

## **GUIDELINE**

### **Solactive High Dividend Upside Volatility Euro PR Index**

Version 1.0 dated March 12th, 2018



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This document contains the underlying principles and regulations regarding the structure and the operating of the Solactive High Dividend Upside Volatility Euro PR 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 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.

## 1 Index specifications

The Solactive High Dividend Upside Volatility Euro PR Index (the “Index”) is an Index of Solactive AG and is calculated and distributed by this provider.

The Index is designed to track the performance 50 companies within the Eurozone investible universe. These stocks are highly liquid, display high dividend yields, and together exhibited optimal upside volatility – the highest achievable (via optimization), while respecting constraints such as individual stock weight caps, portfolio-level dividend yield floors, and sector exposure caps.

The Index is calculated as a Price Return index.

The Index is published in Euro (EUR).

### 1.1 Index name and identifier

Name	ISIN	Bloomberg Ticker	RIC	Return Type
Solactive High Dividend Upside Volatility Euro PR Index	DE000SLA5UK9	SOLHDUVP Index	.SOLHDUVP	Price Return

### 1.2 Initial value

The Index is based on 1000 at the close of trading on the start date, 1<sup>st</sup> February 2006.

### 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 his 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.

The Index is calculated every Business Day from 9:30am to 4:30pm, EST. In the event that data cannot be provided to Reuters or to the pricing services of Boerse Stuttgart AG the Index cannot be distributed.

## **1.5 Weighting**

On each Adjustment Day, each Index Component of the Index is weighted to achieve maximum portfolio upside volatility (under certain constraints). The single steps are described in detail in section 2 (more specifically, the weighting process alone is described in section 2.1.D).

## **1.6 Decision-making bodies**

A Committee composed of staff from Solactive AG is responsible for decisions regarding the composition of the Index as well as any amendments to the rules (in this document referred to as the “Committee” or the “Index Committee”). The future composition of the Index is set by the Committee on the Selection Days. The Committee shall also decide about the future composition of the Index if any Extraordinary Events should occur and the implementation of any necessary adjustments.

Members of the Committee can recommend changes to the guideline and submit them to the Committee for approval if there are regulatory reasons for changing the guidelines.

## **1.7 Publication**

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

## **1.8 Historical data**

Back-tested data prior to the launch of the index is available until 1<sup>st</sup> February 2006. Historical data will be maintained from the launch of the Index on 7<sup>th</sup> November 2017.

## **1.9 Licensing**

Licences 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 Composition of the Index

### 2.1 Selection of the Index Components

The initial composition of the Index as well as any ongoing adjustment is based on the following rules:

On the Selection Days, Solactive AG defines the Selection Pool as lined out in Section 4 of this document. From the Selection Pool, the final Index Components are selected based on the following rules:

A. Companies are ranked according to 12-month trailing dividend yield. Only the top 75 stocks in terms of dividend yield make it to the next step. The rest are eliminated.

B. Start the optimization process, to find the weights of these stocks that result in maximum portfolio upside volatility. The optimization process is defined as:

$$\max (\omega' \cdot \Sigma \cdot \omega)$$

where  $\omega$  is the vector of weights and  $\Sigma$  is the semi-covariance matrix (calculated using 252 business days lookback period), defined as:

$$\sum_{i,j} ij = \frac{1}{T-1} \cdot \sum_{t=1}^T [ \max(R_{it}, 0) \cdot \max(R_{jt}, 0) ]$$

where  $T$  is the number of observations (252 business days), and  $\max(R_{it}, 0)$  is the maximum between zero and the return of asset  $i$  at time  $t$  (equivalent to replacing negative returns with zeroes).

The optimization is solved subject to the following constraints:

i. Sum of weights adds up to 1.

$$\sum_{i=1}^N \omega_i = 1$$

ii. Min/Max weights of 0% and 5% for all individual stocks.

$$\omega_i^{\min} \leq \omega_i \leq \omega_i^{\max}, \quad i = 1, \dots, N$$

iii. Dividend yield floor at portfolio level of 5%.

$$\sum_{i=1}^N \omega_i \cdot \text{div}_i \geq \text{Div}^{\min}$$

▪ No sector constraint at this step

The symbols are re-stated below for clarity:

Symbol	Name	Numeric value of constraint
$\omega_i$	Weight of Stock i	-
$\omega_i^{\max}$	Maximum weight of stock i	5.00%
$\omega_i^{\min}$	Minimum weight of stock i	0%
$\text{div}_i$	12-month trailing dividend yield of stock i	-
$\text{Div}^{\min}$	Minimum portfolio-level dividend yield	5.00%

In case the optimizer does not find a solution that satisfies the constraints, the algorithm relaxes the dividend yield constraint by 0.25% and then it tries again. It will relax this constraint as many times as needed until a solution is found.

- C. After the optimization finds the weights for these stocks, we eliminate the 5 stocks that received the lowest weights (in other words, we eliminate the 5 stocks that contributed the least to portfolio upside volatility).

We then repeat the optimization process described in *Step B* above.

**We keep reiterating this step until 50 stocks remain** (optimize 75 stocks, drop 5, optimize 70 stocks, drop 5, optimize 65 stocks, drop 5, etc).

- D. When 50 stocks are left, we reiterate the optimization process described above in *Step B*, with two alterations:

- ii. Min/Max weights of 0.25% and 5%.

$$\omega_i^{\min} \leq \omega_i \leq \omega_i^{\max}, \quad i = 1, \dots, n$$

- iv. sector constraint: absolute cap of 25%.

$$\sum_{i \in \text{Sec}(j)}^n \omega_i \leq SW_j^{\max}$$

Please note that the sum of weights constraint (i.) and the 5% portfolio-level dividend yield floor constraint (iii.) still apply, as defined above in *Step B*.

The symbols are re-stated below for clarity:

Symbol	Name	Numeric value of constraint
$\omega_i$	Weight of Stock i	-
$\omega_i^{\max}$	Maximum weight of stock i	5.00%
$\omega_i^{\min}$	Minimum weight of stock i	0.25%
$\text{Sec}(j)$	The set of stocks that belong to sector j	-
$SW_j^{\max}$	Maximum weight allocation to sector j	25.00%

In case the optimizer does not find a solution that satisfies all the constraints, the algorithm relaxes the dividend yield constraint by 0.25% and the sector constraint by 5% and then it tries again. It will relax these constraints as many times as needed until a solution is found (over the back-test, constraint relaxation didn't occur).

## 2.2 Ordinary adjustment

The composition of the Index is reviewed four times a year on the close of the business day which is ten business days prior to the 1<sup>st</sup> Wednesday in February, May, August, and November respectively.

The composition of the Index is adjusted on the Adjustment Day. The first adjustment will be made in February 2018 based on the Trading Prices of the Index Components on the Adjustment Day. Solactive AG will publish any changes made to the Index composition on the Selection Day and consequently with sufficient notice before the Adjustment Day.

## 2.3 Extraordinary adjustment

An extraordinary adjustment, if applicable, is triggered and applied in compliance with the rules set forth in the Solactive Guideline for Extraordinary Corporate Actions.

## 3 Calculation of the Index

### 3.1 Index formula

The Index is an index whose value on a Business Day is equivalent to the sum over all Index Components of the products of (a) the Number of Shares of the Index Component and (b) the price of the Index Component at the respective Exchange.

As a formula:

$$Index_t = \sum_{i=1}^n x_{i,t} * p_{i,t}$$

With:

$x_{i,t}$  = Number of Shares of the Index Component i on Trading Day t

$p_{i,t}$  = Price of Index Component i on Trading Day t in Index Currency

### 3.2 Accuracy

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

Trading Prices will be rounded to four decimal places.

### 3.3 Adjustments

Indices need to be adjusted for systematic changes in prices once these become effective. This requires the new Number of Shares of the affected Index Component to be calculated on an ex-ante basis.

The Index is adjusted for distributions, capital increases, rights issues, splits, par value conversions and capital reductions.

This procedure ensures that the first ex quote can be properly reflected in the calculation of the Index. This ex-ante procedure assumes the general acceptance of the Index calculation formula as well as open access to the parameter values used. The calculation parameters are provided by Solactive AG.

### 3.4 Dividends and other distributions

Dividend payments and other distributions are included in the Index. They cause an adjustment of the Number of Shares of the corresponding Index Component. The new Number of Shares is calculated as follows:



$$x_{i,t} = x_{i,t-1} * \frac{p_{i,t-1}}{p_{i,t-1} - D_{i,t}}$$

With:

$x_{i,t}$  = Number of Shares of the Index Component i on Trading Day t

$D_{i,t}$  = Payment on Trading Day t multiplied by the Dividend Correction Factor of the respective country

### 3.5 Corporate actions

#### 3.5.1 Principles

Following the announcement by a company included in the Index of the terms and conditions of a corporate action the Index Calculator determines whether such corporate action has a dilution, concentration or other effect on the price of the Index Component.

If this should be the case the Index Calculator shall make the necessary adjustments to the affected Index Component and/or the formula for calculating the Index and/or to other terms and conditions of this document that he deems appropriate in order to take into account the dilution, concentration or other effect and shall determine the date on which this adjustment shall come into effect.

Amongst other things the Index Calculator can take into account the adjustment made by an Affiliated Exchange as a result of the corporate action with regard to option and futures contracts on the respective share traded on this Affiliated Exchange.

#### 3.5.2 Capital increases

In the case of capital increases (from the company's own resources or through cash contributions) the new Numbers of Shares are calculated as follows:

$$x_{i,t} = x_{i,t-1} * \frac{p_{i,t-1}}{p_{i,t-1} - rB_{i,t-1}} \quad \text{with:} \quad rB_{i,t-1} = \frac{p_{i,t-1} - B - N}{BV + 1}$$

With:

$x_{i,t}$  = Number of Shares of Index Component i on the day of the distribution

$x_{i,t-1}$  = Number of Shares of Index Component i on the day prior to the distribution

$p_{i,t-1}$  = Closing price on the day prior to ex date

$rB_{i,t-1}$  = Calculated value of rights issue

$B$  = Price of rights issue

$N$  = Dividend disadvantage

$BV$  = Subscription ratio

$B = 0$  if capital is increased from the company's own resources.

The last dividend paid or the announced dividend proposal is applied as the dividend disadvantage.

### 3.5.3 Capital reductions

In the case of capital reductions, the new Number of Shares is determined as follows:

$$x_{i,t} = x_{i,t-1} * \frac{1}{H_{i,t}}$$

With:

$H_{i,t}$	= Reduction ratio of the company on day t
$x_{i,t}$	= Number of Shares of the affected Index Component on the day of the distribution
$x_{i,t-1}$	= Number of Shares of the affected Index Component on the day prior to the distribution

### 3.5.4 Share splits and par value conversions

In the case of share splits and par value conversions it is assumed that the prices change in ratio to the number of shares or to the par values. The new Number of Shares is calculated as follows:

$$x_{i,t} = x_{i,t-1} * \frac{N_{i,t-1}}{N_{i,t}}$$

With:

$N_{i,t-1}$	= Former par value of security class i (or new number of shares)
$N_{i,t}$	= New par value of security class i (or former number of shares)
$x_{i,t}$	= Number of Shares of the affected Index Component on the day of the distribution
$x_{i,t-1}$	= Number of Shares of the affected Index Component on the day prior to the distribution

## 3.6 Miscellaneous

### 3.6.1 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](#).

### 3.6.2 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](#).

#### 4. Definitions

**“Index Universe”** in respect of a Selection Day are stocks that fulfill the following criteria:

- primary listing is in one of the following Eurozone countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, and Spain (secondary listings are excluded).

**“Selection Pool”** is determined on a quarterly basis on the Selection Days in January, April, July, and October. It includes those companies that are part of the Universe (as described above) and fulfil the following conditions:

- Minimum Average Daily Value Traded of EUR 20mn over the previous 6 months.
- 12-month trailing dividend yield larger than 0%.

**“Daily Trading Volume”** means, in respect of a Share and of an Exchange Trading Day, the product of (i) the Closing Price of such Share and (ii) the volume traded (measured as a number of Share) of such Share over all relevant exchanges during such Exchange Trading Day.

**“Average Daily Trading Volume”** means, in respect of a Share, the sum of Daily Trading Volumes over a specified period divided by the number of Exchange Trading Days that fall in the specified period.

**“Sector”** is one of the following 20 baskets, as defined by the FactSet Sector Classification system: Commercial Services, Communications, Consumer Durables, Consumer Non-Durables, Consumer Services, Distribution Services, Electronic Technology, Energy Minerals, Finance, Health Services, Health Technology, Industrial Services, Miscellaneous, Non-Energy Minerals, Process Industries, Producer Manufacturing, Retail Trade, Technology Services, Transportation, and Utilities. For clarification, we use the second-broadest classification level (the broadest would be FactSet Economy, the second is FactSet Sector, and the third is FactSet Industry).

**“Index Component”** is each share currently included in the Index.

**“Number of Shares”** is in respect of an Index Component and any given Business Day the number or fraction of shares included in the Index. It is calculated for any Index Component as the ratio of (A) the Percentage Weight of an Index Component multiplied by the Index value and (B) its Trading Price.

**“Percentage Weight”** of an Index Component is the ratio of its Trading Price multiplied by its Number of Shares divided by the Index value.

**“Dividend Correction Factor”** is calculated as 1 minus the applicable withholding tax rate and/or other applicable tax rate currently prevalent in the respective country.

In particular an **“Extraordinary Event”** is

- a Merger
- a Takeover bid
- a delisting
- the Nationalisation of a company
- Insolvency.

The Trading Price for this Index Component on the day the event came into effect is the last available market price for this Index Component quoted on the Exchange on the day the event came into effect (or, if a market price is not available for the day the event came into effect, the last available market price quoted on the Exchange on a day specified as appropriate by the Index Calculator), as determined by the Index Calculator, and this price is used as the Trading Price of the particular Index Component until the end of the day on which the composition of the Index is next set.

In the event of the Insolvency of an issuer of an Index Component the Index Component shall remain in the Index until the next Adjustment Day. As long as a market price for the affected Index Component is available on a Business Day, this shall be applied as the Trading Price for this Index Component on the relevant Business Day, as determined in each case by the Index Calculator. If a market price is not available on a Business Day the Trading Price for this Index Component is set to zero. The Committee may also decide to eliminate the respective Index Component at an earlier point in time prior to the next Adjustment Day. The procedure in this case is identical to an elimination due to an Extraordinary Event.

An Index Component is **“delisted”** if the Exchange announces pursuant to the Exchange regulations that the listing of, the trading in or the issuing of public quotes on the Index Component at the Exchange has ceased immediately or will cease at a later date, for whatever reason (provided delisting is not because of a Merger or a Takeover bid), and the Index Component is not immediately listed, traded or quoted again on an exchange, trading or listing system, acceptable to the Index Calculator,

**“Insolvency”** occurs with regard to an Index Component if (A) all shares of the respective issuer must be transferred to a trustee, liquidator, insolvency administrator or a similar public officer as result of a voluntary or compulsory liquidation, insolvency or winding-up proceedings or comparable proceedings affecting the issuer of the Index Components or (B) the holders of the shares of this issuer are legally enjoined from transferring the shares.

A **“Takeover bid”** is a bid to acquire, an exchange offer or any other offer or act of a legal person that results in the related legal person acquiring as part of an exchange or otherwise more than 10% and less than 100% of the voting shares in circulation from the issuer of the Index Component or the right to acquire these shares, as determined by the Index Calculator based on notices submitted to public or self-regulatory authorities or other information considered by the Index Calculator to be relevant.

With regard to an Index Component a **“Merger”** is

- (i) a change in the security class or a conversion of this share class that results in a transfer or an ultimate definite obligation to transfer all the shares in circulation to another legal person,
- (ii) a merger (either by acquisition or through forming a new structure) or a binding obligation on the part of the issuer to exchange shares with another legal person (except in a merger or share exchange under which the issuer of this Index Component is the acquiring or remaining company and which does not involve a change in security class or a conversion of all the shares in circulation),
- (iii) a takeover offer, exchange offer, other offer or another act of a legal person for the purposes of acquiring or otherwise obtaining from the issuer 100% of the shares issued that entails a transfer or the irrevocable obligation to transfer all shares (with the exception of shares which are held and controlled by the legal person), or
- (iv) a merger (either by acquisition or through forming a new structure) or a binding obligation on the part of the issuer of the share or its subsidiaries to exchange shares with another legal person, whereby the issuer of the share is the acquiring or remaining company and it does not involve a change in the class or a conversion of the all shares issued, but the shares in circulation directly prior to such an event (except for shares held and controlled by the legal person) represent in total less than 50% of the shares in circulation directly subsequent to such an event.

The **“Merger Date”** is the date on which a Merger is concluded or the date specified by the Index Calculator if such a date cannot be determined under the law applicable to the Merger.

**“Nationalisation”** is a process whereby all shares or the majority of the assets of the issuer of the shares are nationalised or are expropriated or otherwise must be transferred to public bodies, authorities or institutions.

**“Exchange”** is, in respect of Index and every Index Component, the respective primary exchange where the Index Component has its primary listing. The Committee may decide to declare a different stock exchange the “Exchange” for trading reasons, even if the company is only listed there via a Stock Substitute.

**“Stock Substitute”** includes in particular American Depositary Receipts (ADR) and Global Depositary Receipts (GDR).

With regard to an Index component (subject to the provisions given above under “Extraordinary Events”) the **“Trading Price”** in respect of a Trading Day is the closing price on this Trading Day determined in accordance with the Exchange regulations. If the Exchange has no closing price for an Index Component, the Index Calculator shall determine the Trading Price and the time of the quote for the share in question in a manner that appears reasonable to him.

A **“Trading Day”** is in relation to the Index or an Index Component a Trading Day on the Exchange (or a day that would have been such a day if a market disruption had not occurred), excluding days on which trading may be ceased prior to the normal Exchange closing time. The Index Calculator is ultimately responsible as to whether a certain day is a Trading Day with regard to the Index or an Index Component or in any other connection relating to this document.

A **“Business Day”** is every day other than Saturday and Sunday.

The **“Index Calculator”** is Solactive AG or any other appropriately appointed successor in this function.

The **“Index Currency”** is Euro (EUR).

**“Market Capitalization”** is with regard to each of the shares in the Index Universe on a Selection Day or Adjustment Day the value published as the Market Capitalization for this day.

As at the date of this document Market Capitalization is defined as the value of a company calculated by multiplying the number of shares outstanding of the company by its share price.

**“Adjustment Day”** is the 1<sup>st</sup> Wednesday in February, May, August, and November.

**“Selection Day”** is the Business Day 10 Business Days before the Adjustment Day.

An **“Affiliated Exchange”** is with regard to an Index Component an exchange, a trading or quotation system on which options and futures contracts on the Index Component in question are traded, as specified by the Index Calculator.

A **“Market Disruption Event”** occurs if

1. one of the following events occurs or exists on a Trading Day prior to the opening quotation time for an Index Component:
  - A) trading is suspended or restricted (due to price movements that exceed the limits allowed by the Exchange or an Affiliated Exchange, or for other reasons):
    - 1.1. across the whole Exchange; or
    - 1.2. in options or futures contracts on or with regard to an Index Component or an Index Component that is quoted on an Affiliated Exchange; or
    - 1.3. on an Exchange or in a trading or quotation system (as determined by the Index Calculator) in which an Index Component is listed or quoted; or

B) an event that (in the assessment of the Index Calculator) generally disrupts and affects the opportunities of market participants to execute on the Exchange transactions in respect of a share included in the Index or to determine market values for a share included in the Index or to execute on an Affiliated Exchange transaction with regard to options and futures contracts on these shares or to determine market values for such options or futures contracts; or

2. trading on the Exchange or an Affiliated Exchange is ceased prior to the usual closing time (as defined below), unless the early cessation of trading is announced by the Exchange or Affiliated Exchange on this Trading Day at least one hour before

(aa) the actual closing time for normal trading on the Exchange or Affiliated Exchange on the Trading Day in question or, if earlier.

(bb) the closing time (if given) of the Exchange or Affiliated Exchange for the execution of orders at the time the quote is given.

**“Normal exchange closing time”** is the time at which the Exchange or an Affiliated Exchange is normally closed on working days without taking into account after-hours trading or other trading activities carried out outside the normal trading hours; or

3. a general moratorium is imposed on banking transactions in the country in which the Exchange is resident if the above-mentioned events are material in the assessment of the Index Calculator, whereby the Index Calculator makes his decision based on those circumstances that he considers reasonable and appropriate.

## 5 Appendix

### 5.1 Contact data

#### Information regarding the Index concept

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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.