Guide to the
REX Bond Indices

Formerly known as the REX Indices of
Deutsche Börse AG

Version 4.2
October 2019

General Information

With effect to August 2019 Deutsche Börse AG has transferred the administration of the Indices formerly known as the REX Indices of Deutsche Börse AG to its affiliate STOXX Ltd.

STOXX Ltd. develops, creates and publishes Indices for certain uses, e.g., the issuance of Financial Instruments. In general, an Index is any figure published or made available to the public that is regularly determined by the application of a formula (or any other method of calculation, or by an assessment) on the basis of the value of one or more underlying assets or prices, including estimated prices, actual or estimated interest rates, quotes and committed quotes, or other values or survey.

All REX Bond Indices are governed by the respective index methodology applicable to the respective index or index family. Purpose of this Guide is to provide for a comprehensible index methodology in continuity of the former REX Indices of Deutsche Börse AG as last amended with effect from October 2017 (version 3.1.2).

In order to ensure the highest quality of each of its indices, STOXX Ltd. exercises the greatest care when compiling and calculating fixed income indices on the basis of the rules set out in this Guide.

However, STOXX Ltd. cannot guarantee that the various indices, or the various ratios that are required for index compilation and computation purposes, as set out in this Guide, are always calculated free of errors. STOXX Ltd. accepts no liability for any direct or indirect losses arising from any incorrect calculation of such indices or ratios.

The REX Bond Indices in no way represent a recommendation for investment. In particular, the compilation and calculation of the various indices shall not be construed as a recommendation of STOXX Ltd. to buy or sell individual securities, or the basket of securities underlying a given index.

Contents

1   Key Features

1.1   Index Concept

All REX Bond Indices of STOXX Ltd. are based on the so-called notional bond concept. This means that the characteristic features of synthetic bonds and mortgage bonds used, such as remaining term and coupons, are maintained on a constant basis, thereby avoiding any unwanted changes in average coupons and average maturities for the index portfolio. The bond indices thus represent the prices of bonds featuring an average coupon of 7.443 percent and a constant remaining term of 5.49 years.

A sub-index is computed and published for each of the various maturity windows ranging from one up to ten years.

In detail, STOXX Ltd. calculates the following bond indices:

1.1.1   REX®

The REX®[1] index is computed on the basis of government bonds which are traded on the German bond market, comprising all Federal government bonds ('*Bundesanleihen*'), Federal debt obligations ('*Bundesobligationen*'), and Treasury notes ('*Bundesschatzanweisungen*') with a fixed coupon and remaining term between six months and 10.5 years, issued by the Federal Republic of Germany, the German Unity Fund as well as the former *Treuhandanstalt* privatization agency.

The REX® index is a weighted price average calculated on the basis of synthetic bonds with a constant maturity. It contains 30 bonds with integer maturities of one up to ten years and three different coupon types of 6 percent, 7.5 percent and 9 percent, respectively. Though the REX index represents just a fraction of the total outstanding volume of all domestic issuers this market accounts for most of the exchange turnover in bonds.

The REXP® is the performance index version of the REX index, covering price changes and interest income. This index measures the performance of a hypothetical portfolio without any withdrawals nor injections of cash.

1.2   Selection of Input Data

All indices are computed once a day. The computation is based on reference prices (Bundesbank-Referenzpreise) from Börse Frankfurt for all fixed-coupon Federal government bonds, Federal debt obligations and Treasury notes, all denominated in Euro and with a remaining term between six months and 10.5 years. The reference prices are based on transactions, in the absence of transactions binding quotes are used instead. The bonds are issued by the Federal Republic of Germany, the German Unity Fund and the former Treuhandanstalt privatization agency.

The bonds require a minimum nominal amount outstanding of 500 million Euro in order to be eligible for all indices.

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[1] REX® and REXP® are registered trademarks of STOXX Ltd.

In the event of bond trading suspensions, the last available reference price is used.

1.3   Calculation Basis

All indices are based on the same reference date (30 December 1987) to the extent possible, thus facilitating direct comparison between the various indices.

The base value of the REXP® as well as the various performance sub-indices for the maturity windows of one up to ten years is set at a level of 100. The REX® indices do not take a base value, instead, they are always computed on the basis of average prices. Accordingly, a REX® of 100 corresponds to a bond featuring an average yield of 7.44 percent and a remaining term of 5.49 years.

1.4   Weighting

All indices are based on the standardized weighting scheme set out below:

Maturity	Weight 6%	7.5%	9%	Total	Weighted coupon
1 year	3.10	1.73	2.56	7.39	7.39
2 years	3.50	2.43	2.87	8.80	7.39
3 years	4.06	3.03	3.16	10.25	7.37
4 years	4.88	3.37	3.70	11.95	7.35
5 years	4.87	3.15	4.02	12.04	7.39
6 years	4.09	2.84	4.32	11.25	7.53
7 years	3.82	3.02	4.79	15.33	7.63
8 years	3.38	3.14	4.06	10.58	7.60
9 years	3.65	2.62	3.38	9.65	7.46
10 years	3.15	1.47	1.84	6.46	7.20
Total	38.50	26.80	34.70	100.00	7.44*

* weighted average coupon

For the purpose of computing weights, the initial step taken was the analysis of the yield curve development since 1967. In this context, all existing Federal government bonds and Federal debt obligations – excluding floating-rate issues – were taken into account in order to identify the various yield cycles between interest rate lows (beginning of 1969 and 1978; 1986 through 1987) and interest rate peaks (1974, 1981, 1990). Analysis has been exclusively carried out on the basis of entire yield cycles to avoid any influences due to different issuer behavior in the respective interest rate peaks and troughs. Securities were grouped by the ten maturity and three coupon classes and weighted according to the share of the respective classes in the total number of bonds outstanding. The various classes have been aggregated as follows:

- Coupon less than or equal to 6.5%

- coupon greater than 6.5% but less than 8.0%

- coupon greater than or equal to 8.0%

- 1-year term: maturities ranging from 0.5 to 1.49 years

- 10-year term: maturity ranging from 9.5 to 10.5 years

The weighting was computed shortly before the launch of the REX® and is subject to annual review. Since then, such review has given no cause for any re-weighting.

1.5   Coupon Effect

As for the REX® and REXP®, the so-called coupon effect is taken into account, resulting from the fact that interest income from bonds is subject to taxation while realized price gains remain tax-exempt. This is why private investors subject to a high degree of tax progression tend to prefer bonds with a low coupon. Thus, the mere existence of different coupons may lead to different yields (prices). Unlike similar index concepts, the coupon effect inherent to the indices is calculated in line with the corresponding yield curve (section 2.1.2 for a detailed description of the underlying regression).

1.6   Publication

The REX® index as well as its respective sub-indices are calculated once every exchange trading.

Index	Alpha	ISIN
REX TOTAL (PRICE INDEX)	REX	DE0008469107
REX 1-YEAR	REX1	DE0008469123
REX 2-YEAR	REX2	DE0008469149
REX 3-YEAR	REX3	DE0008469164
REX 4-YEAR	REX4	DE0008469180
REX 5-YEAR	REX5	DE0008469206
REX 6-YEAR	REX6	DE0008469222
REX 7-YEAR	REX7	DE0008469248
REX 8-YEAR	REX8	DE0008469263
REX 9-YEAR	REX9	DE0008469289
REX 10-YEAR	REX0	DE0008469305
REX TOTAL (PERFORMANCE INDEX)	REXP	DE0008469115
REX 1-YEAR	REXA	DE0008469131
REX 2-YEAR	REXB	DE0008469156
REX 3-YEAR	REXC	DE0008469172
REX 4-YEAR	REXD	DE0008469198
REX 5-YEAR	REXE	DE0008469214
REX 6-YEAR	REXF	DE0008469230
REX 7-YEAR	REXG	DE0008469255
REX 8-YEAR	REXH	DE0008469271
REX 9-YEAR	REXI	DE0008469297
REX 10-YEAR	REXJ	DE0008469313
REX 6% COUPON (PRICE INDEX)	RX60	DE0009651661
REX 7.5% COUPON	RX75	DE0009651687
REX 9% COUPON	RX90	DE0009651703
REX 6% COUPON (PERFORMANCE INDEX)	RP60	DE0009651679
REX 7.5% COUPON	RP75	DE0009651695
REX 9% COUPON	RP90	DE0009651711

1.7   Historical Data

The time series listed below are available for the indices under this Guide:

Index	Prices	Availability
REX and 10 maturity indices (1–10 years)	Daily closing prices	from 1988
REX and 10 maturity indices (1–10 years)	End-of-month prices	from 1967
REXP and 10 maturity indices 1–10 years	daily closing prices	from 1988
REXP and 10 maturity indices 1–10 years	end-of-month prices	from 1967

1.8   Calculation Correction

This section outlines the rules and procedures applicable in case of a calculation error, meaning the provision of index values, usage of index constituents or other elements or the application of weightings, capping, or other aspects of the index methodology in a manner that is not in line with this index methodology, e.g. due to a mistake, incorrect input data, etc.

1.8.1   Rule-based Correction

STOXX Ltd. corrects a Calculation Error without delay on the dissemination day it occurred, provided that STOXX Ltd. becomes aware of such Calculation Error before 15:30 CET of that dissemination day and insofar as technically and operationally feasible. STOXX Ltd. does not change intraday index composition of an index.

If STOXX Ltd. became aware of a Calculation Error at or after 15:30 CET, STOXX Ltd. aims at correcting the Calculation Errors as of the end of the next dissemination day, including corrections to index constituents.

STOXX Ltd. amends without undue delay previous incorrect index values or input data only if they are required for the subsequent index values calculation. Incorrect real-time index values disseminated before the effective time of the correction are not restated.

1.8.2   Non-rule based Correction

If the above-outlined rule-based error correction cannot be applied, the IGC assesses without undue delay:

- if and how the Calculation Error should be corrected, including if the index shall be restated, and/or

- if the dissemination of index values shall be suspended (Discretionary Rule, see Section 5.3).

An index should be restated, when the performance of the index (other than Selection Indices) can no longer be replicated. A suspension of index dissemination is triggered when IGC decides that the correction will take significant time during which misleading index values could lead to financial, legal and reputational risks (Discretionary Rule, see Section 5.3).

STOXX Ltd. suspends the dissemination of an index at the latest at the end of the dissemination day after it became aware of a Calculation Error, if the Calculation Error has not been corrected by then.

STOXX Ltd. will resume the dissemination of the index as soon as the correct index calculation is feasible and the correct historical values are available.

1.8.3 Notifications

In general, notifications take the form of an announcement on the DAX website (http://www.dax-indices.com). Announcements can (but need not, depending on the decision of STOXX Ltd.) be published via financial relevant media.

With regard to Calculation Errors, STOXX Ltd. issues notifications in accordance with the following rules:

- STOXX Ltd. will publish a notification before correcting a Calculation Error. Notifications are effective immediately following their issuance, unless otherwise specified in the notification.

- The notification will specify if a Calculation Error will be corrected retrospectively. In case of retrospective correction, STOXX Ltd. will publish the notification using the new end of day closing price.

- If STOXX Ltd. decides under Section 1.8 that index dissemination is suspended until the Calculation Error is corrected, a resume notification is published specifying the point in time when index dissemination is resumed and the correction will take place.

STOXX Ltd. will refrain from the issuance of a notification if it reaches the view that the issuance of a notification is not in line with the applicable laws and may decide to issue such Notification at a later point in time when such reasons have lapsed (Discretionary Rule, see Section 5.3). By reason of force majeure or other events beyond the control of STOXX Ltd. it might become impossible for STOXX Ltd. to issue a notification in due time or by the means set out herein. In such cases STOXX Ltd. may exceptionally issue the notification either subsequently immediately following such event or in any case by other means (Discretionary Rule, see Section 5.3).

1.9 Index Termination Policy

For termination of an index or an index family that underlie financial products issued on the market, to the knowledge of STOXX Ltd., a market consultation will be conducted by STOXX Ltd. in advance of the termination. The length of the consultation period will be defined in advance based on the specific issues of each proposed termination subject to STOXX Benchmark Transition Policy (Discretionary Rule, see Section 5.3). During the consultation period, clients and third parties will have the chance to share their concerns regarding the termination of the index or index family. Based on the collected feedback, STOXX Ltd. may rethink its decision to terminate an index or an index family (Discretionary Rule, see Section 5.3). At the end of the consultation period, STOXX Ltd. will publicly announce its final decision about the termination. At the end of the consultation period, STOXX Ltd. will publicly announce its final decision about the termination. A transition period will be granted in the event of termination (Discretionary Rule, see Section 5.3).

For termination of an index or an index family that do not underlie financial products issued on the market, no market consultation will be conducted.

2 Calculation

2.1 REX®

2.1.1 Calculation of yields

The market prices of all Federal government bonds, Federal debt obligations and Treasury notes issued by the Federal Republic of Germany, the German Unity Fund and the former Treuhandanstalt privatization agency are used to compute the yields according to the ACT/ACT method. For the purpose of yield calculation, all future payments are discounted to the actual value date. The method provides for exponential discounting of not only the number of entire payment periods, but also the broken (partial) payment period.

(1)

$$\text{Price} = \sum_{i=1}^{n} \frac{\text{Coupon}}{\left(1 + \dfrac{R}{100}\right)^i} + \frac{\text{Redemption}}{\left(1 + \dfrac{R}{100}\right)^n}$$

R = Discount interest rate (equals the yield of a bond)

After transformation pursuant to the summation formula for geometric series:

(2)

$$P + S = \frac{1}{q^{f*a}} * \left(\frac{C}{a} + \frac{\dfrac{C}{a} * \dfrac{q^n - 1}{q - 1} + N}{q^n} \right)$$

whereby: P = Market price for the bond

S = Accrued interest

C = Coupon (nominal interest rate) in percent

a = Number of interest periods per annum

n = Number of outstanding entire interest periods

f = Pro-rata first interest period up to the next coupon date

N   =   Nominal value

q   = $1 + r$,   whereby: r = yield

The required yield (r) is the result of:

(3) $q = 1 + \dfrac{r}{100}$

Formula (2) comprises the following features:

Several coupon dates in the course of the year are taken into account through factor a (e.g. for a semi-annual coupon: a = 2). In this case, the annual yield (R) is obtained from the period yield (r) as follows:

(4) $R = 100*(q^{a} - 1)$

If a = 1 then: R = r

The payment of interest does not start on the day of purchase, but only when the respective amounts are actually being charged or credited, respectively. Since the value date (VD) is two bank business days after the purchase date, public holidays throughout the year must be observed as well. Interest calculations are based on the ACT/ACT day count method. The pro-rata first interest period up to the next coupon date (CD) is as follows:

(5) $f = (CD - VD)/ACT$.

whereby: ACT = number of calendar days of the respective year.

Particular attention is to be paid to the fact that the buyer (seller) of a bond does not only pay (receive) the market price, but also the accrued interest.

Since formula (2) cannot be explicitly resolved to show the yield, such yield has to be approximated on an iterative basis. The period yield (r) in formula (2) is therefore calculated using the 'discrete Newton iteration' method. Instead of an exact derivative, this method uses an approximation thereof by means of a so-called quotient of differences.

The starting value for determining the yield (r) is the value which, according to the method of simple yield computation, is established by the following rule-of-thumb:

$$(6) \qquad q_0 = 1 + \left(\frac{\dfrac{C + \dfrac{N-P}{m}}{P}}{100} \right) \qquad \text{or} \qquad r_0 = \frac{C + \dfrac{N-P}{m}}{P}$$

whereby: m = Remaining term in years (m = n + f)

The value obtained in this way is inserted into formula (2).

The yield is deemed to be exactly calculated if one of the following criteria is fulfilled:

a)   If the differential amount of successive yield values corresponds to $(F(q_t)-F(q_{t-1}))$ $<=$ 0,000000001, changes are considered to be too small.

b)   If the function value (in absolute terms) equals $F(q_t)$ $<=$ 0,000000001, the desired level of accuracy has been reached.

The derivative of the yield function is calculated as a quotient of differences with an increment of ε= 0.00001. As long as the above criteria are not fulfilled, the subsequent value to be inserted is established as follows:

$$(7) \qquad q_{t+1} = q_t - \left(\frac{\varepsilon * F(q_t)}{F(q_t + \varepsilon) - F(q_t)} \right)$$

2.1.2 Calculation of the yield curve structure

A yield curve is calculated on the basis of yields established in (1) for each remaining term and coupon. The following regression determines the area which minimizes the sum of square deviations:

(8)   Yield (r) of a bond

$$= b_1 + b_2 * m + b_3 * m^2 + b_4 * m^3 + b_5 * \ln(m) + b_6 * C + b_7 * C^2$$

whereby: m   =   Remaining term (m = n + f)

C   =   Coupon in percent

$b_1...b_7$ =   Regression coefficients (published daily).

The exchange applies the householder method to calculate the regression parameters. Within the framework of this procedure, the parameters $b_1...b_7$ (uniform for every bond) are computed in such a way that the sum of square adjustment errors is minimized.

2.1.3 Elimination of outliers:

In order to avoid data and/or transmission errors, a tool for the elimination of outliers has been incorporated. That way, the actual yield curve structure can be replicated quite precisely. The elimination of outliers is carried out on the basis of two criteria.

A security is considered to represent an outlier if:

I.)
$$r^{diff} \geq a^{perc} * \overline{sq}$$

whereby: r^{diff} =   Square error of the respective security in relation to the yield curve (square difference between the actual and the theoretical yield of the respective security)

a^{perc} =   10

$\overline{sq}$ =   Average aggregate square error

II.)
$$\left| P - \hat{P} \right| \geq 1$$

whereby: P   =   Market price for the bond

$\hat{P}$ =   Estimated market price/ mid-market average based on bid and ask quotes for   the bond.

After the elimination of outliers, a renewed regression is implemented for the remaining securities, and the final regression coefficients $b_1...b_7$ are computed.

2.1.4 Calculation of the 30 synthetic index bonds

By entering the regression coefficients $b_1...b_7$ into the regression formula, yields for the integer term periods (one up to ten years) and the respective coupons (6 percent, 7.5 percent and 9 percent) are determined. For example, according to formula (8) the yield with respect to a term of three years and a coupon of 9 percent is calculated as follows:

$$r = b_1 + b_2*3 + b_3*3^2 + b_4*3^3 + b_5*\ln(3) + b_6*9 + b_7*9^2$$

whereby: $b_1...b_7$ = Regression coefficients

These yields are then converted into the prices (P) of notional bonds. Formula (2) has already been solved for the price. Additionally, the formula is shortened since the following applies to notional bonds:

- As only integer maturity periods are taken into account, the pro-rata first interest period (f) equals zero.

- Accordingly, the accrued interest (S) is zero as well.

- The nominal value (N) of such notional bonds is 100.

- The number of interest periods per annum (a) equals one.

This avoids accrued interest issues, and the number of cash flows is reduced to a maximum of ten payment dates. The shortened formula looks as follows:

$$(9) \qquad P = \frac{C*\dfrac{q^n - 1}{q - 1} + 100}{q^n}$$

2.1.5 Weighting of synthetic bonds and summation of weighted prices

The fourth step is to multiply the price of each notional bond P_{jk} with a term of j (= 1 to 10) and a coupon of k (= 1 to 3) by its corresponding weight Q_{jk}.

As for the calculation of weights, please refer to section 1.4.

The total of the 30 weighted prices determines the overall REX® index:

$$(10) \qquad REX = K_t * \sum_{j=1}^{10} \sum_{k=1}^{3} P_{jk} * Q_{jk}$$

and

$$(11) \qquad REX_t = K_t * \sum_{i=1}^{30} P_{it} * Q_{it}$$

The REX_j group indices for bonds with a remaining term of j are computed as follows:

$$(12) \qquad REX_j = K_{tj} * \frac{\sum_{k=1}^{3} P_{jk} * Q_{jk}}{\sum_{k=1}^{3} Q_{jk}}$$

whereby: K_{tj} = Chaining factor (for the time being: = 1)

P_{jk} = Price of the bond with remaining term j and coupon k

Q_{jk} = Weight of the bond with remaining term j and coupon k.

2.2 REXP®

The initial calculation of the REX® was based on the end of January 1967. Anybody who had invested DEM 100 in the REX® index on that day could dispose of DEM 470.86 as per 30 December 1987 (subject to monthly reinvestment of the respective coupon income). For harmonization purposes, it was decided that the base date of the REXP® index was to coincide with that of the DAX® (30 December 1987). The corresponding base value should be set at a level of 100. This is why the old REXP* time series was revised to start as REXP® in January 1967 with 100/470.86 * 100 = 21.24.

$$(13) \qquad REXP_t = \frac{REXP_t^*}{REXP_{30.12.87}^*} * 100$$

Formally, the REXP® is computed as a chained index. This means that the current index level is determined by multiplying the index value of the previous day with a certain factor. This factor represents the price change (REX_t^* / REX_{t-1}) as well as the pro-rata coupon yield as performance components:

$$(14) \qquad REXP_t = REXP_{t-1} * \frac{REX_t^* + \left(\dfrac{C_j}{ACT} * \Delta D_t \right)}{REX_{t-1}}$$

The accrued interest (C_j/ACT) per day is multiplied by the difference of value dates and added accordingly. Each annual interval ($D_t - D_{t-1} = ACT$) features a REX® coupon of 7.443 percent.

The lapse of time itself already moves the various bond prices (so-called rolling-up-and-down-the-yield-curve effect). Even if the market remains otherwise unchanged, the prices of above-par issues are bound to fall, whereas their below-par counterparts behave vice versa. A REX® (REX_t^*) shortened in terms of maturity is determined within the framework of the corresponding adjustment procedure: The maturity period (l) indicated in the regression formula is reduced by one day = $1/ACT$ with the other parameters involved to be left unchanged. In the case of public holidays or weekends, the number of days is enhanced accordingly.

The shortened maturity period (l) for the sub-index (remaining term = two years; difference of value dates = one; normal year with 365 days) is established as follows:

$2 - 1/365 = 1.99726$ years.

The index component issues are sold at the prices derived from the above equation. The ensuing reinvestment is executed at those prices which result from the original equation, i.e. using the same parameters, however, using integer terms.

The result of formula (10) is rounded to seven decimal places.

The chosen ACT/ACT day-count method corresponds to the practice of accrued interest settlement and is at the same time in tune with the calculation of yields.

In its capacity as a chained index, REXP® is equal to the product of all chaining factors which have accumulated until the day of calculation, multiplied by the base value of 100.

$$(15) \qquad REXP_t^* = \prod_{i=1}^{t} \frac{REX_t^* + \left(\dfrac{C_j}{ACT} * \Delta D_t \right)}{REX_{t-1}} * 100$$

whereby: $REXP_t$ = Performance index on day t (base date: 30 December 1987; base value = 100)

$REXP^*_t$ = Performance index with a base date of January 1967 and a base value of 100 ($REXP^*_0$ = 100)

REX_t = Price of the REX® on day t

REX^*_t = Price of the REX® with remaining term reduced by ΔD_t

C_j = Average coupon of the REX® in year j (currently at 7.443 percent)

D_t = Date on day t

ΔD_t = Number of days between day t and day t-1 (according to the ACT/ACT day-count method)

D_0 = 31 January 1967

3 Calculation of REX® Yields

Apart from the various component issues included in the REX® and its sub-indices, STOXX Ltd. also computes and distributes the respective yields once a day. Yields are computed on the basis of the weighting matrix already presented in section 1.4 above. Due to the notional bond concept and against the backdrop of an unchanged weighting matrix, yield calculations are based on a fixed flow of payments.

Maturity	Weight 6%	7.5%	9%	Redemption (1)	Weighted coupon	Total interest (2)	Redemption + interest (3)=(1)+(2)
1 year	3.10	1.73	2.56	7.39	7.39	7.44	14.83
2 years	3.50	2.43	2.87	8.80	7.39	6.90	15.70
3 years	4.06	3.03	3.16	10.25	7.37	6.25	16.50
4 years	4.88	3.37	3.70	11.95	7.35	5.49	17.44
5 years	4.87	3.15	4.02	12.04	7.39	4.61	16.65
6 years	4.09	2.84	4.32	11.25	7.53	3.72	14.97
7 years	3.82	3.02	4.79	11.63	7.63	2.88	14.51
8 years	3.38	3.14	4.06	10.58	7.60	1.99	12.57
9 years	3.65	2.62	3.38	9.65	7.46	1.18	10.83
10 years	3.15	1.47	1.84	6.46	7.20	0.46	6.92
Total	38.50	26.80	34.70	100.00	7.44 *		

*average weighted coupon

Each of the yields for the REX® and its sub-indices results from an internal rate of return of the payment series given below. For instance, the following yields are established for a given day:

Payment flows	REX	REX1	REX2	REX3	REX4	REX5	REX6	REX7	REX8	REX9	REX10
Price	-111,34	-104,08	-107,48	-109,89	-111,38	-112,31	-113,20	-113,70	-113,55	-112,91	-111,85
1 year	14,83	107,39	7,39	7,37	7,35	7,39	7,53	7,63	7,60	7,46	7,20
2 years	15,70		107,39	7,37	7,35	7,39	7,53	7,63	7,60	7,46	7,20
3 years	16,50			107,37	7,35	7,39	7,53	7,63	7,60	7,46	7,20
4 years	17,44				107,35	7,39	7,53	7,63	7,60	7,46	7,20
5 years	16,65					107,39	7,53	7,63	7,60	7,46	7,20
6 years	14,97						107,53	7,63	7,60	7,46	7,20
7 years	14,51							107,63	7,60	7,46	7,20
8 years	12,57								107,60	7,46	7,20
9 years	10,83									107,46	7,20
10 years	6,92										107,20
Yield	4,98%	3,18%	3,46%	3,82%	4,20%	4,58%	4,94%	5,24%	5,46%	5,59%	5,61%

The only variable within these payment series is represented by the respective current price of the REX® or its sub-indices. Interest payment of the various sub-indices involved is based on the weighted coupons for the maturities of one up to ten years according to the above table, with each of the corresponding redemption payments equal to 100.

The payment series of the REX® index comprises the aggregate of interest and redemption payments falling due with regard to the individual coupon classes (cf. above table).

REX® yields are calculated once a day and distributed as figures rounded to four decimal places.

4 Chaining in the Event of Changes in the Weighting Matrix

The weighting scheme on which the respective bond indices are based (sections 1.4 above) is checked for its relevance once a year. If necessary, it is adjusted accordingly.

If such adjustment takes place, chaining is carried out in three steps:

a) Calculation of the index value on the chaining date according to the old weighting scheme

The following applies accordingly:

$$REX_t = K_t * \sum_{j=1}^{10} \sum_{k=1}^{3} P_{jk} * Q_{jk}$$

This value corresponds to the closing index published on the date of chaining and is used with four decimal places (as published) for all subsequent calculations.

b) Calculation of an interim value

The interim value is computed using the weights valid on the chaining date (Q^*_{jk}).

The following applies accordingly:

$$\text{Interim value} = \sum_{j=1}^{10} \sum_{k=1}^{3} P_{jk} * Q^*_{jk}$$

whereby: Q^*_{jk} = Updated weight of the bond with remaining term j and coupon k.

c) Calculation of the new chaining factor

The following applies accordingly:

$$K_{t+1} = \frac{REX_t}{\text{Interim value}}$$

After chaining, the index is computed on the basis of the new chaining factor (K_{T+1}).

This procedure applies also to the various REX® sub-indices.

5 Changes in Composition

5.1 Inclusion of new bonds

The REX® index is computed on the basis of sovereign bonds traded on the German bond market. These are Federal government bonds, Federal debt obligations and Treasury notes with a remaining term between six months and 10.5 years, issued by the Federal Republic of Germany, the German Unity Fund and the former Treuhandanstalt privatization agency. In addition, only straight bonds featuring a fixed coupon are taken into consideration to avoid credit differentials between the various bonds involved.

When a bond is issued, it is incorporated into the index calculation process with its ask price at the end of the day of its initial listing.

5.2 Elimination of bonds

On the day on which a REX® component bond issue has less than six months to run, it is automatically removed from the index calculation process.

5.3 Discretion

Save for the cases expressly described in this Guide, the index methodology is entirely rule-based and automatic. Discretion only applies if expressly stated and must be exercised as provided for in this Guide.

5.3.1 Exercise of Discretion

Discretion may only be exercised with a view to resolve issues arising in maintaining the prevailing index methodology in response to unanticipated events, with an overarching aim to accurately and reliably measure the market or economic realities as defined in this Guide.

In accordance with BMR, discretion shall be exercised in line with the following principles:

- The body or person(s) exercising discretion must not be affected by a conflict of interest;
- The body or person(s) exercising discretion must have the requisite skills, knowledge and experience to exercise such discretion;
- All facts and circumstances relevant for the exercise of discretion must have been established and properly documented prior to the exercise of discretion;
- The exercise of discretion must comply with all applicable laws and regulations;
- The body or person(s) exercising discretion must act on the basis of the relevant facts and circumstances only, must give proper weight to the various considerations and ignore irrelevant facts and circumstances;
- The body or person(s) exercising discretion must act with a view to fulfil the purpose set-out above; and
- The body or person(s) exercising discretion must act honestly, reasonably, impartially and in good faith.

Discretionary Rule: *Any exercise of discretion must take into account the rationale of the index, the purpose of the rules with regard to which discretion is exercised, the objective to preserve market integrity and reliability of the index calculation to avoid undue market impact, the technical feasibility and economic reasonability, and the interest of licensees or investors.*

The cases in which STOXX Ltd. may exercise discretion regarding the index methodology and its application are noted in the respective rules of this Guide.

The following bodies are involved in the decision-making process relevant for the indices governed by this Guide:

- Product Initiation Committee (PIC),
- Product Approval Committee (PAC),
- Index Operations Committee (IOC),
- Index Management Committee (IMC),
- Index Governance Committee (IGC),
- Oversight Committee (OC),
- Management Board (MB).

The following table summarizes the cases in which STOXX Ltd. Committee(s) may exercise discretion regarding the index methodology and its application:

Case	Responsible STOXX Committee
Index Termination	IGC
Non-rule based Correction	IOC, IMC, IGC
Deviation from notification procedure regarding Calculation Errors	IOC, IMC, IGC
Determination of expected price to new shares in case of Subscription Rights on Other Share Classes	IGC
Procedure for Subscription Rights on Instruments with Embedded Options	IGC
Limitations	IGC
Annual methodology review schedule	IGC
Initiation of ad hoc methodology reviews	IMC
Determination regarding materiality of changes to the index methodology	IMC
Deviation from standard consultation period in case of material changes of the index methodology	IGC

Decision whether material change shall become effective	IGC
Decision to conduct another consultation in case of material changes of the index methodology	IGC, OC
Deviation from notification procedure in case of material changes of the index methodology	IGC
Deviations from notification procedure in case of non-material changes of the index methodology	IMC

6   Limitations

This section applies in the event of Limitations that occur in case of

- insufficient rules, meaning the absence of a methodology rule, provision or procedure which leads to the failure of determining the respective index value or which leads to an index value that does not properly reflect the concept / nature of the index, e.g.:

  o performance of the index can no longer be physically replicated;

  o insufficiently available index constituents to fulfil the requirements of the Index Methodology; or

  o market disruption which results in the performance of the index being unable to be tracked,

- unclear rules, meaning a situation in which the rules leave multiple possible interpretations on how a certain rule shall be applied to a specific situation,

- failing to produce index values as intended,

- data insufficiency, meaning a scenario in which the calculation of an index is no longer possible due to insufficient data quantity or quality, and

- extreme market events, meaning events that by their nature cannot be foreseen or whose impact on an index or the economic reality the index represented cannot be determined in advance. Examples may be, but are not limited to, the following: (i) a country announces changes to its currency convertibility or restrictions on capital flows; (ii) a country experiences a market disruption, an event that materially negatively influences the aggregated liquidity and market capitalization of entire markets.

If a Limitation has occurred, the IGC shall decide if and how the Limitation shall be rectified (Discretionary Rule, see Section 5.3). Any such rectification may comprise deviations from the index methodology which may apply as long as the Limitation persists (Discretionary Rule, see Section 5.3).

If a decision to deviate from the index methodology is taken, it will be communicated as soon as possible in form of an Announcement or Press Release. STOXX Ltd. will refrain from the issuance of a notification if it reaches the view that the issuance of a notification is not in line with applicable laws and may decide to issue such notification at a later point in time when such reasons have lapsed (Discretionary Rule, see Section 5.3). By reason of force majeure or other events beyond the control of STOXX Ltd. it might become impossible for STOXX Ltd. to issue a notification in due time or by the means set out herein. In such cases STOXX Ltd. may exceptionally issue the notification either subsequently immediately following such event or in any case by other means.

Any measures will be implemented two dissemination days later and will enter into effect the next dissemination day after implementation, unless a different effective date is specified in the notification.

7 Methodology Review

The purpose of the methodology review is to maintain integrity of the index, i.e. that the index methodology remains executable and results in an accurate and reliable representation of the market / economic realities the index seeks to measure.

7.1 Frequency of Review

In order to ensure the index integrity is maintained, the methodology is reviewed annually and ad hoc if a Limitation has occurred. If a Limitation cannot be addressed with by a methodology review, this may give rise to an index cessation or index transition. STOXX Ltd. shall not be liable for any losses arising from any decisions taken as part of a methodology review.

7.2 Review Procedure

7.2.1 Initiation of Methodology Review

The IMC proposes an annual methodology review schedule for approval by the IGC (Discretionary Rule, see Section 5.3).

The IMC is in charge of initiating ad hoc methodology reviews in case of a Limitation or based on recommendations to initiate a Methodology Review by other STOXX Ltd. Committees (Discretionary Rule, see Section 5.3).

7.2.2 Decision and Escalation

The following STOXX Ltd. Committees are responsible for making the decisions on amendments to an index methodology:

The IMC decides on changes to the index methodology, unless

    a. a material change to the index methodology is proposed (see Section 7.3 below),
    b. the change is triggered by an Unclear Rule or Insufficient Rule (as part of a Limitation, Section 6), or
    c. financial products relating to the index have a notional value/notional amount of more than EUR 100 mn.

If the IMC is not in charge, the decision is taken by the IGC (i.e. in the cases set forth in a) to c) above).

7.3 Material Changes with Consultation

As described in the STOXX Changes to Methodology Policy, prior to proposed material changes to the index methodology, a consultation will be performed.

A change to an index methodology shall be considered material in the event of

- a change in the index objective or market/economic reality the index aims to represent (e.g. market leader components vs. mid cap companies),

- a change which affects the composition and weighting rules of an Index,

- a change in the calculation methods and formulas,

- a change in the rules regarding the rebalancing of the weights of index constituents by application of the index methodology,

- a change in the rules regarding the review of index constituents and their respective weights by application of the index methodology and/or

- rules regarding a change in the adjustment of the weights of the index constituents or the composition of the index constituents of Bond Indices due to certain issuer related events,

resulting in a significant change of the concept / nature of the index. The IMC determines whether an amendment is material as defined. In cases where the materiality cannot clearly be assessed the IMC is responsible for making the decision (Discretionary Rule, see Section 5.3).

STOXX Ltd. consults a proposed material change either in a public consultation or with the Advisory Board or with reasonably affected licensees/investors. A licensee shall be considered affected if they hold a license for the respective index. An investor shall be considered affected if they own a contract or financial instrument that references the respective index. Considering the principle of proportionality, STOXX Ltd. informs affected licensees/investors as follows:

- licensees either directly and/or via public consultation;

- investors either via licensees affected by the material change and/or via public consultation.

STOXX Ltd. shall inform affected licensees and investors of the key elements of the index methodology that will in its view be impacted by a proposed material change and information on the rationale for any proposed material change including an assessment as to whether the representativeness of the index and its appropriateness for its intended use are put at risk in case the proposed material change is not put in place.

The consultation shall enable investors and licensees to submit comments. The standard consultation period shall be at least 1 month with the option to extend this period (Discretionary Rule, see Section 5.3). The IGC may decide to shorten the 1-month period (Discretionary Rule, see Section 5.3) in the following cases:

- in urgent cases, such as a situation in which the index cannot be replicated anymore;

- in situations where there is no known licensee / investor impact or only a limited number of affected licensees / investors;

- in order to align the effective date of a proposed changed with an Index Rebalancing, Index Review, and Issuer-related Adjustments, or

- any other similar cases.

The IGC in accordance with this Section 7.3 will consider the feedback received and decide whether the material change shall become effective (Discretionary Rule, see Section 5.3). The IGC is not bound by any feedback received. If the received feedback is ambiguous, the IGC may decide to conduct another consultation (Discretionary Rule, see Section 5.3). If no licensee / investor participate in the consultation, the consulted material change shall enter into effect as outlined in the consultation material.

If the IGC decides that a material change shall become effective, STOXX Ltd. will communicate a timeline on the implementation of the material change, if not already communicated in the consultation material. The decision will be communicated as soon as possible in the form of an Announcement or Press Release. STOXX Ltd. will refrain from issuance of a notification if it reaches the view that the issuance of a notification is not in line with applicable laws and may decide to issue such notification at a later point in time when such reasons have lapsed (Discretionary Rule, see Section 5.3). By reason of force majeure or other events beyond the control of STOXX Ltd. it might become impossible for STOXX Ltd. to issue a notification in due time or by the means set out herein. In such cases STOXX Ltd. may exceptionally issue the notification either subsequently immediately following such event or in any case by other means.

At the end of each consultation STOXX Ltd. will make available the feedback received from licensees / investors in the consultation together with a summary of its response to that feedback, except where confidentiality has been requested by the respective licensee / investor.

7.4 Non-Material Changes without Consultation

Non-material changes of the index methodology, including a description of the impact and the rationale, will be announced via Announcement or Press Release, effective immediately following publication, unless otherwise specified in the notification (Discretionary Rule, see Section 5.3). STOXX Ltd. will refrain from the issuance of a notification if it reaches the view that the issuance of a notification is not in line with applicable laws and may decide to issue such notification at a later point in time when such reasons have lapsed (Discretionary Rule, see Section 5.3). By reason of force majeure or other events beyond the control of STOXX Ltd. it might become impossible for STOXX Ltd. to issue a notification in due time or by the means set out herein. In such cases STOXX Ltd. may exceptionally issue the notification either subsequently immediately following such event or in any case by other means.

8   Contact

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