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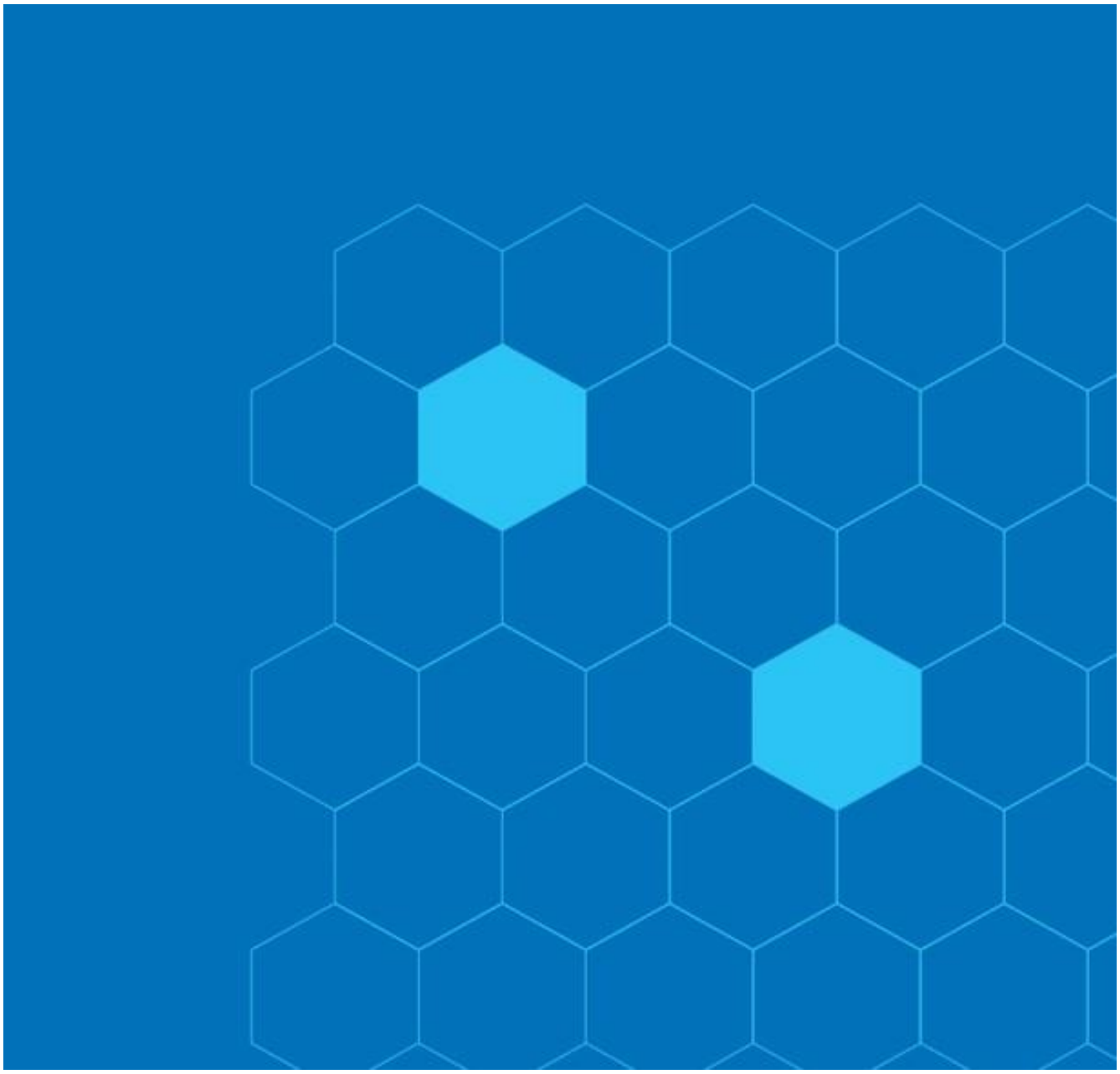
STOXX® CURRENCY RATE INDICES METHODOLOGY GUIDE



STOXX

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1. INTRODUCTION TO THE STOXX INDEX GUIDES

The STOXX index guides are separated into the following sub-sets:

- The **STOXX Calculation guide** provides a general overview of the calculation of the STOXX equity indices, the dissemination, the index formulas and adjustments due to corporate actions
- The **STOXX Index Methodology guide** contains the equity index specific rules regarding the construction and derivation of the portfolio based indices, the individual component selection process and weighting schemes
- The **STOXX World Equity Index Methodology guide** contains the index specific rules regarding the construction and derivation of the STOXX World portfolio based indices, the individual component selection process and weighting schemes
- The **STOXX Strategy Index guide** contains the formulas and description of all strategy indices
- The **STOXX DVP Calculation guide** describes the dividend points products
- The **STOXX Distribution Points Calculation guide** describes the distribution points products
- The **STOXX ESG Index Methodology guide** contains the index specific rules regarding the construction and derivation of the ESG indices, the individual component selection process and weighting schemes
- The **iSTOXX Methodology guide** contains the index specific rules regarding the construction and derivation of the iSTOXX indices, the individual component selection process and weighting schemes
- The **STOXX Reference Rates guide** contains the rules and methodologies of the reference rate indices
- The **STOXX Reference Calculations guide** provides a detailed view of definitions and formulas of the calculations as utilized in the reports, factsheets, indices and presentations produced by STOXX
- The **STOXX Currency Rates Indices Methodology guide** contains the index specific rules regarding the construction and calculation of the derivation of the STOXX FX Rolling Spot Mid-Rate and STOXX FX Rolling Spot Tomorrow Next Open Rate indices
- The **Guide to Industry Classifications Used By STOXX** contains general information pertaining to industry classifications used in STOXX indices, together with any references and links to third-parties that create the data.
- The **STOXX Eligible Market Segments guide** contains the list of stock exchanges and market segments.

All rule books are available for download on http://www.stoxx.com/indices/rulebooks.html

1. INTRODUCTION TO THE STOXX INDEX GUIDES

1.1. HISTORY OF CHANGES TO THE STOXX CURRENCY RATES INDEX METHODOLOGY GUIDE

October 2017: introduction of the STOXX FX Rolling Spot Mid-Rate and STOXX FX Rolling Spot Tomorrow Next Open Rate indices

November 2017: change to Section 3.2 Computational Accuracy: change in number of decimal places from currently 4 and 5 decimal places to 3 decimal places across all currency pair.

March 2018: addition of Section 2. General Principles.

October 2020: addition of EURSEK, USDSEK, EURNOK, USDNOK, EURDKK, USDDKK, EURCZK, EUPLN, EURHUF, USDZAR, USDMXN currency pairs.

May 2021: expansion of filtering criterion in case of multiple values with same timestamp and provider

July 2022: Section 1 updated with new guides

January 2023: Added reference of STOXX Eligible Market Segments guide and removed reference of iSTOXX Bond Index guide.

February 2023: Removed reference of STOXX Bond Index guide.

October 2023: Change in the STOXX logo.

2. GENERAL PRINCIPLES

2.1. INDEX RATIONALE

STOXX defines the index rationale as the basis for applying a certain methodology in order to achieve the index objective. STOXX performs intensive research and may conduct conversations with market participants and third parties for this purpose. STOXX discloses the index objective in every case.

2.2. METHODOLOGY REVIEW POLICIES

STOXX constantly monitors the execution of the index calculation rules in order to ensure the validity of the index methodology. STOXX also conducts general methodology reviews in a periodic and ad-hoc basis, to reflect economic and political changes and developments in the investment industry. As result of these activities, STOXX introduces changes to the methodology books. Material changes are notified to subscribers and the media through the usual communication channels. Clarifications of the methodology are updated in the rulebook. All changes are tracked in section 1.1.

2.3. INDEX TERMINATION POLICIES

For the termination of an index or index family for which outstanding products are present in the market to the knowledge of STOXX, a market consultation with the involved clients will be initiated by STOXX to take into account their views and concerns related to the termination or transition. A consultation period will be opened. Its duration depends on the specific issue. After the consultation period and in case of further action needed, a notification will be issued and the process defined above will be followed. In the case of a transition, STOXX will launch the alternative index and will notify of its character as a suitable replacement for an existing index whose calculation should be discontinued in the future. This notification advices clients on the alternative recommended by STOXX as replacement. The timeframe in which both indices will be calculated in parallel will be disclosed in the notification's text and will be no shorter than three months.

For the termination of an index or index family for which, to the knowledge of STOXX, no listed financial products are issued in the market, a press release notification or e-mail notification to subscribers will be communicated at least three months before coming into force. Clients or third parties with interest in the index or index family are urged to communicate as soon as possible their concerns to STOXX. Based on the feedback collected, STOXX may alter the index termination decision. For the termination of an index without financial product issued on there will be no market consultation. Changes to the original notification will be communicated in the same manner.

3. OVERVIEW

3.1. DESCRIPTION

The STOXX FX Rolling Spot Mid Rate index and STOXX FX Rolling Spot Tomorrow Next Open Rate index respectively indicate the spot mid rate and tom-next swap rate spread of major currency pairs and serve as reference for the settlement of the EUREX Rolling Spot futures.

The rates represented by the indices are provided by 360T, the multi-bank, multi-asset trading platform for OTC financial instruments part of the Deutsche Börse Group.

The data used in the index calculation is from a transparent, bilateral, disclosed FX execution model where the client (price taker) indicates their interest to their liquidity providers, who then competitively price the requested transaction accordingly for the client, while exercising their best execution policy to award the trade to the winning provider.

The index uses a cascading process flow to identify highly accurate and timely price information and implements appropriate steps to ensure the index is resilient to abuse or manipulation.

Reliable, executable price data is blended in using a weighted algorithm favoring the executed data. Minimum diversity requirements are applied to eliminate dependency on single information sources and logically progressive discovery steps and a cleansing mechanism ensure the exact sources are not predictable from day to day, thereby minimizing the possibility for any one source or participant to reliably manipulate the output.

A rolling spot product, like the Eurex Rolling Spot Futures, using this index will be able to use the daily spot rate component to mark to market the spot position, then to use the daily tomorrow-next component to effect a pass through of interest rate differential between long and short holders of each rolling spot position each day.

3.2. IDENTIFIERS AND HISTORICAL DATA AVAILABILITY

Name	ISIN	Symbol	Historical Data available from
Spot mid rate AUDJPY	DE000A0QZCY7	RSAYSM	04.09.2017
Spot mid rate AUDUSD	DE000A0QZCZ4	RSAUSM	04.09.2017
Spot mid rate EURAUD	DE000A0QZC11	RSEASM	04.09.2017
Spot mid rate EURCHF	DE000A0QZCS9	RSEFSM	04.09.2017
Spot mid rate EURGBP	DE000A0QZCV3	RSEPSM	04.09.2017
Spot mid rate EURJPY	DE000A0QZC03	RSEYSM	04.09.2017
Spot mid rate EURUSD	DE000A0QZCT7	RSEUSM	04.09.2017
Spot mid rate GBPCHF	DE000A0QZCX9	RSPFSM	04.09.2017
Spot mid rate GBPUSD	DE000A0QZCU5	RSPUSM	04.09.2017
Spot mid rate NZDUSD	DE000A0SNGQ6	RSNUSM	04.09.2017
Spot mid rate USDCHF	DE000A0QZCW1	RSUFSM	04.09.2017
Spot mid rate USDJPY	DE000A0QZC37	RSUYSM	04.09.2017
Spot mid rate USDSEK	DE000A21V298	RSUSSM	28.10.2020
Spot mid rate EURSEK	DE000A21V3A3	RSESSM	28.10.2020

3. OVERVIEW

Name	ISIN	Symbol	Historical Data available from
Spot mid rate USDNOK	DE000A21V3B1	RSUNSM	28.10.2020
Spot mid rate EURNOK	DE000A21V3C9	RSENSM	28.10.2020
Spot mid rate USDDKK	DE000A21V3D7	RSUDSM	28.10.2020
Spot mid rate EURDKK	DE000A21V3E5	RSEDSM	28.10.2020
Spot mid rate EURPLN	DE000A21V3G0	RSELSM	28.10.2020
Spot mid rate EURHUF	DE000A21V3J4	RSEHSM	28.10.2020
Spot mid rate EURCZK	DE000A21V3L0	RSECSM	28.10.2020
Spot mid rate USDMXN	DE000A21V3Q9	RSUMSM	28.10.2020
Spot mid rate USDZAR	DE000A21V3R7	RSUZSM	28.10.2020
Tomorrow-next open rate AUDJPY	DE000A0QZDB3	RSAYTO	04.09.2017
Tomorrow-next open rate AUDUSD	DE000A0QZC86	RSAUTO	04.09.2017
Tomorrow-next open rate EURAUD	DE000A0QZDA5	RSEATO	04.09.2017
Tomorrow-next open rate EURCHF	DE000A0QZC52	RSEFTO	04.09.2017
Tomorrow-next open rate EURGBP	DE000A0QZC45	RSEPTO	04.09.2017
Tomorrow-next open rate EURJPY	DE000A0QZDD9	RSEYTO	04.09.2017
Tomorrow-next open rate EURUSD	DE000A0QZC29	RSEUTO	04.09.2017
Tomorrow-next open rate GBPCHF	DE000A0QZC60	RSPFTO	04.09.2017
Tomorrow-next open rate GBPUSD	DE000A0QZC78	RSPUTO	04.09.2017
Tomorrow-next open rate NZDUSD	DE000A0SNGP8	RSNUTO	04.09.2017
Tomorrow-next open rate USDCHF	DE000A0QZC94	RSUFTO	04.09.2017
Tomorrow-next open rate USDJPY	DE000A0QZDC1	RSUYTO	04.09.2017
Tomorrow-next open rate USDSEK	DE000A21V3W7	RSUSTO	28.10.2020
Tomorrow-next open rate EURSEK	DE000A21V3X5	RSESTO	28.10.2020
Tomorrow-next open rate USDNOK	DE000A21V3Y3	RSUNTO	28.10.2020
Tomorrow-next open rate EURNOK	DE000A21V3Z0	RSENTO	28.10.2020
Tomorrow-next open rate USDDKK	DE000A21V306	RSUDTO	28.10.2020
Tomorrow-next open rate EURDKK	DE000A21V314	RSEDTO	28.10.2020
Tomorrow-next open rate EURPLN	DE000A21V330	RSELTO	28.10.2020
Tomorrow-next open rate EURHUF	DE000A21V355	RSEHTO	28.10.2020
Tomorrow-next open rate EURCZK	DE000A21V371	RSECTO	28.10.2020
Tomorrow-next open rate USDMXN	DE000A21V4B9	RSUMTO	28.10.2020
Tomorrow-next open rate USDZAR	DE000A21V4C7	RSUZTO	28.10.2020

4. CALCULATION

4.1. CALCULATION FORMULA

The STOXX FX Rolling Spot Mid Rate index and STOXX FX Rolling Spot Tomorrow Next Open Rate index are designed to be calculated on transaction data; however, quotes can be included in the aggregation when insufficient transaction data is available to form an adequate data point for a currency pair.

Data observation period

Data are observed over a time window ending at 17:00 CET. The start time of the window can be progressively extended in case data coverage is not sufficient.

Filtering of outliers

To minimize any bias in the index calculation which may derive from the inclusion of outlier data, a procedure to exclude outliers is in place.

Aggregation of data

A combined weighting scheme that takes time, type of price and notional size in account aims to increase the representativeness of the index value and to remove the potential for any party to manipulate the fixing.

4.1.1. INDEX FORMULA AND INTERMEDIATE CALCULATION STEPS

Overview:

The process attempts to build an index point at the proposed time by cascading through levels with differing criteria to select data. Each subsequent layer is less restrictive, increasing the available data. The first level to meet the acceptance criteria is used.

Once the relevant data has been selected, filtering and cleansing steps are applied.

To ensure a proportionate treatment of the information available, bid and ask rates are treated separately.

Once all processing is complete, a single spot value and T/N swap value will be produced for each currency pair.

Spot rates:

Define time window:

1. 5 (or 10 or 15 in subsequent iterations) minutes window ending approx. at 17:00 CET

4. CALCULATION

2. Separate data in bid and ask block (irrespective of whether traded or non-traded values are considered)
3. Prepare traded values for each side (bid and ask):
    a. ensure that no provider contributes more than 50% of values by filtering out the oldest values from the affected provider
    b. in case of multiple values with same time-stamp and provider, consider the values with highest notional and, if still not sufficient, the best ones (highest bid or lowest ask)
4. Prepare non-traded values for each side (bid and ask):
    a. remove values with notional below € 750,000
    b. in case of multiple values with same time-stamp and provider, consider the values with highest notional and, if still not sufficient, the best ones (highest bid or lowest ask)
5. For the traded values check that:
    a. at least 10 different data points exist, and
    b. at least 3 different providers exist
6. If conditions in step 5 are not met, include non-traded values and check that:
    a. at least 10 different values exist, and
    b. at least 3 different providers exist
7. If conditions in step 6 are not met, extend the observation window and restart from step 1. The same time window has to be used for both bid and ask blocks.
8. Filter out outliers:
    a. sort and group data points in deciles
    b. exclude the 1st and 10th decile
9. Calculate weighted rates: $wp_i = \frac{\sum_{i=1}^{n} p_i \cdot tw_i \cdot aw_i \cdot vw_i}{\sum_{i=1}^{n} tw_i \cdot aw_i \cdot vw_i}$

    with:

    $tw_i = \frac{1}{2^{t_i}}$, where t_i is the time between the time as of which the value was received and the final calculation time

    $$aw_i = \begin{cases} 1 \; if \; trade \\ 0.75 \; if \; quote \end{cases}$$

    $$vw_i = \begin{cases} 1 \; if \; €0.5m \leq notional \leq €5m \\ 0.5 \; otherwise \end{cases}$$

10. Calculate spot mid rates as arithmetic average of bid and ask. In case an index value cannot be determined, the previous value is disseminated.

Swap rates:

1. Define time window:

4. CALCULATION

1 (or 2 or 4 or 8 or 12 in subsequent iterations) hour window ending approx. at 17:00 CET

2. Separate data in bid and ask block (irrespective of whether traded or non-traded values are considered)
3. Prepare traded values for each side (bid and ask):
    a. ensure that no provider contributes more than 50% of values by filtering out the oldest values from the affected provider
    b. in case of multiple values with same time-stamp and provider, consider the values with highest notional and, if still not sufficient, the best ones (highest bid or lowest ask)
4. Prepare non-traded values for each side (bid and ask):
    a. remove values with notional below € 750,000
    b. in case of multiple values with same time-stamp and provider, consider the values with highest notional and, if still not sufficient, the best ones (highest bid or lowest ask)
5. For the combined set of traded and non-traded values check that:
    a. at least 5 different records exist
    b. at least 2 different providers exist
6. If conditions in step 5 are not met, extend the observation window and restart from step 1. The same time window has to be used for both bid and ask blocks.
7. Filter out outliers:
    a. Sort and group records in deciles
    b. Filter out the 1st and 10th decile
8. Calculate weighted rates $wp_i = \frac{\sum_{i=1}^{n} p_i \cdot vw_i}{\sum_{i=1}^{n} \cdot vw_i}$

    with:

    $vw_i = \begin{cases} 1 \; if \; €0.5m \; \leq notional \leq €5m \\ 0.5 \; otherwise \end{cases}$

9. Calculate mid rates as arithmetic average of bid and ask. In case an index value cannot be determined, the previous value is disseminated.

The Tomorrow Next Open Rate of each currency pair is obtained by summing the calculated spot mid and swap mid rates.

4.2. COMPUTATIONAL ACCURACY

Figures of the published STOXX FX Rolling Spot Mid Rate index and STOXX FX Rolling Spot Tomorrow Next Open Rate index are rounded to three decimal places.

4.3. DISSEMINATION DAYS AND TIME

4. CALCULATION

The STOXX FX Rolling Spot Mid Rate index and STOXX FX Rolling Spot Tomorrow Next Open Rate are calculated on an daily basis according to STOXX dissemination calendar. The index values are disseminated at 18:30 CET.