

## **GUIDELINE**

# **SOLACTIVE Europe US Selection INDEX**

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This document contains the underlying principles and regulations regarding the structure and the operating of the Solactive Europe US Selection Index. Solactive AG shall make every effort to implement 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 is no 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.

# INTRODUCTION

This document is to be used as a guideline with regard to the composition, calculation and management of the Europe US Selection Index. Any changes made to the guideline are initiated by the Committee specified below. The Europe US Selection Index is the sole property of Solactive AG. The Europe US Selection Index is calculated and published by Solactive AG (the “Index Calculator”). The name “Solactive” is copyrighted.

## 1 INDEX SPECIFICATIONS

The Europe US Selection Index is a currency hedged Long/Short version (hedged in Euro) of the Intermediate Euro Levels (“Underlying Strategy Baskets (Long and Short)”). These Intermediate Euro Levels are based on two Reference Baskets (“Underlying Reference Baskets (EU/US)”). Detailed information regarding the Intermediate Euro Levels and the Reference Baskets can be found below. The same disclaimers and legal information apply as for the Europe US Selection Index.

### 1.1 Short name and ISIN

The Europe US Selection Index is distributed under ISIN DE000SLA0J87; the WKN is SLA0J8. The Bloomberg Ticker is EUSSEL Index.

### 1.2 Initial value

The Index is based on 1000 as at the close of trading on the start date of 31st March 2015.

### 1.3 Distribution

The Europe US Selection Index is published via the price marketing services of Boerse Stuttgart AG and is distributed to all affiliated vendors.

### 1.4 Prices and calculation frequency

The Europe US Selection Index is calculated every Calculation Date around 10:00 am CET for the previous Business day.

The index is calculated on any calendar day except on the 1st of January and 25th of December.

### 1.5 Weighting

The Europe US Selection Index is weighted to provide 130% exposure to the Long Underlying Strategy Basket and -30% to the Short Underlying Strategy Basket.

The weighting methodology may be amended by the Committee if required due to legal framework.

### 1.6 Decision-making bodies

A Committee composed of Solactive AG employees is responsible for decisions regarding the composition of the Europe US Selection Index as well as any amendments to the rules (hereinafter referred to as the “Committee” or the “Underlying Strategy Basket Committee”). The Committee will also decide about the future composition of the Europe US Selection if any extraordinary event (see below) occurs and the implementation of any necessary adjustments. Any Member of the Committee can

recommend at any time changes to the composition of the Underlying Strategy Basket or to the guideline and submit them to the Committee for approval.

## **1.7 Publication**

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

## **1.8 Historical data**

Historical backtested data are available starting January 2005. The index was first calculated on March 31<sup>st</sup> 2015.

## **1.9 Licensing**

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

## **2 COMPOSITION OF THE INDEX**

### **2.1 Selection of the index components**

The components of the Europe US Selection Index are not changed over time. The selection of the components of the underlying (unhedged) strategy baskets and their respective reference baskets are defined below

### **2.2 Ordinary adjustment**

The index is a fixed quantity index whose numbers of shares are rebalanced monthly. The new quantities are calculated on the Index Review Date, which is the last calculation day of each month minus five calculation days. The quantities become effective COB on the index rebalancing day, which is the day falling five calculation days after the index review day.

### **2.3 Extraordinary adjustment**

The index is not rebalanced extraordinarily.

## 3 CALCULATION OF THE INDEX

### 3.1 Index formula

#### 3.1.1 Index formula for the Europe US Selection Index

The Europe US Selection Index is a Long/Short Index whose value reflects the value of the Underlying Strategy Baskets (namely the hedged Long and Short Underlying Strategy Baskets).

As a formula:

$$IL_t = IL_{t_{index}^*} * \left( 1 + i_{t_{index}^*}^{EUR} * \frac{DCF_{t,t_{index}^*}}{360} \right) + \sum_k NOSH_{t_{index}^*}^k * \left( USB_t^k - USB_{t_{index}^*}^k * \left( 1 + i_{t_{index}^*}^{EUR} * \frac{DCF_{t,t_{index}^*}}{360} \right) \right)$$

Where:

$IL_t$  is the value of the Europe US Selection Index as of Calculation Date t.

$NOSH_{t_{index}^*}^k$  is the number of shares of Underlying Strategy Basket k,  $k \in \{Long, Short\}$ , in the Europe US Selection Index as of Calculation Date  $t_{index}^*$ .

$USB_t^k$  is the value of the hedged Underlying Strategy Basket k,  $k \in \{Long, Short\}$ , as of Calculation Date t.

$USB_{t_{index}^*}^k$  is the value of the hedged Underlying Strategy Basket k,  $k \in \{Long, Short\}$ , as of Calculation Date  $t^*$ .

$t_{index}^*$  is the Index Rebalancing Date which falls strictly before Calculation Date t. For the avoidance of doubt, if t is itself an Index Rebalancing Date, then  $t_{index}^*$  refers to the previous Index Rebalancing Date.

$DCF_{t,t_{index}^*}$  is the number of calendar days between Calculation Date t (excluded) and Calculation Date  $t^*$  (included).

The number of shares are calculated according to the following formula:

If t is an Index Rebalancing Date, then

$$NOSH_t^{Long} = \frac{1.3 * IL_{t_{index}^{rev}}}{USB_{t_{index}^{rev}}^{Long}}, \quad NOSH_t^{Short} = \frac{-0.3 * IL_{t_{index}^{rev}}}{USB_{t_{index}^{rev}}^{Short}}$$

If t is not an Index Rebalancing Date, then

$$NOSH_t^{Long} = NOSH_{t-1}^{Long}, \quad NOSH_t^{Short} = NOSH_{t-1}^{Short}$$

Where  $t_{index}^{rev}$  is the Index Review Date prior to the given Index Rebalancing Date.

#### 3.1.2 Formula for the Hedged Long and Short Underlying Strategy Baskets

The (hedged) Long and Short Underlying Strategy Baskets reflect the values of the EUR currency hedge on a daily basis of the Unhedged Underlying Strategy Baskets (the Unhedged Long Underlying Strategy Basket and the Unhedged Short Underlying Strategy Basket).

As a formula

$$USB_t^k = USB_{t-1}^k * \left( \frac{IL_t^{k,uh}}{IL_{t-1}^{k,uh}} + \sum_c HI_{c,t}^{k,uh} \right)$$

Where

$USB_t^k$  is the level of the hedged (Long or Short respectively) Underlying Strategy Basket as of Calculation Date t ( where  $k \in \{Long, Short\}$ )

$USB_{t-1}^k$  is the level of the hedged (Long or Short respectively) Underlying Strategy Basket as of Calculation Date t-1.

$USB_t^{k,uh}$  is the level of the Unhedged (Long or Short respectively) Underlying Strategy Basket as of Calculation Date t (where  $k \in \{Long, Short\}$ )

$USB_{t-1}^{k,uh}$  is the level of the Unhedged (Long or Short respectively) Underlying Strategy Basket as of Calculation Date t-1.

c is the set of currencies to be hedged in the Unhedged Underlying Strategy Baskets. c may consists of the following currencies: DKK, GBP, NOK, CHF, USD, SEK.

$HI_{c,t}^{k,uh}$  is the hedge impact of currency c in the Unhedged Underlying Strategy Basket k (where  $k \in \{Long, Short\}$ ) as of Calculation Date t. It is calculated according to the following formula:

$$HI_{c,t}^{k,uh} = -w_{c,t-1}^{k,uh} * \left( \frac{FX_{c,t-1}}{FX_{c,t}} - 1 + i_{t-1}^c * \frac{DCF_{t,t-1}}{360} \frac{FX_{c,t-1}}{FX_{c,t}} - i_{t-1}^{EUR} * \frac{DCF_{t,t-1}}{360} \right)$$

Where

$w_{c,t-1}^{k,uh}$  is the weight of currency c in the Unhedged Underlying Strategy Basket k (where  $k \in \{Long, Short\}$ ) as of Calculation Date t-1

$FX_{c,t}$  is the currency exchange rate to convert one EUR into units of currency c as of Calculation Date t.

$FX_{c,t-1}$  is the currency exchange rate to convert one EUR into units of currency c as of Calculation Date t-1.

$i_{t-1}^c$  is the reference interest rate of currency c as of Calculation Date t-1.

$DCF_{t,t-1}$  is the number of calendar days between Calculation Date t (excluding) and Calculation Date t-1 (including)

$i_{t-1}^{EUR}$  is the EUR reference rate as of Calculation Date t-1

$DCF_{t,t-1}$  is the number of calendar days between Calculation Date t (excluding) and Calculation Date t-1 (including)

### 3.1.3 Formula for the Unhedged Long and Short Underlying Strategy Baskets

The Unhedged Long and Short Underlying Strategy Baskets are fixed quantity price return indices whose number of shares are rebalanced quarterly. The new quantities are calculated on the Basket Review Date. They become effective COB on the basket rebalancing day, which is the day falling five calculation days after the basket review day. As the baskets are price return, the prices considered in the calculation are not adjusted for regular cash (but for irregular cash and rights issues).

The index level is then calculated according to the following formula:

$$USB_t^{k,uh} = \sum_i NOSH_{i,t_{basket}^*}^{k,uh} * Price_{i,t} / FX_{c(i),t}$$

Where

$USB_t^{k,uh}$  has the same meaning as above.

$t_{basket}^*$  is the Basket Rebalancing Date which falls strictly before Calculation Date t

$NOSH_{i,t_{basket}^*}^{k,uh}$  is the number of shares of underlying component i at Basket Rebalancing Date  $t^*$

$Price_{i,t}$  is the closing level of underlying component i as of Calculation Date t.

i is the number of underlying components in the Long or Short Unhedged Underlying Strategy Basket.

$c(i)$  is the currency in which underlying component i is denominated.

$FX_{c(i),t}$  is the exchange rate to convert one EUR into units of currency  $c(i)$  as of Calculation Date t.

The numbers of shares are calculated according to the following formula:

If t is a Basket Rebalancing Date, then

$$NOSH_{i,t}^{k,uh} = \frac{w_{i,t_{basket}^*}^{k,uh} * IL_{t_{basket}^*}^{k,uh}}{\left( Price_{i,t_{basket}^*}^{rev} / FX_{c(i),t_{basket}^*}^{rev} \right)} * \frac{IL_t^{k,uh}}{IL_t^{k,uh,hypo}}$$

Where

$$IL_t^{k,uh,hypo} = \sum_i NOSH_{i,t}^{k,uh,prelim} * Price_{i,t} / FX_{c(i),t}$$

and

$$NOSH_{i,t}^{k,uh,prelim} = \frac{w_{i,t_{basket}^{rev}}^{k,uh} * IL_{t_{basket}^{rev}}^{k,uh}}{\left(Price_{i,t_{basket}^{rev}} / FX_{c(i),t_{basket}^{rev}}\right)}$$

$t_{basket}^{rev}$  is the Basket Review Date prior to the given Basket Rebalancing Date.

$w_{i,t_{basket}^{rev}}^{k,uh}$  is the weight of underlying component i of the Unhedged Underlying Strategy Basket k (where  $k \in \{Long, Short\}$ ) on the Basket Review Date immediately preceding Calculation Date t. Please refer to section 3.1.4 Weight determination for the computation of the weights.

If t is not a Basket Rebalancing Date, then

$$NOSH_{i,t}^{k,uh} = NOSH_{i,t-1}^{k,uh}$$

### 3.1.4 Weight determination

The weights for the Long and Short Unhedged Underlying Strategy Baskets are calculated on each Basket Review Date for the Long and Short Unhedged Underlying Strategy Baskets.

#### 3.1.4.1 Calculation for the Long Unhedged Underlying Strategy Basket

The vector of reference weights for the underlying components in the Universe as of Basket Review Date  $t_{basket}^{rev}$  (the ‘‘Reference Weights’’,  $w_{t_{basket}^{rev}}^{Ref}$ ), is the solution to the following optimization problem:

$$\begin{aligned} \max_w \quad & w' * Est\_Div_{t_{basket}^{rev}} \\ \text{s.t.} \quad & \sum_i w_i = 1 \\ & w_i \in [0; 0.05] \\ & \sqrt{w' * VC_{t_{basket}^{rev}} * w} \leq rvc * ReferenceVol_{t_{basket}^{rev}} \end{aligned}$$

Where

$Est\_Div_{t_{basket}^{rev}}$  is the vector of estimated dividend yields of the underlying components in the Universe (each denominated in its original currency) as of Basket Review Date t. Estimated dividend yields are computed from a dedicated data provider. It is in the sole discretion of the index owner to change the source for the calculation of the estimated dividend yield.

$VC_{t_{basket}^{rev}}$  is the variance-covariance matrix of the returns of the underlying components in the Universe (each denominated in its original currency) as of Basket Review Date  $t_{Rev}$ . A generic element (i,j) of VC is calculated according to the following formula

$$VC_{t_{basket}^{rev}}(i,j) = \frac{1}{250} \sum_{k=0}^{249} \left( r_{i,t_{basket}^{rev}-k} - \overline{r_{i,t_{basket}^{rev}-k}} \right) \left( r_{j,t_{basket}^{rev}-k} - \overline{r_{j,t_{basket}^{rev}-k}} \right)$$

where

$$r_{i,t_{basket}^{rev}-k} = \ln \left( \frac{Price_{i,t_{basket}^{rev}-k}}{Price_{i,t_{basket}^{rev}-k-3}} \right) \sqrt{\frac{365}{Act(t(t-k-3), t(t-k))}}$$

$$\overline{r_{i,t-k}} = \frac{1}{250} \sum_{k=0}^{249} r_{i,t-k}$$

$Price_{i,t_{basket}^{rev}-k}$  is the price of underlying component i as of Calculation Date  $t_{basket}^{rev} - k$

$rvc$  is the relative volatility constraint which is set to 65%. In case no solution does respect constraint of the optimization problem, then Relative Volatility Constraint shall be increased by 5%. This procedure is repeated until a solution to the optimization problem is found or if Relative Volatility Constraint is equal to 100%.

$ReferenceVol_{t_{basket}^{rev}}$  is the volatility of the European Reference Basket (as defined below) as of Basket Review Date  $t_{Rev}$ . It is calculated according to the following formula:



$$ReferenceVol_{t_{basket}^{rev}} = \sqrt{\frac{1}{120} * \sum_{k=0}^{120} \left( \sqrt{\frac{365}{Act(t(t-k-3), t(t-k))}} * \ln \left( \frac{RB_{t_{basket}^{rev}-k}}{RB_{t_{basket}^{rev}-k-3}} \right) \right)^2}$$

Where

$RB_{t_{basket}^{rev}-k}$  is the level of the EU Reference Basket as of Calculation Date  $t_{basket}^{rev} - k$

$Act(t(t-k-3), t(t-k))$  is the number of calendar days between Calculation Date t-k-3 (included) and Calculation Date t-k (excluded)

### 3.1.4.2 Calculation of the weights for the Long Unhedged Underlying Strategy Basket

The weights for the Long unhedged Underlying Strategy Basket are the Reference Weights as calculated in section 3.1.4.1, rounded to 6 decimals. Excess or shortage weight is added/subtracted to/from the underlying component's weight which has the largest reference weight smaller or equal to 2.5%.

### 3.1.4.3 Calculation of the weights for the Short Unhedged Underlying Strategy Basket

The weights for the Short Unhedged Underlying Strategy Basket are calculated the following way:

We define three sets:

- 1) Smallest weight subset: Those underlying components whose reference weights are below or equal 0.01%
- 2) The most capitalized subset: Those underlying components whose market capitalization lies in the top 30% percentile.
- 3) The highest Beta subset: Those underlying components whose beta (as defined below) lies in the top 30% percentile.

We select those underlying components which lie in the intersection of the three sets as defined above. In case less than 19 underlying components are selected, we enlarge the percentiles of set 2) and set 3) by 1%. This procedure is repeated until at least 20 underlying components are selected.

One arrives at the weights for the Short Unhedged Underlying Strategy Basket by equally weighting the selected underlying components.

The Beta is computed as of the Basket Review Date ( $t_{basket}^{rev}$ ) using the last 250 3-day returns for each underlying Component in the Universe according to the following formula:

$$Beta(Component i, Reference Basket j, t_{basket}^{rev}) = \frac{\frac{1}{250} \sum_{k=0}^{249} \left( (r_{i,t_{basket}^{rev}-k} - \overline{r_{i,t_{basket}^{rev}-k}}) \right) \left( (r_{j,t_{basket}^{rev}-k} - \overline{r_{j,t_{basket}^{rev}-k}}) \right)}{\frac{1}{250} \sum_{k=0}^{249} \left( (r_{j,t_{basket}^{rev}-k} - \overline{r_{j,t_{basket}^{rev}-k}}) \right)^2}$$

Where,

$$r_{i,t_{review}-k} = \ln \left( \frac{Price_{i,t_{basket}^{rev}-k}}{Price_{i,t_{basket}^{rev}-k-3}} \right) \sqrt{\frac{365}{Act(t(t-k-3), t(t-k))}}$$

$$r_{j,t_{review}-k} = \ln \left( \frac{RB_{j,t_{basket}^{rev}-k}}{RB_{j,t_{basket}^{rev}-k-3}} \right) \sqrt{\frac{365}{Act(t(t-k-3), t(t-k))}},$$

where j is either EU or US

$Price_{i,t_{basket}^{rev}-k}$  is the price of underlying component i at Calculation Date  $t_{basket}^{rev} - k$

Note that the Beta for an underlying component listed on an American Exchange is calculated using the US Reference Basket (as defined below), the Beta for an underlying component listed on an European Exchange is calculated using the EU Reference Basket (as defined below).

For the avoidance of doubt, the Beta for US stocks uses the prices of underlying components in USD. The Beta for European Stocks uses the price of the underlying components converted to EUR, except for underlying components denominated in GBP, in which case the underlying components are not converted to EUR.

### 3.1.5 Calculation of the Reference Baskets

There are two Reference Baskets underlying the Unhedged Underlying Strategy Baskets:

- the Europe Reference Basket
- the US Reference Basket

The Europe Reference Basket is comprised of the 200 biggest free-float capitalization shares (each of them an underlying component) in the European Universe (as defined below). It is a capitalization-weighted price return basket denominated in EUR which is rebalanced quarterly. On the Basket Review Date (5 calculation days before the Basket Rebalancing Date), new number of shares are calculated which become effective at the close of the Basket Rebalancing Date (the last calculation date of each quarter). As the basket is price return, the prices considered in the calculation are not adjusted for regular cash (but for irregular cash and rights issues).

The US Reference Basket is comprised of the 100 biggest free-float capitalization shares (each of them an underlying component) in the American Universe (as defined below). It is a capitalization-weighted price return basket denominated in USD which is rebalanced quarterly. On the Basket Review Date (5 calculation days before the Rebalancing Date), new number of shares are calculated which become effective at the close of the Basket Rebalancing Date (the last calculation date of each quarter). As the basket is price return, the prices considered in the calculation are not adjusted for regular cash (but for irregular cash and rights issues).

The calculation of the index level of the reference baskets works analogously to the calculation of the Unhedged Underlying Strategy Baskets (see above).

“European Universe” means all securities that are part of the [Solactive GBS Developed Markets Europe Investable Universe USD Index PR \(ISIN: DE000SLA8DV6 on a Basket Review Date](#).

“American Universe” means all securities that are part of the [Solactive GBS United States Investable Universe Index PR \(ISIN: DE000SLA8D10 on a Basket Review Date](#).

The “Universe” consists of the union of the “European Universe” and the “American Universe”.

For avoidance of doubt, the Universe is reviewed on a quarterly basis at the Basket Review Date.

“Eligible Country” means the United States and any European country considered as developed by the Underlying Strategy Basket Calculation Agent. As of the Underlying Strategy Basket Launch Date, the list of Eligible Countries is the following: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. Such list may be updated from time to time by the Underlying Strategy Basket Calculation Agent in order to insure that it remains consistent over time with the definition of developed countries as determined by the Underlying Strategy Basket Calculation Agent.

### **3.2 Accuracy**

The EU US Selection Index is rounded to two decimal places.

### **3.3 Dividends and other distributions**

As the index is price return, dividends are not reinvested in the index.

### **3.4 Corporate actions**

Corporate actions are treated according to the standard treatment of corporate actions for price return indices according to the following document: <https://www.solactive.com/documents/equity-index-methodology/>.

### **3.5 Calculation of the Index in the event of a market disruption**

Not Applicable.

## 4 DEFINITIONS

Calculation Date: All weekdays except 25<sup>th</sup> of December and 1<sup>st</sup> of January

Long Underlying Strategy Basket: The currency hedged version of the Unhedged Long Underlying Strategy Basket as defined in Section 3.1.2

Short Underlying Strategy Basket: The currency hedged version of the Unhedged Short Underlying Strategy Basket as defined in Section 3.1.2

Unhedged Long Underlying Strategy Basket: The Basket as defined in Section 3.1.3

Unhedged Short Underlying Strategy Basket: The Basket as defined in Section 3.1.3

Index Rebalancing Date: The last Calculation Date of each month

Index Review Date: The Calculation Date which falls five Calculation Dates before the Index Rebalancing Date.

Basket Rebalancing Date: The last Calculation Date of each quarter

Basket Review Date: The Calculation Date which falls five Calculation Dates before the Basket Rebalancing Date

Currency Exchange Rates: The fixing rates as published by WM Company at 4:00 pm London time

Reference Interest Rates: The rates published under the following Bloomberg Tickers

- EUR003M Index
- CIBO03M Index
- NIBOR3M Index
- STIB3M Index
- SF0003M Index
- BP0003M Index
- US0003M Index

## **5 APPENDIX**

### **5.1 Contact data**

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### **5.2 Calculation of the Index – change 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, which he 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.