

INDEX GUIDELINE

HSBC DYNAMIC US FIXED INCOME INDEX

Version 1.0

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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 HSBC Dynamic US Fixed Income Index (the "INDEX"). Any amendments to the rules made to the GUIDELINE are approved by the OVERSIGHT COMMITTEE specified in Section 4.5. The INDEX is 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.

HSBC (the "INDEX IP OWNER") owns the copyright and all other intellectual property rights in the INDEX. Any use of these intellectual property rights may only be made with the prior written consent of the INDEX IP OWNER.

The INDEX IP OWNER is not responsible for the actions or inactions of the INDEX ADMINISTRATOR in accordance with the agreement on index administration and index calculation between the INDEX IP OWNER and the INDEX ADMINISTRATOR and any other separate agreements between the INDEX IP OWNER and the INDEX ADMINISTRATOR that have been or may be entered into from time to time (the "INDEX AGREEMENTS").

The INDEX IP OWNER owns the copyright and all other intellectual property rights in the INDEX. Any use of these intellectual property rights may only be made with the prior written consent of the INDEX IP OWNER.

The INDEX will be governed by the INDEX ADMINISTRATOR. The INDEX ADMINISTRATOR controls the creation and operation of the INDEX, including (but not limited to) all stages and processes involved in the production, calculation, maintenance, administration and dissemination of the INDEX. Notwithstanding that the INDEX relies on information from third party sources, the INDEX ADMINISTRATOR has primary responsibility for all aspects of the INDEX administration and determination process.

In no event shall the INDEX IP OWNER be liable (whether directly or indirectly, in contract, tort or otherwise) for any loss incurred by any person that arises out of or in connection with the INDEX, including in relation to the performance by the INDEX IP OWNER of any part of its role in respect of the INDEX, save in the case of gross negligence, fraud or wilful default. In no event, shall the INDEX IP OWNER have any liability to any persons for any direct, indirect, special, punitive or consequential damages (including lost profits) even if notified of the possibility of such damages.

With respect to any products linked to the INDEX, the INDEX IP OWNER expressly disclaims all liability for regulatory, juridical or reputational consequences suffered by any party in any transaction connected with the INDEX.

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. **The INDEX ADMINISTRATOR** strives to the best of its ability to ensure the correctness of the calculation. There is no obligation for **the INDEX ADMINISTRATOR** – 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 **the INDEX ADMINISTRATOR** does not constitute a recommendation for capital investment and does not contain any assurance or opinion of **the INDEX ADMINISTRATOR** regarding a possible investment in a financial instrument based on this INDEX.

The text uses defined terms which are formatted with "SMALL CAPS". Such Terms shall have the meaning assigned to them as specified in Section 5 (Definitions).



1. INDEX SPECIFICATIONS

1.1. SCOPE OF THE INDEX

Category	Description
Asset Class	Fixed Income
Strategy	The INDEX is aimed at replicating the performance a strategy which can allocate between three fixed income indices as referenced under Section 2.1 below.
Rebalancing Frequency	Monthly

1.2. IDENTIFIERS AND PUBLICATION

The INDEX is published under the following identifiers:

Name	ISIN	Currency	Type	RIC	BBG ticker
HSBC Dynamic US Fixed Income Index	DE000SLOGTC7	USD	Excess Return	.HSIEFIDU	HSIEFIDU Index

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 07/07/2003, the "START DATE", is 100. Historical values from the 17/10/2022, 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

A closing level of the INDEX is calculated for each CALCULATION DAY. This closing level is based on the CLOSING LEVELS for the INDEX COMPONENTS.



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 the IP OWNER (or any of its affiliates).

2. INDEX SELECTION

2.1. INDEX COMPONENTS

No.	Name	Currency	Type	BBG ticker
1	HSBC Macroeconomic Treasury Yield Spread Volatility Net (“ INDEX COMPONENT 1 ”)	USD	Excess Return	HSMETYSN Index
2	Solactive 10-Year U.S. Treasury Future ER (“ INDEX COMPONENT 2 ”)	USD	Excess Return	SOLUS10E Index
3	Solactive US Treasury Composite Bond 3d Rolling Futures Index (“ INDEX COMPONENT 3 ”)	USD	Excess Return	SOLUS3RF Index

The INDEX invests in the INDEX COMPONENTS detailed in the table above as follows:

- SHORT-TERM LEAST SQUARES SIGNALS and LONG-TERM LEAST SQUARES SIGNALS are calculated for each INDEX COMPONENT in accordance with Section 3.2 below.
- A SIGNAL SCORE is calculated in accordance with Section 3.2 below as the average of the SHORT-TERM LEAST SQUARES SIGNALS and LONG-TERM LEAST SQUARES SIGNALS signal for each INDEX COMPONENT.
- The final target weights for each INDEX COMPONENT are calculated as a sum of fixed and signal-based weights.
- The weight of the INDEX COMPONENT 1 shall be no more than 50% and no less than 0%.

The SHORT-TERM LEAST SQUARES SIGNALS and LONG-TERM LEAST SQUARES SIGNALS are calculated on each SIGNAL CALCULATION DAY.

The INDEX is then rebalanced on the REBALANCING DAY immediately following the relevant SIGNAL CALCULATION DAY.



3. CALCULATION OF THE INDEX

3.1. INDEX FORMULA

The INDEX is calculated as an excess return Index.

The Index level (I_t) on each CALCULATION DAY t is calculated in accordance with the following formula:

If CALCULATION DAY t is the START DATE:

$$I_t = 100$$

Else:

$$I_t = I_{t-1} * \left(1 + \sum_{i=1}^3 x_{t-1}^i * \left(\frac{CL_t^i}{CL_{t-1}^i} - 1 \right) - R_t * TC * \sum_{i=1}^3 abs(x_t^i - x_{t-1}^i) \right)$$

Where:

abs The absolute value.

I_{t-1} The level of the INDEX as of the CALCULATION DAY immediately preceding CALCULATION DAY t

CL_t^i The CLOSING LEVEL of INDEX COMPONENT i as of CALCULATION DAY t

CL_{t-1}^i The CLOSING LEVEL of INDEX COMPONENT i as of the CALCULATION DAY immediately preceding CALCULATION DAY t

R_t The rebalancing indicator, equal to 1 if CALCULATION DAY t is a REBALANCING DAY and 0 otherwise

TC The transaction costs parameter of 0.02%

x_t^i The percentage weight of INDEX COMPONENT i as of CALCULATION DAY t, calculated as

$$x_t^i = \frac{\frac{w_r^i CL_t^i}{CL_r^i}}{\sum_{i=1}^3 \frac{w_r^i CL_t^i}{CL_r^i} + 1 - \sum_{i=1}^3 w_r^i}$$

Where:

w_r^i is the normalized weight of INDEX COMPONENT i calculated in accordance with Section 3.3 on the SIGNAL CALCULATION DAY immediately preceding CALCULATION DAY t

x_{t-1}^i The percentage weight of INDEX COMPONENT i as of the CALCULATION DAY immediately preceding CALCULATION DAY t

CL_r^i The CLOSING LEVEL of INDEX COMPONENT i as of the REBALANCING DAY r immediately preceding CALCULATION DAY t



3.2. LEAST SQUARES SIGNAL CALCULATION

On each SIGNAL CALCULATION DAY, the following calculations are performed to calculate the SHORT-TERM LEAST SQUARES SIGNALS and LONG-TERM LEAST SQUARES SIGNALS in respect of an INDEX COMPONENT:

Three regressions are performed for both the SHORT-TERM LEAST SQUARES SIGNALS and LONG-TERM LEAST SQUARES SIGNALS in respect of an INDEX COMPONENT i where a stream of returns for such INDEX COMPONENT i is regressed on a trend variable:

$$Y_{SCD} = \alpha_{SCD} + \beta_{SCD} * X_{SCD} + \varepsilon_{SCD}$$

α_{SCD} , β_{SCD} and ε_{SCD} are the intercept, slope parameter and error term respectively of the linear regression performed on SIGNAL CALCULATION DAY SCD

Where, for the short-term regression:

$$Y_{SCD} = \{y_1^i, y_2^i, \dots, y_{55}^i\}$$

$$X_{SCD} = \{1, 2, \dots, 55\}$$

With:

$$y_n^i = \sum_{k=1}^n \ln \left(\frac{CL_{SCD-55-k}^i}{CL_{SCD-55-k-1}^i} \right)$$

Where:

$CL_{SCD-55-k}^i$ The CLOSING LEVEL of INDEX COMPONENT i as of the CALCULATION DAY which is 55-k CALCULATION DAYS prior to the SIGNAL CALCULATION DAY scd.

$CL_{SCD-55-k-1}^i$ The CLOSING LEVEL of INDEX COMPONENT i as of the CALCULATION DAY which is 55-k-1 CALCULATION DAYS prior to the SIGNAL CALCULATION DAY scd

Similarly for the long-term regression:

$$Y_{SCD} = \{y_1^i, y_2^i, \dots, y_{126}^i\}$$

$$X_{SCD} = \{1, 2, \dots, 126\}$$

With:

$$y_n^i = \sum_{k=1}^n \ln \left(\frac{CL_{SCD-126-k}^i}{CL_{SCD-126-k-1}^i} \right)$$



Where:

$CL_{SCD-126-k}^i$ The CLOSING LEVEL of INDEX COMPONENT i as of the CALCULATION DAY which is 126-k CALCULATION DAYS prior to the SIGNAL CALCULATION DAY s_{cd}

$CL_{SCD-126-k}^i$ The CLOSING LEVEL of INDEX COMPONENT i as of the CALCULATION DAY which is 126-k-1 CALCULATION DAYS prior to the SIGNAL CALCULATION DAY s_{cd}

Denote by β_{ST}^i the slope-parameter of the short-term regression for INDEX COMPONENT i , s_{ST}^i the standard error of this regression and finally R_{ST}^{2i} the coefficient of determination of this regression.

The SHORT-TERM LEAST SQUARES SIGNALS in respect of INDEX COMPONENT i and SIGNAL CALCULATION DAY s_{cd} is calculated in accordance with the following formula:

$$LSQSignal_{ST}^{i,SCD} = 1 - 2 * \Phi \left(-\frac{\beta_{ST}^i}{s_{ST}^i} * \sqrt{R_{ST}^{2i}} \right)$$

Where:

$\Phi(\cdot)$ The normal cumulative distribution function

Again similarly, the LONG-TERM LEAST SQUARES SIGNALS in respect of a INDEX COMPONENT i and SIGNAL CALCULATION DAY s_{cd} is calculated in accordance with the following formula:

$$LSQSignal_{LT}^{i,SCD} = 1 - 2 * \Phi \left(-\frac{\beta_{LT}^i}{s_{LT}^i} * \sqrt{R_{LT}^{2i}} \right)$$

Where β_{LT}^i , s_{LT}^i , and R_{LT}^{2i} are the slope parameter, the standard error, and the coefficient of determination of the long-term regression for Index Component i .

The "SIGNAL SCORE" in respect of an INDEX COMPONENT i and a SIGNAL CALCULATION DAY s_{cd} is calculated in accordance with the following formula, being the average of the LONG-TERM LEAST SQUARES SIGNAL and the SHORT-TERM LEAST SQUARES SIGNAL in respect of such INDEX COMPONENT i and such SIGNAL CALCULATION DAY s_{cd} :

$$SignalScore_{SCD}^i = \frac{LSQSignal_{LT}^{i,SCD} + LSQSignal_{ST}^{i,SCD}}{2}$$

3.3. WEIGHTS CALCULATION

The unnormalized weights for each INDEX COMPONENT i and a SIGNAL CALCULATION DAY s_{cd} is calculated according to the following formula:

$$wu_{SCD}^i = \frac{0.5 + SignalScore_{SCD}^i}{2}$$



Where:

$SignalScore_{SCD}^i$ The SIGNAL SCORE in respect of INDEX COMPONENT i and SIGNAL CALCULATION DAY SCD.

The normalized weights for each INDEX COMPONENT i and a SIGNAL CALCULATION DAY SCD are calculated as follows:

- If:

$$\sum_{j=1}^3 abs(wu_{SCD}^j) > MaxLev \text{ and } \sum_{j=1}^3 abs(wu_{SCD}^j) \neq 0:$$

$$w_{SCD}^i = \frac{wu_{SCD}^i * MaxLev}{\sum_{j=1}^3 abs(wu_{SCD}^j)}$$

Where:

$MaxLev$: The maximum leverage of 150%.

- Otherwise, no normalization is needed and

$$w_{SCD}^i = wu_{SCD}^i$$

The normalized weight of the INDEX COMPONENT 1 in respect of any SIGNAL CALCULATION DAY SCD (w_{SCD}^1) shall be no more than 50% and no less than 0%.

By construction, before this capping, the normalized weight w_{SCD}^1 will be between -1 and 1. This shall be mapped to the interval [0,0.5]

Formally, if $w_{SCD}^1 > 0.5$ we update the normalized weights as follows:

$$w_{SCD}^1 = 0.5$$

if $w_{SCD}^1 < 0$ we update the weights as follows:



$$w_{SCD}^1 = 0$$

3.4. ACCURACY

The level of the INDEX will be rounded to 4 decimal places for publication purposes.

3.5. RECALCULATION

The INDEX ADMINISTRATOR makes the greatest possible efforts to accurately calculate and maintain the INDEX. However, errors in the determination process may occur from time to time for a variety of reasons (internal or external) and therefore, cannot be completely ruled out in respect of the INDEX. The INDEX ADMINISTRATOR 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/>.

3.6. MARKET DISRUPTION

In periods of market stress the INDEX ADMINISTRATOR shall calculate the INDEX 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 limited to (i) exercising routine judgement (in the expert view of the by the INDEX ADMINISTRATOR) in the administration of the Index rules, provided, however, that such routine judgment does not include deviations or alterations to the Index rules that are designed to improve the financial performance of the Index, (ii) correcting errors in the implementation of the rules or calculations made pursuant to the rules, or (iii) making an adjustment to respond to an unanticipated event outside of INDEX ADMINISTRATOR'S control, such as a stock split, merger, listing or delisting, nationalization, or insolvency, a disruption in the financial markets for specific assets



or in a particular jurisdiction, regulatory compliance requirement, force majeure, or any other unanticipated event of similar magnitude and significance, subject to sections 3.5 to 3.6 hereof.

4.2. METHODOLOGY REVIEW

The methodology of the INDEX is subject to regular review, at least annually. If a change in methodology has been identified as a result of such review (e.g. if the underlying market or economic reality has changed since the launch of the INDEX or 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/>.

Any such change in the methodology will be announced on the SOLACTIVE website under the Section "Announcement", which is available at <https://www.solactive.com/news/announcements/>.

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. Any such changes or modifications made in respect of the INDEX in accordance with this Section 4.3 shall be made by the INDEX ADMINISTRATOR in its sole and absolute discretion and 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

The INDEX ADMINISTRATOR shall make the greatest possible efforts to ensure the resilience and continued integrity of the INDEX over time. Where necessary, the INDEX ADMINISTRATOR shall follow a clearly defined and transparent procedure to adapt the INDEX methodology to account for changing underlying markets (see Section 4.2 "*Methodology Review*") in order to maintain continued reliability and comparability of the INDEX. 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 the 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 methodology 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.

The INDEX ADMINISTRATOR 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 the INDEX ADMINISTRATOR 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 every weekday where the Chicago Board of Trade (CBOT) (MIC: XCBT) is open for general business

"CLOSING LEVEL" is, in respect of each of INDEX COMPONENT 2 and INDEX COMPONENT 3 and a relevant day, the level as calculated and published by Solactive in respect of such INDEX COMPONENT 2 and INDEX COMPONENT 3 on such relevant day. In respect of INDEX COMPONENT 1 and a relevant day, the "CLOSING LEVEL" is the level as calculated and published by S&P Global (or any successor thereto, as determined by the INDEX ADMINISTRATOR) in respect of INDEX COMPONENT 1 on such relevant day.

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

"INDEX COMPONENT" is each of INDEX COMPONENT 1, INDEX COMPONENT 2 AND INDEX COMPONENT , as defined in Section 2.1.

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

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

"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 4.5.

"REBALANCING DAY" is the CALCULATION DAY which falls one CALCULATION DAY after the SIGNAL CALCULATION DAY

"SIGNAL CALCULATION DAY" is every Friday, or if such Friday is not a CALCULATION DAY, the immediately preceding CALCULATION DAY

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

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

CONTACT

Solactive AG
German Index Engineering
Platz der Einheit 1
60327 Frankfurt am Main
Germany

Tel.: +49 (0) 69 719 160 00

Fax: +49 (0) 69 719 160 25

Email: info@solactive.com

Website: www.solactive.com

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