

# INDEX GUIDELINE

*AI Powered US Equity Base Index*

*Version 1.0*

*09 August 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 AI Powered US Equity Base Index (the "Index"). Any changes made to the Guideline are subject to the approval of a committee, as specified in Section 4.5. The Index is administered, calculated and published by Solactive AG ("Solactive") assuming the role as administrator (the "Index Administrator") under the Regulation (EU) 2016/1011 (the "Benchmark Regulation" or "BMR"). The name "Solactive" is trademarked.

The Guideline and the documents referenced herein contain the underlying principles and rules regarding the structure and operation of the Index. 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 level of the Index at any certain point in time nor in any other respect. Solactive AG 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 Index is owned by EquBot Inc. ("EquBot") and administered, calculated, and published by Solactive AG.
- > It tracks the price movements of a portfolio of shares selected by EquBot from the constituents of the Solactive US Large & Mid Cap Index following a methodology based on artificial intelligence techniques, subject to certain allocation constraints.
- > The Index is calculated as a Total Return ("TR") index, Net Total Return ("NTR") index and as a Price Return ("PR") index.
- > The Index is denominated in USD.

## 1.1. SHORT NAME AND ISIN

The Index is published under the following identifiers:

Name	ISIN	RIC	Bloomberg
AI Powered US Equity Base Index (TR)	DE000SLA8NN2	.AIPEXTR	AIPEXTR Index
AI Powered US Equity Base Index (NTR)	DE000SLA9GZ8	.AIPEXNR	
AI Powered US Equity Base Index (PR)	DE000SLA8NP7	.AIEXPR	AIEXPR Index

## 1.2. INITIAL LEVEL OF THE INDEX

The Index is based on 1000 at the close of trading on 30 January 2004.

## 1.3. DISTRIBUTION

The Index is published on the website of the Index Administrator ([www.solactive.com](http://www.solactive.com)) and is, in addition, available via the price marketing services of Boerse Stuttgart AG and may be distributed to all of its affiliated vendors. Each vendor decides on an individual basis as to whether it will distribute or display the Index via its information systems.

## 1.4. PRICES AND CALCULATION FREQUENCY

The level of the Index is calculated on each Calculation Day from 9:00 a.m. to 10:50 p.m. CET based on the Trading Prices on the Exchanges on which the Index Components are listed. Trading Prices of Index



Components not listed in the Index Currency are converted using the current Reuters spot foreign exchange rate. Should there be no current Trading Price for an Index Component, the later of: (i) the most recent Closing Price; or (ii) the last available Trading Price for the preceding Trading Day is used in the calculation.

In addition to the intraday calculation a closing level of the Index for each Calculation Day is also calculated. This closing level is based on the Closing Prices for the Index Components on the respective Exchanges on which the Index Components are listed. The Closing Prices of Index Components not listed in the Index Currency are converted using the 4pm London time WM Fixing quoted by Reuters. If there is no 4pm London time WM Fixing for the relevant Calculation Day, the last available 4pm London time WM Fixing will be used for the closing level calculation.

## 1.5. PUBLICATION

All specifications and information relevant for calculating the Index are made available on the Solactive website: <http://www.solactive.com>.

## 1.6. HISTORICAL DATA

Historical data will be maintained from the launch of the Index on 09 August 2019.

## 1.7. 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 EquBot.

# 2. COMPOSITION OF THE INDEX

## 2.1. SELECTION OF THE INDEX COMPONENTS

The Index Components are selected in respect of each Selection Day from the Index Universe according to the rules-based, quantitative methodology elaborated by EquBot.

An introduction of EquBot and an overview of this methodology are given below.

The Index Components are subject to allocation constraints, as further detailed in section 2.2.



## 2.1.1. EquBot

EquBot Inc is a San Francisco, CA based AI powered investment manager, a graduate of the IBM Global Entrepreneur Program, and is part of the with Watson Program. EquBot helps global investment professionals transform data into better outcomes.

Using both proprietary AI technology and IBM Watson®, EquBot designs investment strategies that can utilize AI throughout the entire investment process. EquBot technology can combine both fundamental and quantitative analysis while formulating new investment insights through the use of AI. EquBot solutions utilize large amounts of data to build predictive financial models on over 50,000 globally traded companies.

Along with being the owner of the Index, EquBot also manages exchange-traded funds and dedicated mandates for institutional investors.

## 2.1.2. AI Scores

In respect of each Selection Day, the following scores are computed for each share within the Index Universe: the AI Financial Score, the AI Management Score and the AI News Score (each, an “AI Score”).

These scores range from 0 to 10 and aim to quantify the potential increase in the value of each share with respect to data specific to each score.

### Source Data

AI Financial Scores are based on signals collected since 1999, where available. The signals are sourced from financial statement data, forecasted financial data, and trading data. Natural language processing (“NLP”), powered by IBM Watson®, is used to extract the relevant signals from financial statements.

AI Management Scores are based on signals collected since 1999, where available. The signals are sourced from financial statement data and company management specific news articles. Natural language processing (“NLP”), powered by IBM Watson®, is used to extract the relevant signals from these sources.

AI News Scores are based on signals collected since 1999, where available. The signals are sourced from news articles and social media posts. Natural language processing (“NLP”), powered by IBM Watson®, is used to extract the relevant signals from these sources.

The signals set forth in the Annex herein are used for the calculation of the AI Scores. Data normalization and other techniques are applied to overcome missing and erroneous data issues.

### Deep Learning Model

For each AI Score, the signals in respect of each share within the Index Universe are subsequently inserted into a deep learning model. This is done independently for each AI Score, and the models are specific to



each share. The models are formulated to estimate the future price of each share over a 1-month time horizon, relative to its current price.

### Calculation of AI Scores

In respect of each Selection Day, the AI Score for each share within the Index Universe is calculated in accordance with the following formula:

$$AI\ Score_{i,s} = \frac{N_{i,s} - N_{min,s}}{N_{max,s} - N_{min,s}} \times 10$$

With:

- $N_{i,s}$  = the future price of share  $i$ , expressed as a percentage of its current price, as estimated on Selection Day  $s$  by the model related to the relevant AI Score
- $N_{min,s}$  = the theoretical minimum value of  $N_{i,s}$  in respect of such Selection Day across all shares within the Index Universe, assuming the  $N_{i,s}$  in respect of such Selection Day are normally distributed
- $N_{max,s}$  = the theoretical maximum value of  $N_{i,s}$  in respect of such Selection Day across all shares within the Index Universe, assuming the  $N_{i,s}$  in respect of such Selection Day are normally distributed

## 2.1.3. Opportunity Value

In respect of each Selection Day, the Opportunity Value ("OV") for each share within the Index Universe is calculated as follows:

- 1) The Aggregated AI Score of each within the Index Universe is computed, equal to the product of the AI Financial Score, AI Management Score and AI News Score of the relevant share
- 2) The Opportunity Value of each share within the Index Universe is then computed as the z-score of the Aggregated AI Score of the relevant share among the Aggregated AI Scores of all the shares in respect of such Selection Day.

## 2.1.4. Component Selection

On each Selection Day, the algorithm aims to select and assign weights to a subset of shares within the Index Universe in order to form the portfolio with the highest Opportunity Value under the allocation constraints set forth in section 2.2.

## 2.2. ALLOCATION CONSTRAINTS

The selection of Index Components from EquBot in respect of each Selection Day  $s$  shall be subject to the following constraints:





- (i) The Index Components with a market capitalization (as given by Factset under the mnemonic P\_MARKET\_VAL\_SEC or its predecessor or successor, as applicable) in respect of such Selection Day that is less than USD 2 billion shall be excluded from the selection;
- (ii) The weight in respect of each Index Component  $i$  shall be subject to the following cap:

$$Cap_{i,s} = \text{Min}(Cap, \alpha \times ADVTC_{i,s}, \beta \times ADVTP_{i,s})$$

With:

$$Cap = [7.50\%]$$

$$\alpha = [1/2,700,000,000 * 15\% * 3]$$

$$\beta = [1/2,700,000,000 * 50\% * 3]$$

$ADVTC_{i,s}$  = the average over the 20 Trading Days period ending on Selection Day  $s$  of the daily traded volume across all exchanges on which Index Component  $i$  is listed (as given by Factset under the mnemonic XP\_AGG\_VOLUME or its predecessor or successor, as applicable)

$ADVTP_{i,s}$  = the average over the 20 Trading Days period ending on Selection Day  $s$  of the daily traded volume on the primary exchange on which Index Component  $i$  is listed on the close (as given by Factset under the mnemonic XP\_VOLUME\_CLOSE or its predecessor or successor, as applicable) or, if such data is not available,  $[10\%] * ADVTC_{i,s}$

The excess weight that results from implementing these constraints shall be allocated into the I-Shares 1-3 Year Treasury Bond ETF (SHY UP Equity).

## 2.3. ADJUSTMENT

The initial composition of the Index is implemented on the close of 30 January 2004.

Thereafter, the composition of the Index is reviewed on each Selection Day and adjusted over several Trading Days, on the close of each Trading Day during the following Adjustment Period, as follows:

- (i) the target weight of each share within the Index Universe in respect of each Trading Day that doesn't fall during an Adjustment Period shall be equal to the weight of such share in respect of the preceding Selection Day, as determined in accordance with sections 2.1 and 2.2;
- (ii) the target weight of each share within the Index Universe in respect of each Trading Day falling during an Adjustment Period shall be determined in accordance with the following formula:



$$w_{i,r} = w_{i,r_0} + \frac{m \times (w_{i,s} - w_{i,r_0})}{5}$$

With:

$w_{i,r}$  = the target weight of share  $i$  in respect of such Trading Day

$w_{i,r_0}$  = the target weight of share  $i$  in respect of the Trading Day immediately preceding such Adjustment Period

$m$  = (a) if such Trading Day is the first Trading Day of such Adjustment Period, 1, (b) if such Trading Day is the second Trading Day of such Adjustment Period, 2 or (c) if such Trading Day is the third Trading Day of such Adjustment Period, 3 or (d) if such Trading Day is the fourth Trading Day of such Adjustment Period, 4 or (e) if such Trading Day is the fifth Trading Day of such Adjustment Period, 5

$w_{i,s}$  = the weight of share  $i$  in respect of the preceding Selection Day, as determined in accordance with sections 2.1 and 2.2

## 2.4. DISCONTINUATION OF THE SELECTION PROCESS

In the event that EquBot would no longer be able to compute or communicate the selection of Index Components and their weights to the Index Administrator, the index would then be composed of a unique Index Component with a weight of 100% (that shall not be subject to the allocation constraints described in section 2.2). Such Index Component shall be the SPDR S&P 500 ETF Trust (SPY UP).

# 3. CALCULATION OF THE INDEX

## 3.1. INDEX FORMULA

The level of the Index on a Business Day at the relevant time is calculated in accordance with the following formula:

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

With:

$x_{i,t}$  = Fraction of Shares of the Index Component  $i$  on Business Day  $t$

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



## 3.2. ACCURACY

- > The level of the Index will be rounded to 2 decimal places.
- > The Fraction of Shares of the Index Components will be rounded to six decimal places.

## 3.3. ADJUSTMENTS

Under certain circumstances, an adjustment of the Index may be necessary between two regular Adjustment Periods. Basically, such adjustment is needed to be made if a corporate action (as specified in Section 3.4 below) in relation of an Index Component occurs. Such adjustment may need to be done in relation to an Index Component and/or may also affect the Number of Index Shares and/or the weighting of certain Index Components and will be made in compliance with the Solactive Equity Index Methodology, which is incorporated by reference and available on the Solactive website: <https://www.solactive.com/documents/equity-index-methodology/>.

Solactive will announce the Index adjustment giving a notice period of at least two Trading Days (with respect to the affected Index Component) on the Solactive website under the Section "Announcements", which is available at <https://www.Solactive.com/news/announcements/>. The Index adjustments will be implemented on the effective day specified in the respective notice.

## 3.4. CORPORATE ACTIONS

As part of the Index maintenance Solactive will consider various events – also referred to as corporate actions – which result in an adjustment to the Index between two regular Adjustment Periods. Such events have a material impact on the price, weighting or overall integrity of Index Components. Therefore, they need to be accounted for in the calculation of the Index. Corporate actions will be implemented from the cum-day to the ex-day of the corporate action, so that the adjustment to the Index coincides with the occurrence of the price effect of the respective corporate action.

Adjustments to the Index to account for corporate actions will be made in compliance with the Solactive Equity Index Methodology, which is available on the Solactive website: <https://www.solactive.com/documents/equity-index-methodology/>. This document contains for each corporate action a brief definition and specifies the relevant adjustment to the Index variables.

While Solactive aims at creating and maintaining its methodology for treatment of corporate actions as generic and transparent as possible and in line with regulatory requirements, it retains the right in accordance with the Solactive Equity Index Methodology to deviate from these standard procedures in case of any unusual or complex corporate action or if such a deviation is made to preserve the comparability and representativeness of the Index over time.

SOLACTIVE considers following, but not conclusive, list of corporate actions as relevant for INDEX maintenance:



- > Cash Distributions (e.g. payment of a dividend)
- > Stock distributions (e.g. payment of a dividend in form of additional shares)
- > Stock distributions of another company (e.g. payment of a dividend in form of additional shares of another company (e.g. of a subsidiary))
- > Share splits (company's present shares are divided and therefore multiplied by a given factor)
- > Reverse splits (company's present shares are effectively merged)
- > Capital increases (such as issuing additional shares)
- > Share repurchases (a company offer its shareholders the option to sell their shares to a fixed price)
- > Spin-offs (the issuer of (Index Component) shares splits its business activities into two or more entities and distributes new equity shares in the created entities to the shareholders of the former entity)
- > Mergers & Acquisitions (transaction in which the ownership of a company (or other business organizations) are transferred or consolidated with other entities, e.g. fusion of two or more separate companies into one entity)
- > Delistings (company's shares are no longer publicly traded at a stock exchange)
- > Nationalization of a company (effective control of a legal entity is taken over by a state)
- > Insolvency

For the purpose of the interpretation of the Solactive Equity Index Methodology, the Total Return version of the index shall be deemed to be a Gross Total Return Index.

## 3.5. MISCELLANEOUS

### 3.5.1. Recalculation

Solactive makes the greatest possible efforts to accurately calculate and maintain its indices. However, errors in the determination process may occur from time to time for variety reasons (internal or external) and therefore, cannot be completely ruled out. Solactive endeavors to correct all errors that have been identified within a reasonable period of time. The understanding of "a reasonable period of time" as well as the general measures to be taken are generally depending on the underlying and is specified in the Solactive Correction Policy, which is incorporated by reference and available on the Solactive website: <https://www.solactive.com/documents/correction-policy/>.

### 3.5.2. Market Disruption

In periods of market stress Solactive calculates its indices following predefined and exhaustive arrangements as described in the Solactive Disruption Policy, which is incorporated by reference and



available on the Solactive website: <https://www.solactive.com/documents/disruption-policy/>. Such market stress can arise due to a variety of reasons, but generally results in inaccurate or delayed prices for one or more Index Components. The determination of the Index may be limited or impaired at times of illiquid or fragmented markets and market stress.

## 4. MISCELLANEOUS

### 4.1. DISCRETION

Any discretion which may need to be exercised in relation to the determination of the Index) shall be made in accordance with strict rules regarding the exercise of discretion or expert judgement.

### 4.2. METHODOLOGY REVIEW

The methodology of the Index is subject to regular review, at least annually. In case a need of a change of the methodology has been identified within such review (e.g. if the underlying market or economic reality has changed since the launch of the Index, i.e. if the present methodology is based on obsolete assumptions and factors and no longer reflects the reality as accurately, reliably and appropriately as before), such change will be made in accordance with the Solactive Methodology Policy, which is incorporated by reference and available on the Solactive website: <https://www.solactive.com/documents/methodology-policy/>.

Such change in the methodology will be announced on the Solactive website under the Section "[Announcement](https://www.solactive.com/news/announcements/)", which is available at <https://www.solactive.com/news/announcements/>. The date of the last amendment of this Index is contained in this Guideline.

### 4.3. CHANGES IN CALCULATION METHOD

The application by the Index Administrator of the method described in this document is final and binding. The Index Administrator 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 and financial or tax reasons may require changes to be made to this method. The Index Administrator 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 Administrator is not obliged to provide information on any such modifications or changes. Despite the modifications and changes, the Index



Administrator will take the appropriate steps to ensure a calculation method is applied that is consistent with the method described above.

#### 4.4. TERMINATION

Solactive makes the greatest possible efforts to ensure the resilience and continued integrity of its indices over time. Where necessary, Solactive follows a clearly defined and transparent procedure to adapt Index methodologies to changing underlying markets (see Section 4.2 “Methodology Review”) in order to maintain continued reliability and comparability of the indices. Nevertheless, if no other options are available the orderly cessation of the Index may be indicated. This is usually the case when the underlying market or economic reality, which an index is set to measure or to reflect, changes substantially and in a way not foreseeable at the time of inception of the index, the index rules, and particularly the selection criteria, can no longer be applied coherently or the index is no longer used as the underlying value for financial instruments, investment funds and financial contracts.

Solactive has established and maintains clear guidelines on how to identify situations in which the cessation of an index is unavoidable, how stakeholders are to be informed and consulted and the procedures to be followed for a termination or the transition to an alternative index. Details are specified in the Solactive Termination Policy, which is incorporated by reference and available on the Solactive website: <https://www.solactive.com/documents/termination-policy/>.

#### 4.5. OVERSIGHT

An oversight committee composed of staff from Solactive and its subsidiaries (the “Oversight Committee”) is responsible for decisions regarding any amendments to the rules of the Index. Any such amendment, which may result in an amendment of the Guideline, must be submitted to the Oversight Committee for prior approval and will be made in compliance with the Methodology Policy, which is available on the Solactive website: <https://www.solactive.com/documents/methodology-policy/>.



## 5. DEFINITIONS

“Adjustment Day” is the last Business Day of each month.

“Adjustment Period” means (i) 30 January 2004 and (ii) the period starting from (and including) each Adjustment Day until (and including) the immediately following 4 Trading Days.

An “Adjustment Period Trading Day” is any Trading Day falling during an Adjustment Period.

A “Business Day” is any day on which the New York Stock Exchange (NYSE) is open for trading.

A “Calculation Day” means a Business Day.

The “Closing Price” in respect of an Index Component and a Trading Day is a security's final regular-hours Trading Price published by the Exchange and determined in accordance with the Exchange regulations. If the Exchange has no or has not published a Closing Price in accordance with the Exchange rules for an Index Component, the last Trading Price will be used.

The “Exchange” is, in respect of the Index and every Index Component, the regulated stock exchange in the United States where the respective Index Component has its primary listing.

“Factset” means FactSet Research Systems Inc..

The “Fraction of Shares of the Index Component” is, in respect of an Index Component and a Calculation Day, the number of shares of such Index Component included in the Index on such Calculation Day. This number is calculated as the target weight of such Index Component in respect of the immediately preceding Calculation Day, multiplied by the closing level of the Index in respect of such Calculation Day divided by the Closing Price of such Index Component in respect of such Calculation Day.

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

The “Index Currency” is USD.

The “Index Universe” in respect of a Selection Day are the constituents of the Solactive US Large & Mid Cap Index (ISIN: DE000SLA0Q62).

“Selection Day” is the Business Day falling four Business Days before each Adjustment Day, disregarding any potential change of the Adjustment Day announced after Selection Day.

“Trading Day” is any day on which the New York Stock Exchange (NYSE) and the NASDAQ are both open for trading.

The “Trading Price” in respect of an Index Component and a Trading Day is the most recent published price at which the Index Component was traded on the respective Exchange.



## 6. APPENDIX

### 6.1. CONTACT DATA

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# ANNEX

Table 1. AI Financial Score signals and data sources

ID	Signal	Primary Data Source
1	Sales/Revenue	Financial Statement
2	COGS	Financial Statement
3	R&D Expense	Financial Statement
4	SG&A Expense	Financial Statement
5	Depreciation & Amortization	Financial Statement
6	Interest Expense	Financial Statement
7	Non-Operating Income/Loss	Financial Statement
8	Income Taxes	Financial Statement
9	Minority Interest in Earnings	Financial Statement
10	Other Income (Loss)	Financial Statement
11	Ext. Items & Disc. Ops.	Financial Statement
12	Preferred Dividends	Financial Statement
13	Operating Cash and Market. Sec.	Financial Statement
14	Receivables	Financial Statement
15	Inventories	Financial Statement
16	Other Current Assets	Financial Statement
17	PP&E (Net)	Financial Statement
18	Investments	Financial Statement
19	Intangibles	Financial Statement
20	Other Assets	Financial Statement
21	Current Debt	Financial Statement
22	Accounts Payable	Financial Statement



23	Income Taxes Payable	Financial Statement
24	Other Current Liabilities	Financial Statement
25	Long-Term Debt	Financial Statement
26	Other Liabilities	Financial Statement
27	Deferred Taxes	Financial Statement
28	Minority Interest	Financial Statement
29	Preferred Stock	Financial Statement
30	Paid in Common Capital (Net)	Financial Statement
31	Retained Earnings	Financial Statement
32	Common Dividends	Financial Statement
33	EBITDA	Financial Statement
34	EPS	Financial Statement
35	Analyst Forecast on Earning (EPS)	Third Party Data Provider of forecasted financial data
36	Analyst Growth forecast	Third Party Data Provider of forecasted financial data
37	Last Trading Prices	Third Party Data Provider of trading data
38	Trading Volume	Third Party Data Provider of trading data
39	Relative Strength Index	Third Party Data Provider of trading data
40	52 Week High	Third Party Data Provider of trading data
41	52 Week Low	Third Party Data Provider of trading data
42	Open Price	Third Party Data Provider of trading data



Table 2. AI Management Score signals and data sources

ID	Signal	Primary Data Source
1	Management Compensation	Financial Statement
2	Net Sales Growth	Third Party Data Provider of forecasted financial data
3	Expense Growth	Third Party Data Provider of forecasted financial data
4	Geo Expansion	Third Party Data Provider of forecasted financial data
5	Profit Growth	Third Party Data Provider of forecasted financial data
6	ROA	Third Party Data Provider of forecasted financial data
7	Credit Rating	Third Party Data Provider of forecasted financial data
8	Earnings Surprise	Third Party Data Provider of forecasted financial data
9	ROE	Third Party Data Provider of forecasted financial data
10	Community Engagement	Public websites
11	Product Launch	Public websites
12	Headcount Growth	Public websites
13	ESG	Public websites
14	Innovation spend	Public websites
15	Customer Satisfaction	Public websites
16	Customer LTV	Public websites
17	Leadership Influence	Public websites



Table 3. AI News Score signals and data sources

ID	Signal Classification	Primary Data Source
1	News Sentiment	Public Websites
2	Headline Frequency	Public Websites
3	Social Med Sentiment	Public Websites
4	Media Engagement	Public Websites
5	Legal Involvement	Public Websites
6	Production loss	Public Websites
7	Earnings Revision	Public Websites
8	Crisis Response	Public Websites
9	Regulatory Changes	Public Websites
10	Natural Disaster	Public Websites
11	Customer sentiment	Public Websites
12	New Products	Public Websites
13	Strategic Partnership	Public Websites
14	M&A Detail	Public Websites
15	Correlated Company Sentiment	Public Websites

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