Index Live Date, the currency exchange rate, expressed as the amount of EUR for which USD 1 may be exchanged, prevailing at 16:00 New York City time on such Index Calculation Date, all as determined by the Index Administrator or, if such rate does not appear, the rate (the "Fallback Rate") determined by the Index Administrator from such source(s) and at such time as it deems appropriate.

Exchange Rate Price

Source = means Reuters RIC USDEURFIXP=WM (or such other RIC as may replace that RIC on that service or such other service as may replace that service for the purposes of displaying the relevant currency exchange rate); provided that, if the Index Administrator determines that a rate is unavailable in respect of an Index Calculation Date then the Exchange Rate Price Source or such day shall be such market price information provider providing USD/EUR exchange rates selected by the Index Administrator and provided further that if no such market price information provider is available at the relevant time, there will be no Exchange Rate Price Source.

$HedgedIL_t$ = the Index Closing Level in respect of Index Calculation Date t

$HedgedIL_{(t-1)}$ = the Index Closing Level in respect of Index Calculation Date $t-1$

IL_t = the Underlying Index Closing Level in respect of Index Calculation Date t

$IL_{(t-1)}$ = in respect of Index Calculation Date t , the Underlying Index Closing Level in respect of Index Calculation Date $t-1$

$IL_{(t,R)}$ = in respect of Index Calculation Date t , the Underlying Index Closing Level in respect of Rebalancing Date t, R

Rebalance Dates = (a) the Index Commencement Date; and (b) the third Friday of each month in each year following the Index Commencement Date, or if any such day is not an Index Calculation Date, the immediately preceding Index Calculation Date.

Index Commencement Date = 29-December-2017

2.5 CALCULATION OF NOTIONAL INDICES



The notional indices get calculated as follows:

$$\text{Notional } L_t = \text{HedgedUnit}_{t-1} \times \sum_{i=1}^3 |N(t, i)|$$

With *HedgedUnit_t* being 1 for all t in the respect of the DBTIDEUN.

2.6 ACCURACY

The value of the Index will be rounded to three decimal places.

2.7 MISCELLANEOUS

2.7.1 Recalculation

Solactive AG makes the greatest possible efforts to accurately calculate and maintain its indices. However, the occurrence of errors in the index determination process cannot be ruled out. In such cases Solactive AG adheres to its publicly available [Correction Policy](#).

2.7.2 Market Disruption

In periods of market stress Solactive AG calculates its indices following predefined and exhaustive arrangements set out in its publicly available [Disruption Policy](#).

3 DISRUPTIONS AND CONSEQUENCES

Terms used in this Section 3.1 (Consequences of a Disruption Event) have the meanings given to them in Section 4 (Definitions).

3.1 Consequences of a Disruption Event

If a Disruption Event occurs or is continuing on any Index Business Day, the Index Administrator will determine in its reasonable discretion whether the occurrence or existence of such event is material in respect of the notional buying and/or selling of Futures and/or the calculation of the Index. In the event that the Index Administrator determines that the occurrence or existence of a Disruption Event is material in respect of the notional buying and/or selling of Futures and/or the calculation of the Index, the Index Administrator may:

- 1) determine any relevant price, value, amount, rate or level required in order to calculate the Index Level in respect of such Index Business Day;
- 2) suspend the notional buying and/or selling of Futures and/or defer the determination and publication of the Index Level until the next Index Business Day on which the Index Administrator determines that no Disruption Event exists; provided that where any such suspension of the notional buying and/or selling of Futures and/or deferral of determination and publication continues for a period of 10 consecutive Index Business Days, then the Index Administrator will:



- a) determine and, if applicable, publish the Index Level in respect of each Index Business Day falling in such period in its sole discretion taking into consideration the then-prevailing market conditions, the last reported price, value, rate, spread or level and such other factor(s) and condition(s) as the Index Administrator considers relevant for the purpose of determining such Index Level; and/or
 - b) permanently cease determining and publishing the Index as of the later of (x) the date when such Disruption Event commenced or (y) the Index Business Day immediately following the last Index Business Day for which the Index Administrator calculated and, if applicable, published the relevant Index Level in accordance with sub-clause a) above (if any);
- 3) make such determinations and/or adjustments in relation to the Index Rules as it considers reasonably appropriate with regard to preserving the economic intention of the methodology of the Index as set out in this Index Description;
- 4) in the case of a Disruption Event due to an Underlying Index Event, select a successor exchange to replace the Exchange and/or a Successor Underlying Index, with such successor exchange and/or Successor Underlying Index to be selected by the Index Administrator with regard to preserving the economic intention of the methodology of the Index as set out herein and, in each case, make such adjustments to the Index to reflect such selection as it determines reasonably appropriate; and/or
- 5) permanently cease to determine, calculate and make available the Index Level and cancel the Index.

4 DEFINITIONS

"Index Business Day" means any day on which the Exchange is scheduled to be open for Trading.

"Exchange" means the New York Stock Exchange.

The "Index Administrator" is Solactive AG or any other appropriately appointed successor in this function.

The "Index Currency" is USD.

5 CHANGES IN CALCULATION METHOD

The application by the Index Calculator of the method described in this document is final and binding. The Index Calculator shall apply the method described above for the composition and calculation of the Index. However, it cannot be excluded that the market environment, supervisory, legal, financial or tax reasons may require changes to be made to this method. The Index Calculator may also make changes to the terms and conditions of the Index and the method applied to calculate the Index that it deems to be necessary and desirable in order to prevent obvious or demonstrable error or to remedy, correct or supplement incorrect terms and conditions. The Index Calculator is not obliged to provide information on any such modifications or changes. Despite the modifications and changes, the Index Calculator will take the appropriate steps to ensure a calculation method is applied that is consistent with the method described above.



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