

Guideline relating to

Solactive Leveraged Bond Futures Index Family

Version 1.0 dated July 14th, 2015



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Introduction

This document is to be used as a guideline with regard to the composition, calculation and management of the Solactive Leveraged Bond Futures Index Family. The Solactive Leveraged Bond Futures Index Family is calculated and published by Solactive AG. Solactive AG reserves all rights relating to the index family.

1 Index specifications

The Solactive Leveraged Bond Futures Index Family (consisting of a number of single indices, each such index called an “**Index**” and together the “**Indices**”) tracks a daily leveraged exposure to Bond Future levels taking into account a financing component and transaction costs.

1.1 Short name

The Indices of the Solactive Leveraged Bond Futures Index Family are distributed under the identifiers stated in Appendix 1.

1.2 Initial value

The initial value of the indices is 1,000 as of their respective Start Dates. The Start Dates of the Indices are stated in Appendix 1.

1.3 Distribution

The Solactive Leveraged Bond Futures Index Family 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 Solactive Leveraged Bond Futures Index Family via its information systems.

1.4 Prices and calculation frequency

The Indices are calculated on each Business Day based on the prices of the respective underlying assets. During the times of live calculation the Indices are calculated based on the most recent prices from Thomson Reuters. In case there is no current price available during the time of live calculation, the most recent one is used.

In the event that data cannot be provided to the pricing services of Boerse Stuttgart AG the Indices cannot be distributed.

Any materially incorrect calculation is adjusted on a retrospective basis.

2 Calculation of the Indices

2.1 Index formula (intraday levels)

Subject to the occurrence of an Intraday Restrike Event (as further explained in section 2.7), the intraday level of an Index on a Business Day (t) at a Calculation Time (v), noted I(t,v), is calculated in accordance with the following formula:

$$I(t, v) = I(t - 1) \times \max(0, 1 + L \times \text{Perf}(t - 1, t, v))$$

2.2 Index formula (closing level)

Subject to the occurrence of an Intraday Restrike Event (as further explained in section 2.7), the closing level of an Index on a Business Day (t), noted I(t), is calculated in accordance with the following formula:

As of the Start Date:

$$I(0) = 1,000$$

For any subsequent Calculation Date:

$$I(t) = I(t - 1) \times \max(0, 1 + \text{Fin}(t) + L \times \text{Perf}(t - 1, t) - \text{TC}(t - 1, t))$$

2.3 Determination of the financing Component Fin(t)

Subject to the occurrence of an Intraday Restrike Event (as further explained in section 2.7), the financing component on a Business Day (t), noted Fin(t), is calculated in accordance with the following formula:

$$\text{Fin}(t) = \text{EONIA}(t - 1) \times \frac{\text{Act}(t - 1, t)}{360}$$

2.4 Determination of the performance component Perf(t-1,t) and Perf(t-1,t,v)

Subject to the occurrence of an Intraday Restrike Event (as further explained in section 2.7), the performance component on a Business Day (t), noted Perf(t-1,t), is calculated in accordance with the following formula:

$$\text{Perf}(t - 1, t) = \frac{\text{Fut}(t - 1, t) - \text{Fut}(t - 1, t - 1)}{\text{Fut}(t - 1, t - 1)}$$

Subject to the occurrence of an Intraday Restrike Event (as further explained in section 2.7), the performance component on a Business Day (t) at a Calculation Time (v), noted Perf(t-1,t,v), is calculated in accordance with the following formula:

$$\text{Perf}(t - 1, t, v) = \frac{\text{Fut}(t - 1, t, v) - \text{Fut}(t - 1, t - 1)}{\text{Fut}(t - 1, t - 1)}$$

2.5 Determination of the transaction cost component TC(t-1,t)

Subject to the occurrence of an Intraday Restrike Event (as further explained in section 2.7), the transaction cost component on a Business Day (t), noted TC(t-1,t), is calculated in accordance with the following formulae:

If t is the Business Day immediately following the Start Date (as defined in Appendix 1), then $\text{TC}(t-1,t) = 0$.

For any Business Day which follows such date:

If t-1 is a Roll Date then

$$TC(t-1, t) = |L| \times \left(\frac{\text{Spread}(t-1, t-1)}{\text{Fut}(t-1, t-1)} + \frac{\text{Spread}(t-2, t-1)}{\text{Fut}(t-2, t-2)} \times \frac{I(t-2)}{I(t-1)} \right)$$

Else

$$TC(t-1, t) = |L| \times \text{Spread}(t-1, t-1) \times \left| \frac{1}{\text{Fut}(t-1, t-1)} - \frac{1}{\text{Fut}(t-1, t-2)} \times \frac{I(t-2)}{I(t-1)} \right|$$

Where

$$\text{Spread}(s, t) = \frac{|\text{Fut}_{\text{ASK}}(s, t) - \text{Fut}_{\text{BID}}(s, t)|}{2}$$

2.6 Calculation precision

The Index value is rounded to four decimal places.

2.7 Extraordinary adjustment

2.7.1. Initialisation

At the beginning of each Business Day (t) we define:

$$\text{RestrikeFut}(t-1, t_0) = \text{Fut}(t-1, t-1)$$

$$I(t_0) = I(t-1)$$

$$i = 1$$

2.7.2. Occurrence and management of an extraordinary adjustment

If at any given moment v during a Business Day (t) an Intraday Restrike Event takes place, which means the following condition holds:

(i) If $L > 0$

$$\frac{\text{Fut}(t-1, t, v)}{\text{RestrikeFut}(t-1, t_{i-1})} < 1 - EAT$$

(ii) If $L < 0$

$$\frac{\text{Fut}(t-1, t, v)}{\text{RestrikeFut}(t-1, t_{i-1})} > 1 + EAT$$

With EAT being the Extraordinary adjustment threshold which is provided in Appendix 1.

Then such moment defined as v_i is deemed to be an Restrike Event Time and we define $\text{RestrikeFut}(t-1, t_i)$ as follows:

(i) If $L > 0$

$$\text{RestrikeFut}(t - 1, t_i) = \min_{\theta \in [v_i, v_i^+]} [\text{Fut}(t - 1, t, \theta)]$$

(ii) If $L < 0$

$$\text{RestrikeFut}(t - 1, t_i) = \max_{\theta \in [v_i, v_i^+]} [\text{Fut}(t - 1, t, \theta)]$$

The period $[v_i, v_i^+]$ is the Restrike Observation Period.

Following which we define $I(t_i)$:

$$I(t_i) = I(t_{i-1}) \times (\max(0, 1 + L \times \text{Perf}(t_{i-1}, t_i)))$$

Where:

$$\text{Perf}(t_{i-1}, t_i) = \frac{\text{RestrikeFut}(t - 1, t_i) - \text{RestrikeFut}(t - 1, t_{i-1})}{\text{RestrikeFut}(t - 1, t_{i-1})}$$

and in such case, for any Calculation Time v following v_i^+ the level on the Index shall be calculated in accordance with the following formulae:

$$I(t, v) = I(t_i) \times (\max(0, 1 + L \times \text{Perf}(t_i, t, v)))$$

Where:

$$\text{Perf}(t_i, t, v) = \frac{\text{Fut}(t - 1, t, v) - \text{RestrikeFut}(t - 1, t_i)}{\text{RestrikeFut}(t - 1, t_i)}$$

In the absence of any subsequent Intraday Restrike Event on the same Business Day (t), then:

$$I(t) = I(t_i) \times (\max(0, 1 + \text{Fin}(t) + L \times \text{Perf}(t_i, t) - \text{TC}(t_i, t)))$$

Where:

$\text{Perf}(t_i, t)$ is determined in accordance with the following formula:

$$\text{Perf}(t_i, t) = \frac{\text{Fut}(t - 1, t) - \text{RestrikeFut}(t - 1, t_i)}{\text{RestrikeFut}(t - 1, t_i)}$$

$\text{TC}(t_i, t)$ is determined in accordance with the following formulae:

If $t-1$ is a Roll Date then

$$\text{TC}(t_i, t) = |L| \times \left(\frac{\text{Spread}(t - 1, t - 1)}{\text{Fut}(t - 1, t - 1)} + \frac{\text{Spread}(t - 2, t - 1)}{\text{Fut}(t - 2, t - 2)} \times \frac{I(t - 2)}{I(t - 1)} \right)$$

Else

$$\text{TC}(t_i, t) = |L| \times \text{Spread}(t - 1, t - 1) \times \left| \frac{1}{\text{Fut}(t - 1, t - 1)} - \frac{1}{\text{Fut}(t - 1, t - 2)} \times \frac{I(t - 2)}{I(t - 1)} \right|$$

In the case of any subsequent Intraday Restrike Event on the same Business Day (t), then this section 2.7.2 shall be repeated with i being incremented to the next integer (i.e. $i=2$, then $i=3$, etc.)

3 Definitions

Act(t;t-1)	means the number of calendar days between Index Calculation Date (t) (included) and Index Calculation Date (t-1) (excluded).
Active Future (s)	means the future which is considered as active (i.e. not rolled yet) as of Calculation Date (s). For the avoidance of doubt if s is a Roll Date then Active Future (s) is the new active contract corresponding to this Roll Date.
Business Day	means each and every Scheduled Trading Day (i.e. Monday to Friday) with the exception of 25 December and 1 January.
Calculation Time	means, on a Business Day, any time between the Opening Time and the Closing Time.
Closing Time	means 17:40 Frankfurt time starting on July 15 th 2015, before this date it was referring to the Closing Time of the Future
EONIA(t-1)	means, in respect of Index Calculation Date (t-1), the effective overnight rate computed as a weighted average of all overnight unsecured lending transactions in the interbank market, initiated within the euro area by the contributing panel banks. This rate is calculated by the European Central Bank and displayed on the EONIA Reuters Page on or around 7.00 pm., Brussels time. This rate is expressed in percentage per annum.
Exchange	means the exchange provided in Appendix 1, or any successor thereto.
Financing Component	means, in respect of an Index and a Business Day (t), the value of the Financing Component determined in accordance with section 2.3.
Fut(s,t)	means $(Fut_{ASK}(s,t) + Fut_{BID}(s,t))/2$
Fut(s,t,v)	means the last price of the Active Future(s) on Calculation Time (v) on Calculation Date (t)
Fut_{ASK}(s,t)	means the ask price of the Active Future(s) as of the Closing Time on Calculation Date (t)
Fut_{BID}(s,t)	means the bid price of the Active Future(s) as of the Closing Time on Calculation Date (t)
I(t)	means, in respect of an Index and a Business Day (t), the closing level of the Index determined in accordance with section 2.2.
I(t,v)	means, in respect of an Index, a Business Day (t) and a Calculation Time (v), the intraday level of the Index determined in accordance with section 2.1.
Intraday Restrike Event	means the occurrence of an intraday restrike event as described in section 2.7.
L	means, in respect of an Index, the leverage factor provided in Appendix 1.
Last Trading Date	means, in respect of each Index, the dates provided in Appendix 1 which correspond to the last trading date of the Underlying Bond future.
Opening Time	means 08:00 Frankfurt time.
Restrike Event Time	means the time at which an Intraday Restrike Event occurs, as described in section 2.7.
Restrike Observation Period	means in respect of an Intraday Restrike Event, the period starting on and excluding the Restrike Event Time and finishing on and including the earlier

of (i) the time falling 15 minutes after the Restrike Event Time and (ii) the Closing Time as described in section 2.7.

Roll Date

means, in respect of an Index, the Scheduled Trading Day preceding the Last Trading Date..

Scheduled Trading Day

means, in respect of an Index, each day on which the Exchange is scheduled to be open for trading for its regular trading session

v

v is a value for the time of the day. For example, for 8:00 am v can take the value 8/24.

Appendix 1

Index	Bloomberg Ticker	Underlying Bond future	Exchange	L	Start Date	Last Trading Date	EAT
Solactive Leveraged Long x 3 Bund Futures Index	BUN3L	Euro-BUND Future (FGBL)	Eurex	3	05/02/2014	Eurex Last Trading Day	16.66%
Solactive Leveraged Short x 3 Bund Futures Index	BUN3S	Euro-BUND Future (FGBL)	Eurex	-3	05/02/2014	Eurex Last Trading Day	16.66%
Solactive Leveraged Long x 5 Bund Futures Index	BUN5L	Euro-BUND Future (FGBL)	Eurex	5	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Short x 5 Bund Futures Index	BUN5S	Euro-BUND Future (FGBL)	Eurex	-5	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Long x 7 Bund Futures Index	BUN7L	Euro-BUND Future (FGBL)	Eurex	7	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Short x 7 Bund Futures Index	BUN7S	Euro-BUND Future (FGBL)	Eurex	-7	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Long x 10 Bund Futures Index	BUN10L	Euro-BUND Future (FGBL)	Eurex	10	05/02/2014	Eurex Last Trading Day	8.00%
Solactive Leveraged Short x 10 Bund Futures Index	BUN10S	Euro-BUND Future (FGBL)	Eurex	-10	05/02/2014	Eurex Last Trading Day	8.00%
Solactive Leveraged Long x 3 BTP Futures Index	BTP3L	Long-Term Euro-BTP Future (FBTP)	Eurex	3	05/02/2014	Eurex Last Trading Day	16.66%
Solactive Leveraged Short x 3 BTP Futures Index	BTP3S	Long-Term Euro-BTP Future (FBTP)	Eurex	-3	05/02/2014	Eurex Last Trading Day	16.66%
Solactive Leveraged Long x 5 BTP Futures Index	BTP5L	Long-Term Euro-BTP Future (FBTP)	Eurex	5	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Short x 5 BTP Futures Index	BTP5S	Long-Term	Eurex	-5	05/02/2014	Eurex Last Trading	10.00%

		Euro-BTP Future (FBTP)				Day	
Solactive Leveraged Long x 7 BTP Futures Index	BTP7L	Long-Term Euro-BTP Future (FBTP)	Eurex	7	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Short x 7 BTP Futures Index	BTP7S	Long-Term Euro-BTP Future (FBTP)	Eurex	-7	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Long x 10 BTP Futures Index	BTP10L	Long-Term Euro-BTP Future (FBTP)	Eurex	10	05/02/2014	Eurex Last Trading Day	8.00%
Solactive Leveraged Short x 10 BTP Futures Index	BTP10S	Long-Term Euro-BTP Future (FBTP)	Eurex	-10	05/02/2014	Eurex Last Trading Day	8.00%
Solactive Leveraged Long x 3 OAT Futures Index	OAT3L	Euro-OAT Future (FOAT)	Eurex	3	05/02/2014	Eurex Last Trading Day	16.66%
Solactive Leveraged Short x 3 OAT Futures Index	OAT3S	Euro-OAT Future (FOAT)	Eurex	-3	05/02/2014	Eurex Last Trading Day	16.66%
Solactive Leveraged Long x 5 OAT Futures Index	OAT5L	Euro-OAT Future (FOAT)	Eurex	5	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Short x 5 OAT Futures Index	OAT5S	Euro-OAT Future (FOAT)	Eurex	-5	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Long x 7 OAT Futures Index	OAT7L	Euro-OAT Future (FOAT)	Eurex	7	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Short x 7 OAT Futures Index	OAT7S	Euro-OAT Future (FOAT)	Eurex	-7	05/02/2014	Eurex Last Trading Day	10.00%
Solactive Leveraged Long x 10 OAT Futures Index	OAT10L	Euro-OAT Future (FOAT)	Eurex	10	05/02/2014	Eurex Last Trading Day	8.00%
Solactive Leveraged Short x 10 OAT Futures Index	OAT10S	Euro-OAT	Eurex	-10	05/02/2014	Eurex Last Trading	8.00%

		Future (FOAT)				Day	
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Where **Eurex Last Trading Day** means the dates published by Eurex on its website, which for indicative purposes, shall include the following dates for 2014 and 2015: 06.03.2014; 06.06.2014; 08.09.2014; 08.12.2014; 06.03.2015; 08.06.2015; 08.09.2015; 08.12.2015

Appendix 2

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