SOLACTIVE
German Index Engineering

INDEX GUIDELINE

Franklin US Core Balanced Index

VERSION 1.0

12 JULY 2023

TABLE OF CONTENTS

INTRODUCTION

This document (the "GUIDELINE") is to be used as a guideline with regard to the composition, calculation and maintenance of the Franklin US Core Balanced Index (the "INDEX"). Any amendments to the rules made to the GUIDELINE are approved by the OVERSIGHT COMMITTEE specified in Section 5.5. The INDEX is owned by Franklin Templeton and calculated, administered 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 policies and methodology documents referenced herein contain the underlying principles and rules regarding the structure and operation of the INDEX. SOLACTIVE 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 strives to the best of its ability to ensure the correctness of the calculation. There is no obligation for SOLACTIVE – 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 does not constitute a recommendation for capital investment and does not contain any assurance or opinion of SOLACTIVE regarding a possible investment in a financial instrument based on this INDEX.

1. INDEX SPECIFICATIONS

1.1. SCOPE OF THE INDEX

The INDEX strategy tracks the performance of US equity and fixed income assets while applying a volatility layer on top.

The Franklin US Core Balanced Index is a USD (the "Index Currency") denominated index.

1.2. IDENTIFIERS AND PUBLICATION

The INDEX is published under the following identifiers:

Name	ISIN	Currency	Type	RIC	BBG ticker
Franklin US Core Balanced Index	DE000SL0HPY7	USD	ER*	.FTUSCORB	FTUSCORB INDEX

*ER means that the Index is calculated as excess return.

The INDEX is published on the website of the INDEX ADMINISTRATOR (www.solactive.com) and is, in addition, available via the price marketing services of Boerse Stuttgart GmbH 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.

Any publication in relation to the INDEX (e.g. notices, amendments to the GUIDELINE) will be available at the website of the INDEX ADMINISTRATOR: https://www.solactive.com/news/announcements/.

1.3. INITIAL LEVEL OF THE INDEX

The initial level of the INDEX on the 04/02/2003, the Index START DATE, is 100. Historical values from the 12/07/2023, the LIVE DATE, will be recorded in accordance with Article 8 of the BMR. Levels of the INDEX published for a period prior to the LIVE DATE have been back-tested.

1.4. PRICES AND CALCULATION FREQUENCY

The level of the INDEX is calculated on each CALCULATION DAY from 9:00 a.m. to 10:53 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. LICENSING

Licenses to use the INDEX as the underlying value for financial instruments, investment funds and financial contracts may be issued to stock exchanges, banks, financial services providers and investment houses by SOLACTIVE.

2. INDEX SELECTION

The INDEX is composed of the following underlying instruments:

Component	Name	Currency	RIC	BBG Ticker
1	Franklin US Core Index TR	USD	.FTUSCORT	FTUSCORT Index
2	Merrill Lynch 10-year U.S. Treasury Futures Total Return	USD	.MLT1US10	MLT1US10 Index
3	Fed Fund rate	USD	USONFFE=	FEDL01 Index

In the following, component 1 will be referred to as the equity component, component 2 will be referred to as the bond component, and the cash index derived from component 3 will be referred to as the cash component.

3. CALCULATION OF THE INDEX

3.1. CASH INDEX FORMULA

The of the Cash Index Start Date (t_{CISD}), the level of the Cash Index is equal to 100

$$C3_{t_{CISD}} = 100$$

On each any CALCULATION DAY following the Cash Index Start Date, the level of the Cash Index is calculated according to:

$$C3_t = C3_{t-1} * \left(1 + rate_{t-1} * DCF_{t,t-1}\right)$$

Where:

$rate_{t-1}$: the level of component 3 as of CALCULATION DAY t-1. If no such level is published, the last available level is used instead

$DCF_{t,t-1}$: The day count fraction, which equals the number of calendar days between CALCULATION DAY t and CALCULATION DAY t-1, divided by 360

3.2. STOP LOSS CALCUALTION

The stop loss is calculated according to the following set of formulas.

Starting on the ninth CALCULATION DAY following the Cash Index Start Date, the 10-day return of component 2 is calculated:

$$ret\_10d_t^{C2} = \frac{C2_t}{C2_{t-10}}$$

Where:

$C2_t$: the level of component 2 as of CALCULATION DAY t

$C2_{t-10}$: the level of component 2 as of the CALCULATION DAY which falls 10 CALCULATION DAYS after CALCULATION DAY t

Starting on the 63rd CALCULATION DAY following the Cash Index Start Date, 63-day volatility of component 2 is calculated:

$$vol\_63d_t^{C2} = \sqrt{\frac{10}{63} \times \left[\left(\frac{1}{63} \times \sum_{k=0}^{62} \ln\left(\frac{C2_{t-k}}{C2_{t-k-1}}\right)^2\right) - \left(\frac{1}{63} \times \sum_{k=0}^{62} \ln\left(\frac{C2_{t-k}}{C2_{t-k-1}}\right)\right)^2\right]}$$

Based on the 10-day return of component 2 and the 63-day volatility of component 2, a stop-loss signal is calculated according to:

$$sl\_signal_t = \frac{ret\_10d_t^{C2}}{vol\_63d_t^{C2}}$$

On the 63rd CALCULATION DAY following the Cash Index Start Date, the 10-year treasury weight is calculated as:

$$w_t^{10y} = \begin{cases} \min\left(1, w_{t-1}^{10y} + buffer\right) if\ sl\_signal_{t-1} > threshold\_high \\ \max\left(0, w_{t-1}^{10y} - buffer\right) if\ sl\_signal_{t-1} > threshold\_low \\ w_{t-1}^{10y}\ otherwise \end{cases}$$

Where:

$buffer$: The rebalancing buffer of 25%

$threshold\_high$: the upper threshold of 0

$threshold\_low$: the lower threshold of -2

3.3. VOLATILITY AND COVARIANCE CALCULAITON

On each CALCULATION DAY following the Index Start Date, the following calculations are performed:

$$ret_t^{C1} = ln\left(\frac{C1_t}{C1_{t-1}}\right)$$

$$ret_t^{C2} = ln\left(\frac{C2_t}{C2_{t-1}}\right)$$

$$ret_t^{C3} = ln\left(\frac{C3_t}{C3_{t-1}}\right)$$

In addition to the logarithmic returns, discrete returns are calculated according to:

$$d\_ret_t^{C1} = \frac{C1_t}{C1_{t-1}} - 1$$

$$d\_ret_t^{C2} = \frac{C2_t}{C2_{t-1}} - 1$$

$$d\_ret_t^{C3} = \frac{C3_t}{C3_{t-1}} - 1$$

On the CALCULATION DAY falling 21 CALCULATION DAY after the Index Start Date (the Variance Start Date VST), volatilities and covariances are calculated for all three components according to (for $\lambda = 0.94$ and $\lambda = 0.97$):

$$vol_{VST}^{C1,\lambda} = \sqrt{252 * \frac{1}{21} * \sum_{i=0}^{20} {ret_t^{C1}}^2}$$

$$vol_{VST}^{C2,\lambda} = \sqrt{252 * \frac{1}{21} * \sum_{i=0}^{20} {ret_t^{C2}}^2}$$

$$vol_{VST}^{C3,\lambda} = \sqrt{252 * \frac{1}{21} * \sum_{i=0}^{20} {ret_t^{C3}}^2}$$

$$covar_{VST}^{C1,C2,\lambda} = \frac{252}{21}\sum_{i=0}^{20} ret_t^{C1} * ret_t^{C2}$$

$$covar_{VST}^{C1,C3,\lambda} = \frac{252}{21}\sum_{i=0}^{20} ret_t^{C1} * ret_t^{C3}$$

$$covar_{VST}^{C2,C3,\lambda} = \frac{252}{21}\sum_{i=0}^{20} ret_t^{C2} * ret_t^{C3}$$

On each the CALCULATION DAY after the Variance Start Date volatilities and covariances are calculated for all three components according to (for $\lambda = 0.94$ and $\lambda = 0.97$):

$$vol_t^{C1,\lambda} = \sqrt{vol_{t-1}^{C1,\lambda^2} * \lambda + ret_t^{C1^2} * (1-\lambda) * 252}$$

$$vol_t^{C2,\lambda} = \sqrt{vol_{t-1}^{C2,\lambda^2} * \lambda + ret_t^{C2^2} * (1-\lambda) * 252}$$

$$vol_t^{C3,\lambda} = \sqrt{vol_{t-1}^{C3,\lambda^2} * \lambda + ret_t^{C3^2} * (1-\lambda) * 252}$$

$$covar_t^{C1,C2,\lambda} = covar_{t-1}^{C1,C2,\lambda} * \lambda + ret_t^{C1} * ret_t^{C2} * (1-\lambda) * 252$$

$$covar_t^{C1,C3,\lambda} = covar_{t-1}^{C1,C3,\lambda} * \lambda + ret_t^{C1} * ret_t^{C3} * (1-\lambda) * 252$$

$$covar_t^{C2,C3,\lambda} = covar_{t-1}^{C2,C3,\lambda} * \lambda + ret_t^{C2} * ret_t^{C3} * (1-\lambda) * 252$$

The long-term equity and bond volatility are calculated over last 10 years of business days on each CALCULATION DAY from and including the VARIANCE START DATE according to:

$$LTvol_t^{C1} = \sqrt{252 * \frac{1}{252*10} * \sum_{i=t-(252*10-1)}^{t} ret_t^{C1^2}}$$

$$LTvol_t^{C2} = \sqrt{252 * \frac{1}{252 * 10} * \sum_{i=t-(252*10-1)}^{t} ret_t^{C2^2}}$$

The Equity / Bond Long Term volatility ratio is calculated on each CALCULATION DAY from and including the VARIANCE START DATE according to:

$$EqBondVolRatio_t = \frac{LTvol_t^{C1}}{LTvol_t^{C2}}$$

3.4. EXPOSURE CALCULATION

The equity exposure is calculated on each CALCULATION DAY after the VARIANCE START DATE according to:

$$eq\_exposure_t = \frac{\frac{LTvol_{t-1}^{C1}}{vol_{t-1}^{C1,0.94}}}{\frac{LTvol_{t-1}^{C1}}{vol_{t-1}^{C1,0.94}} + EqBondVolRatio_{t-1} * \frac{vol_{t-1}^{C2,0.94}}{LTvol_{t-1}^{C2}}}$$

Where:

$target\_vol$: the level of the target volatility of 5%

The bond exposure and the cash exposure are calculated on each CALCULATION DAY after the VARIANCE START DATE according to:

$$bond\_exposure_t = \left(1 - eq\_exposure_t\right) * w_t^{10y}$$

$$cash\_exposure_t = 1 - bond\_exposure_t - eq\_exposure_t$$

3.5. BASKET AND INDEX CALCULATION

The level of the Basket as of the Basket Start Date (BST) is equal to 100:

$$B_{BST} = 100$$

On each CALCULATION DAY after the BASKET START DATE:

$$B_t = (1 + basket\_ret_t) * B_{t-1}$$

Where:

$basket\_ret_t$: The basket return as of CALCULATION DAY t

This is calculated as:

$$basket\_ret_t = eq\_exposure_{t-1} * d\_ret_t^{C1} + bond\_exposure_{t-1} * d\_ret_t^{C2} + cash\_exposure_{t-1} * d\_ret_t^{C3}$$

The active weights for equity, bond and cash are calculated according to the following formula on each CALCULATION DAY after the BASKET START DATE:

$$w\_active_t^{eq} = eq_{exposure}{}_{t-1} * \frac{C1_t / C1_{t-1}}{B_t / B_{t-1}}$$

$$w\_active_t^{bond} = bond\_exposure_{t-1} * \frac{C2_t / C2_{t-1}}{B_t / B_{t-1}}$$

$$w\_active_t^{cash} = 1 - w\_active_t^{bond} - w\_active_t^{eq}$$

The short ($\lambda = 0.94$) and long ($\lambda = 0.97$) basket volatilities are calculated on each CALCULATION DAY from and including the BASKET START DATE:

$$basket\_vol_t^{\lambda} = \sqrt{\begin{aligned} &eq\_exposure_t{}^2 * vol_{t-1}^{C1,\lambda^2} + bond\_exposure_t{}^2 * vol_{t-1}^{C2,\lambda^2} + cash\_exposure_t{}^2 * vol_{t-1}^{C3,\lambda^2} + \\ &2 * eq\_exposure_t * bond\_exposure_t * covar_{t-1}^{C1,C2,\lambda} + \\ &2 * eq\_exposure_t * cash\_exposure_t * covar_{t-1}^{C1,C3,\lambda} + \\ &2 * bond\_exposure_t * cash\_exposure_t * covar_{t-1}^{C2,C3,\lambda} \end{aligned}}$$

The basket volatility is then calculated as the maximum of the short and long basket volatility:

$$basket\_vol_t = max(basket\_vol_t^{0.94}, basket\_vol_t^{0.97})$$

The basket leverage is calculated from each CALCULATION DAY from and including the BASKET START DATE:

$$basket\_lev_t = min\left(\text{expo\_max}, \frac{target\_vol}{basket\_vol_t} * VAF_t\right)$$

Where:

VAF_t: The variance adjustment factor as of CALCULATION DAY t

expo_max: The maximum exposure equal to 150%

The variance adjustment factor is equal to 1 for the first 120 CALCULATION DAYS following the BASKET START DATE. From that date onwards, the variance adjustment factor is calculated as:

$$VAF_t = min\left(vaf\_cap, max\left(vaf\_floor, \sqrt{max\left(0{,}1 + \left(1 - \left(\frac{vol_{t-1}}{target\_vol}\right)^2\right)\right)}\right)\right)$$

Where:

vaf_cap: the variance adjustment factor cap of 120%

vaf_floor: the variance adjustment factor cap of 80%

vol_{t-1}: The index volatility as of CALCULATION DAY t-1

The index volatility as of CALCULATION DAY t can only be calculated 120 CALCULATION DAYS after the BASKET START DATE:

$$vol_t = \sqrt{\frac{252}{119} * \left[\left(\frac{1}{120} \times \sum_{k=0}^{119}\left(\frac{Index_t}{Index_{t-1}} - 1\right)^2\right) - \left(\frac{1}{120} \times \sum_{k=0}^{119}\left(\frac{Index_t}{Index_{t-1}} - 1\right)\right)^2\right]}$$

The basket turnover is calculated from each CALCULATION DAY after the BASKET START DATE:

$$\begin{aligned} basket\_turnover_t \\ &= abs\left(basket\_lev_t * eq\_exposure_t - basket\_lev_{t-1} * w\_active_t^{eq}\right) \\ &+ abs\left(basket\_lev_t * bond\_exposure_t - basket\_lev_{t-1} * w\_active_t^{bond}\right) \end{aligned}$$

The Index is calculated from each day from and including the Index Start Date (IST).

The level of the Index as of the Index Start Date is equal to 100:

$$Index_{IST} = 100$$

On each CALCULATION DAY following the Index Start Date, the level of the Index is calculated according to:

$$Index_t = Index_{t-1} * (1 + basket\_lev_{t-1} * (basket\_ret_t - d\_ret_t^{C3}) + drag_t - basket\_turnover_{t-1} * TC)$$

Where:

$drag_{t-1}$: The daily drag as of CALCULATION DAY t-1

TC: The transaction cost factor of 1 basis point

The daily drag as of CALCULATION DAY t is calculated according to:

$$drag_t = -fee * DCF_{t,t-1}$$

Where:

fee: The fee of 0.5%

3.6. ACCURACY

The level of the INDEX will be rounded to 2 decimal places.

3.7. 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/.

3.8. 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 (for example the determination of the INDEX UNIVERSE (if applicable), the selection of the INDEX COMPONENTS (if applicable) or any other relevant decisions in relation to 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 "Error! Hyperlink reference not valid., 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 5.2 "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

"BENCHMARK REGULATION" shall have the meaning as defined in Section "Introduction".

"BMR" shall have the meaning as defined in Section "Introduction".

"CALCULATION DAY" is any day on which New York Stock Exchange (NYSE) is open for general business.

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.

"GUIDELINE" shall have the meaning as defined in Section "Introduction".

"INDEX" shall have the meaning as defined in Section "Introduction".

"INDEX ADMINISTRATOR" shall have the meaning as defined in Section "Introduction".

"INDEX COMPONENT" is each security reflected in the INDEX.

"INDEX COMPONENT REQUIREMENTS" shall have the meaning as defined in Section 2.2.

"INDEX CURRENCY" is the currency specified in the column "Currency" in the table in Section 1.2.

"LIVE DATE" shall have the meaning as defined in Section 1.3.

"OVERSIGHT COMMITTEE" shall have the meaning as defined in Section 5.5.

"SOLACTIVE" shall have the meaning as defined in Section "Introduction".

"Index START DATE" shall have the meaning as defined in Section 1.3.

"BASKET START DATE"

"VARIANCE START DATE"

"TRADING DAY" is with respect to an INDEX COMPONENT included in the INDEX at the REBALANCE DAY and every INDEX COMPONENT included in the INDEX at the CALCULATION DAY immediately following the REBALANCE DAY (for clarification: this provision is intended to capture the TRADING DAYS for the securities to be included in the INDEX as new INDEX COMPONENTS with close of trading on the relevant EXCHANGE on the REBALANCE DAY) a day on which the relevant EXCHANGE is open for trading (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 scheduled EXCHANGE closing time and days on which the EXCHANGE is open for a scheduled shortened period. The INDEX ADMINISTRATOR is ultimately responsible as to whether a certain day is a TRADING DAY.

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.

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