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STOXX[®]

CALCULATION

GUIDE



STOXX

INNOVATIVE. GLOBAL. INDICES.

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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 indices, the dissemination, the index formulas and adjustments due to corporate actions
- » The **STOXX Index Methodology guide** contains the index specific rules regarding the construction and derivation of the portfolio based indices, the individual component selection process and weighting schemes
- » The **STOXX Strategy guide** contains the formulas and description of all non-equity/strategy indices
- » The **STOXX Dividend Points Calculation guide** describes the dividend points products
- » The **STOXX Distribution Points Calculation guide** describes the distribution points products
- » The **STOXX ESG 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 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 Statistical Calculations** guide provides a detailed view of definitions and formulas of the statistical calculations as utilized in the reports, factsheets, indices and presentations produced by STOXX

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

2. CHANGES TO THE GUIDE BOOK

2.1. HISTORY OF CHANGES TO THE STOXX EQUITY CALCULATION GUIDE

- » February 2011: Publication of a complete new rule book series
- » August 2011: Modification of Free Float Factors and Share Adjustments
- » February 2013: Amendments of chapter 8 Corporate Actions and Adjustments; addition of chapter 5.8 STOXX News and Index Data Notifications and 13 Contact and Customer Support
- » July 2014: Interims solution: Treatment of Rights Issues with highly dilutive terms in chapter 8.1 and addition of chapter 8.7: Extreme Market and Company Events
- » September 2014: Treatment of Rights Issues with highly dilutive terms in chapter 8.1
- » December 2014: Clarification taxation of corporate actions in chapter 8
- » July 2016: Correction of wording in treatment of Spin-offs in chapter 8.4
- » May 2017: Update of Customer Support contact details
- » October 2017: Update of definition for Dissemination Calendar
- » November 2017: Calendars addition to the definition for Dissemination Calendar
- » December 2017: Calendars addition to the definition for Dissemination Calendar
- » December 2017 /2: Correction of typing error in spin-off adjustment formula
- » March 2018: Change of cut-off date for free-float research in section 8.2
- » July 2019: Change of announcement of events that involve takeover of US or Canadian company in section 8.3
- » May 2020: Treatment of stock dividends from redeemable shares
- » June 2020: Introduction of sections 9. Discretion, 10. Limitations, 11. Methodology Review, 12. Calculation Correction
- » June 2020: Clarification of section 8.6 Illiquidity, Bankruptcy and Delisting
- » July 2020: Change of section 8.7 Payment Defaults and Dividend Data Changes
- » October 2020: Update of section 8.3 Mergers and Takeovers

3.1. DISSEMINATION CALENDARS

The STOXX indices are disseminated Monday through Friday between 0:00 and 22:15 CET, according to the calendars defined below.

In exceptional cases, the STOXX Management Board can make changes to the dissemination calendar.

3.1.1. REGIONAL CALENDARS

STOXX defines the following Regional Calendars:

- » STOXX Europe Calendar: every weekday except January 1st, Good Friday, Easter Monday, December 25th and December 26th (this is the default calendar for any index, unless differently specified in the relevant index methodology)
- » STOXX Americas Calendar: every weekday except January 1st, Good Friday and December 25th
- » STOXX Asia Calendar: every weekday except January 1st

3.1.2. COUNTRY CALENDARS

STOXX defines Country Calendars as every weekday except non-trading days which are defined as exchange holidays. The information is provided by STOXX on an annual basis and is available on the STOXX website under Resources, Methodology, Dissemination for the countries listed in chapter 4.3 of STOXX Index Methodology Guide.

For the latest update, please refer to the following link:
Dissemination period: <http://www.stoxx.com/res-dissemination.html>

3.1.3. OTHER CALENDARS

- » STOXX Target Calendar: every weekday except January 1st, Good Friday, Easter Monday, May 1st, December 25th and December 26th
- » STOXX Eurex Calendar: every weekday except January 1st, Good Friday, Easter Monday, May 1st, December 24th, December 25th and December 26th
- » STOXX Specific Calendar: Index specific calendars which cannot be associated to any of the above defined STOXX Calendars. In this case the dissemination days are specified in the relevant index methodology and are subject to STOXX approval.

3.2. DISSEMINATION PERIOD

The index dissemination period begins with the opening of the first trading system. Each index has a defined dissemination start and end time. The actual dissemination of each index is triggered, when the first opening stock price for that index is received within these time frames. The index dissemination period ends, when the last trading system in the regional universe closes.

For the latest update, please refer to the following links:

Dissemination period: <http://www.stoxx.com/indices/dissemination/period.html>

Individual index dissemination times: http://www.stoxx.com/data/vendor_codes.html

3.3. REAL-TIME AND END-OF-DAY INDICES

The indices are calculated and disseminated at different frequency standards:

- » Real-time indices: Calculated and disseminated every 15 seconds during the index dissemination period.
- » End-of-day indices: Calculated and disseminated once a day at the end of the index dissemination period.

All indices including their frequencies are listed in the data vendor code file:

http://www.stoxx.com/data/vendor_codes.html

The index values are disseminated over the Consolidated Exchange Feed (CEF) of Deutsche Börse and can be procured directly from data vendors. For further information:

<http://www.stoxx.com/indices/dissemination/realtime.html>

4. INPUT DATA

4.1. SOURCES

The input data sources for the index production include:

- » Trading platforms
- » Regulatory agencies
- » Companies in the investable stock universe
- » Real-time and end of day stock prices and currency exchange rates provided by Thomson Reuters
- » Related data and service providers

4.2. MONITORING

The real-time input data feeds for the index calculation are monitored by:

- » Data filters
- » Quality assurance tools
- » Verification against secondary sources

4.3. DATA ACCURACY

The data accuracy for the following factors of the index calculation is defined as (unless stated differently in the individual index methodologies):

- » Input data (e.g. pricing and currency rates) and other underlying data: rounded to seven decimal places
- » Index divisors and market capitalization: rounded to integer numbers
- » Free float factors: rounded to four decimal places
- » Product of (number of shares x Free float factor x weighting capfactor): rounded to integer numbers
- » Product of (weightfactor x weighting capfactor): rounded to integer numbers
- » Index values: rounded to two decimal places for dissemination
- » Weights: expressed in percentage with 5 decimals

4.4. CURRENCY RATES

All real-time indices use the following currency rates:

- » From 09:00 to 17:30 CET, the mid between the latest real-time bid and ask prices is used as the currency rate in order to calculate the indices for Europe, Eastern Europe and the EU Enlarged region.
 - » From 15:30 to 22:15 CET, the mid between the latest real-time bid and ask prices is used as the currency rate in order to calculate the indices for the Americas region.
-

4. INPUT DATA

» From 00:00 to 11:00 CET, the mid between the latest real-time bid and ask prices is used as the currency rate in order to calculate the indices for the Asia/Pacific region.

All end-of-day indices, as well as the closing procedure for the real-time indices, use currency rates as follows:

- » From 17:30 CET, fixed foreign exchange rates are used for the calculation of the indices (using WM fixed exchange rates from 17:00 CET).
- » The global closings set at 22:15 CET use the same fixed rates as the European indices.

The fixed foreign exchange rates are provided by the WM Company – for further information refer to Reuters page “WMRSPOT01” or Bloomberg page “WMCO”.

4.5. STOCK PRICES

The data hierarchy used to process stock prices and calculate the STOXX equity indices are as follows. All data are provided by Thomson Reuters. For all non-equity indices the individual index methodologies contain further descriptions about the pricing sources and types.

- » The opening price: the first traded price during the official trading hours of the stock’s trading system; until this is available, the previous day’s closing/adjusted price is used.
- » The intraday price: the currently traded price during the official trading hours of the stock’s trading system. When the stock is not traded, the last available stock price is used, this can either be the last available intraday stock price (e.g. if the stock is temporarily suspended) or the last available closing/adjusted price (e.g. if the stock exchange is closed).
- » The closing price: the last traded price or auction price during the official trading hours of the stock’s trading system is used. If the stock has not been traded all day, then the previous day’s closing/adjusted price is used.
- » The adjusted price: the closing price is adjusted to reflect a stock’s corporate action that will be effective the next trading day.
- » Stock prices in local currency are converted to EUR first before being converted to the index currency.

5. AVAILABLE DATA

5.1. OPEN QUOTATIONS

The index open quotation takes the opening prices of all stocks in a real-time index into account. This value indicates what the index value would have been, if all opening stock prices had been received at the same time.

The index open quotations for the real-time indices are calculated either as soon as all the relevant opening stock prices are received or, at the latest, at 10:30 CET. If an opening stock price is unavailable at 10:30 CET, the stock's previous day's closing/adjusted price is used.

Non-EUR stock prices are converted into EUR using the currency rate valid at the time of the opening stock price (or previous day's closing/adjusted price), i.e. opening stock prices are converted using real-time currency rates and the previous day's closing prices are converted using WM fixed exchange rates of the day before.

5.2. INDEX SETTLEMENT VALUES

The index settlement values are calculated daily as the average of the 41 index values disseminated between 11:50 CET and 12:00 CET.

5.3. INTRADAY SNAPSHOTS DATA

Intraday snapshot data for the STOXX indices are disseminated daily at:

- » 10:30 CET or earlier: opening stock prices for selected STOXX indices and open quotation index values for real-time indices.
- » 12:00 CET: final index settlement values (FSV) as well as component stock prices for selected STOXX indices.
- » 10:30 CET, 15:30 CET, 17:45 CET and 18:45 CET: intraday index values and component stock prices for selected STOXX indices.

5.4. CLOSING DATA

The closing data for the STOXX indices are disseminated after the index dissemination period for the relevant region. The closing data includes the following sets of data:

- » Stock prices: both closing and adjusted prices for all components of the STOXX indices.
- » Index-related values: closing values, market capitalization and divisors for all indices.
- » Currency rates to EUR for all currencies used in any STOXX indices.
- » Corporate actions and dividends: effective the next trading day.
- » Other information like weightings, corporate actions and dividend forecasts.

5. AVAILABLE DATA

5.5. CORPORATE ACTION FORECASTS

The corporate action forecasts are updated daily and include information about future adjustments induced by confirmed corporate events. This includes, but it is not limited to:

- » Mergers, takeovers, spin-offs, price and shares adjustment, and IPOs for the coming week.
- » Initial public offerings (IPOs): recent IPOs that could qualify for the indices; for the STOXX Europe IPO Indices.

All corporate actions and dividend forecasts are subject to change. Customers are recommended to download regularly the forecast from the website and subscribe to corporate actions and dividend alerts to receive notification for the latest changes.

5.6. MONTHLY REPORTS AND SELECTION LISTS

The monthly reports are published each month and include the following data for selected indices:

- » Index composition and performance reports
- » Statistical and fundamental reports
- » Factsheets for various indices with information on fundamental ratios, performance data and other statistics

Selection lists are produced for indices with a fixed number of components in order to:

- » indicate possible changes in the composition of the index at the time of the next quarterly / semi-annual / annual review, and
- » determine replacements for any stock deleted from the indices due to corporate actions.
- » The STOXX Management Board¹ may decide to update the selection lists in between the regular publication dates to reflect extraordinary market movements and underlying data changes.

5.7. INDEX REVIEW LISTS

Each index has defined dates, when the new constituents, the underlying data (shares, free float, weighting-cap factors) are announced and implemented. The component and the underlying data announcement dates differ by index category and are therefore covered in the STOXX Methodology Guide. The quarterly implementation for all indices is always on the third Friday in March, June, September and December.

5.8. STOXX NEWS AND INDEX DATA NOTIFICATIONS

¹ The STOXX Management Board has delegated certain decisions to internal committees.

5. AVAILABLE DATA

For customers a subscription to e-mail notifications is available on the website. Notifications are sent out for short-term corporate actions and dividend changes, the periodic review announcements, index calculation and production issues and errors, new index launches and general information from STOXX.

6. INDEX PARAMETERS

6.1. PRICE AND RETURN INDICES

All indices are calculated as price and return indices. Dividend payments are invested in return indices only and neglected in price indices. Return indices are available as gross-return versions, calculated with a full dividend re-investment and as net-return investment, where dividends minus the withholding taxes are invested. .

6.2. INDICES IN EUR, USD AND OTHER CURRENCIES

All stock prices of the indices are converted to EUR and USD, as follows:

- » EUR indices: Non-EUR stock prices are converted to EUR for the index calculation.
- » USD indices: Non-EUR stock prices are converted to EUR first (as above), and then - together with the EUR stock prices - converted to USD for the index calculation.

Some indices are additionally available in other currencies. The following rule applies:

- » Indices in other currencies: non-EUR stock prices are converted to EUR first, and then - together with the EUR stock prices - converted to the appropriate index currency for the index calculation.

7. INDEX VALUE CALCULATION

7.1. INDEX FORMULAS

The indices are calculated with the Laspeyres formula, which measures price changes against a fixed base quantity weight. Each index has a unique index divisor, which is adjusted to maintain the continuity of the index's values across changes due to corporate actions.

7.1.1. MARKET CAPITALIZATION-WEIGHTED

The indices are calculated with the Laspeyres formula, which measures price changes against a fixed base quantity weight:

$$\text{Index}_t = \frac{\sum_{i=1}^n (p_{it} \cdot s_{it} \cdot \text{ff}_{it} \cdot \text{cf}_{it} \cdot x_{it})}{D_t} = \frac{M_t}{D_t}$$

Where:

- t = Time the index is computed
- n = Number of companies in the index
- p_{it} = Price of company (i) at time (t)
- s_{it} = Number of shares of company (i) at time (t)
- ff_{it} = Free float factor of company (i) at time (t)
- cf_{it} = Weighting cap factor of company (i) at time (t)
- x_{it} = Exchange rate from local currency into index currency for company (i) at time (t)
- M_t = Free float market capitalization of the index at time (t)
- D_t = Divisor of the index at time (t)

7.1.2. PRICE-WEIGHTED WITH WEIGHTING FACTORS

The indices are weighted based on the components' stock prices and weighting factors:

$$\text{Index}_t = \frac{\sum_{i=1}^n (p_{it} \cdot \text{wf}_{it} \cdot \text{cf}_{it} \cdot x_{it})}{D_t} = \frac{M_t}{D_t}$$

Where:

- t = Time the index is computed
- n = Number of companies in the index
- p_{it} = Price of company (i) at time (t)
- wf_{it} = Weighting factor of company (i) at time (t)
- cf_{it} = Weighting cap factor of company (i) at time (t)
- x_{it} = Exchange rate from local currency into index currency for company (i) at time (t)
- M_t = Total 'units' of the index at time (t)
- D_t = Divisor of the index at time (t)

7. INDEX VALUE CALCULATION

7.2. INDEX DIVISOR CALCULATION

7.2.1. MARKET CAPITALIZATION-WEIGHTED

Each index has a unique index divisor that is adjusted to maintain the continuity of the index's values across changes due to corporate actions. Changes in weights due to corporate actions are distributed proportionally across all index components. The index divisors are calculated as follows:

$$D_{t+1} = D_t \cdot \frac{\sum_{i=1}^n (p_{it} \cdot s_{it} \cdot ff_{it} \cdot cf_{it} \cdot x_{it}) \pm \Delta MC_{t+1}}{\sum_{i=1}^n (p_{it} \cdot s_{it} \cdot ff_{it} \cdot cf_{it} \cdot x_{it})}$$

Where:

- D_{t+1} = Divisor at time (t+1)
- D_t = Divisor at time (t)
- n = Number of companies in the index
- p_{it} = Price of company (i) at time (t)
- s_{it} = Number of shares of company (i) at time (t)
- ff_{it} = Free float factor of company (i) at time (t)
- cf_{it} = Weighting cap factor of company (i) at time (t) (only applicable if index is capped)
- x_{it} = Exchange rate from local currency into index currency for company (i) at time (t)
- ΔMC_{t+1} = The difference between the closing market capitalization of the index and the adjusted closing market capitalization of the index:
For companies with corporate actions effective at time (t+1), the free float market capitalization is calculated with adjusted closing prices, the new number of shares at time (t+1) and the free float factor at time (t+1) minus the free float market capitalization calculated with closing prices, number of shares at time (t) and free float factor at time (t).

7.2.2. PRICE-WEIGHTED WITH WEIGHTING FACTORS

Each index has a unique index divisor that is adjusted to maintain the continuity of the index's values across changes due to corporate actions. Changes in weights due to corporate actions are distributed proportionally across all index components. The index divisors are calculated as follows:

$$D_{t+1} = D_t \cdot \frac{\sum_{i=1}^n (p_{it} \cdot wf_{it} \cdot cf_{it} \cdot x_{it}) \pm \Delta MC_{t+1}}{\sum_{i=1}^n (p_{it} \cdot wf_{it} \cdot cf_{it} \cdot x_{it})}$$

Where:

- D_{t+1} = Divisor at time (t+1)
- D_t = Divisor at time (t)
- n = Number of companies in the index
- p_{it} = Price of company (i) at time (t)
- wf_{it} = Weighting factor of company (i) at time (t)
- cf_{it} = Weighting cap factor of company (i) at time (t) (only applicable if index is capped)
- x_{it} = Exchange rate from local currency into index currency for company (i) at time (t)

7. INDEX VALUE CALCULATION

ΔMC_{t+1} = The difference between the units in the index at closing and the units in the index after calculation parameters have been adjusted:
 For companies with corporate actions effective at time (t+1), the units in the index are calculated with adjusted closing prices, the adjusted weighting factors at time (t+1) and the adjusted weighting cap factors at time (t+1) minus the units in the index calculated with closing prices, weighting factors at time (t) and weighting cap factors at time (t).

7.2.3. DIVIDEND POINT CALCULATIONS

Dividend Point Calculations

For a detailed overview also consult the STOXX Dividend Point Calculation Guide.

$$DP_t(DVP) = \frac{\sum_{i=1}^n d_{it} \cdot s_{it} \cdot ff_{it} \cdot cf_{it} \cdot X_{it-1}}{D_t}$$

DP	= Dividend points (applies to STOXX Dividend Point – DVP indices only)
t	= Time the value is computed
D_t	= Divisor of the price index at time t
t	= Time the amount is computed
n	= Number of companies in the index
i	= Individual company being a constituent of the index
d_{it}	= Includes ordinary un-adjusted gross cash dividends and withholding tax amounts applied to special cash dividends and capital returns (d) in respect of each share of company (i) which is a constituent of the index at day (t) being an ex-dividend date as appropriate, or zero if no amount is applicable
s_{it}	= Number of shares outstanding of company (i) at time (t)
ff_{it}	= Free float factor of company (i) at time (t)
cf_{it}	= Weighting cap factor of company (i) at time (t)
X_{it-1}	= Exchange rate from local currency into EUR for company (i) at time (t-1)

8. CORPORATE ACTIONS AND ADJUSTMENTS

8.1. CORPORATE ACTIONS

The list of corporate actions indicate the calculation of the adjusted prices and the impact on the index divisor. All corporate actions and dividends are implemented at the effective date (ex-date); i.e. with corporate actions where cash or other corporate assets are distributed to shareholders, the price of the stock will drop on the ex- day. Changes in weights due to corporate actions are distributed proportionally across all index components and equal an investment into the portfolio.

Withholding taxes are considered for all corporate actions and dividends where applicable and defined per country. If STOXX becomes aware of an exception on the taxation; e.g. in case a company confirms a deviating tax treatment the exception will be used for the index calculation.

For the latest update on withholding taxes, please refer to the following link:
<http://www.stoxx.com/indices/taxes.html>

For the corporate actions listed below, the following assumptions apply:

- » Shareholders will receive “B” new shares for every “A” share held (where applicable)
- » All adjusted prices consider withholding taxes based on the new shares being distributed:
 $B \times (1 - \text{withholding tax where applicable})$
- » If the new shares have a dividend disadvantage - i.e. the new shares have a different dividend from that paid on the old shares - the price for these new shares will be adjusted according to the gross dividend amount

<p>1. Cash dividend (applies to return indices only)</p> <hr/> <p>Definition: Cash distributions that are within the scope of the regular dividend policy or that the company defines as a regular distribution.</p> <p>Adjusted price (net return) = closing price - dividend announced by the company $\times (1 - \text{withholding tax})$</p> <p>Adjusted price (gross return) = closing price - dividend announced by the company</p>	<p>Divisor</p> <hr/> <p>decreases</p>
<p>2. Special cash dividend (applies to price and return indices)</p> <hr/> <p>Definition: Cash distributions that are outside the scope of the regular dividend policy or that the company defines as an extraordinary distribution.</p> <p>Adjusted price = closing price - dividend announced by the company $\times (1 - \text{withholding tax if applicable})$</p>	<p>Divisor</p> <hr/> <p>decreases</p>

8. CORPORATE ACTIONS AND ADJUSTMENTS

3. Split and reverse split	Divisor
Adjusted price = closing price × A / B New number of shares = old number of shares × B / A	unchanged
For price-weighted indices with weighting factors: new weighting factor = old weighting factor × B/A	
4. Rights offering	Divisor
Standard rights issue treatments	
a) Free float market capitalization weighted indices Adjusted price = (closing price × A + subscription price × B) / (A + B) New number of shares = old number of shares × (A + B) / A	increases
b) Price weighted indices with weighting factors Adjusted price = (closing price × A + subscription price × B) / (A + B) New weighting factor = old weighting factor × closing price / adjusted price	Unchanged
Further distinctions are made applicable for both weighting schemas:	
» Extremely dilutive rights issue with a share ratio larger or equal to 2000% (B/A ≥ 20)	
» Highly dilutive rights issue with a share ratio larger or equal to 200% (B/A ≥ 2)	
Extremely dilutive rights issues are treated as following:	
» STOXX will announce the deletion of the company from all indices following the standard rules for index replacements if sufficient notice period can be given	
» Sufficient notice period: STOXX is able to make an announcement about index changes two trading days before the ex-date	
» The company may enter the indices again at the next periodic index review, but only after the new shares have been listed	
Extremely dilutive rights issues without sufficient notice period and all highly dilutive rights issues are treated as following:	
» Inclusion of the rights into the indices with a theoretical price on the ex-date	
» The rights must be listed on an eligible stock exchange and tradable starting on the ex-date otherwise only a price adjustment is made	
» The rights will have the same parameters as the parent company	
» The rights will be removed at the close of the day they start to trade with traded price being available	
» The number of shares and weighting factors will be increased after the new shares have been listed	

8. CORPORATE ACTIONS AND ADJUSTMENTS

If the subscription price is not available or equal to or greater than the closing price on the day before the effective date, then no adjustment is made.

5. Stock dividend

Adjusted price = closing price \times A / (A + B)
 New number of shares = old number of shares \times (A + B) / A

For price-weighted indices with weighting factors:
 New weighting factor = old weighting factor \times (A + B) / A

Divisor

unchanged

unchanged

6. Stock dividend (from treasury stock)

Stock dividends from treasury stocks will be adjusted as cash dividends.

a1) If treated as regular cash dividend, only the return indices are adjusted.

Adjusted close = close - close \times B / (A + B)

a2) If treated as extraordinary dividend, the price and the return indices are adjusted.

Adjusted close = close - close \times B / (A + B)

Divisor

decreases

7. Stock dividend (from redeemable shares)

Stock dividends from redeemable shares will be adjusted as cash dividends. In such a case redeemable shares are considered as:

- A separated share line with a fixed price
- Ordinary shares that are self-tendered on the same ex-date

a1) If treated as regular cash dividend, only the return indices are adjusted.

Adjusted close = close - close \times B / (A + B)

a2) If treated as extraordinary dividend, the price and the return indices are adjusted.

Adjusted close = close - close \times B / (A + B)

Divisor

decreases

8. Stock dividend of another company

Adjusted price = (closing price \times A - price of the other company \times B) / A

Divisor

decreases

8. CORPORATE ACTIONS AND ADJUSTMENTS

12. Combination stock distribution (dividend or split) and rights offering	Divisor
For the above corporate actions the following additional assumptions apply:	
» Shareholders receive 'B' new shares from the distribution and 'C' new shares from the rights offering for every 'A' share held.	
» If 'A' is not equal to one, all the following 'new number of shares' formulas need to be divided by 'A':	
a1) If rights are applicable after stock distribution (one action applicable to another)	increases
Adjusted price = $[\text{closing price} \times A + \text{subscription price} \times C \times (1 + B / A)] / [(A+B) \times (1+C / A)]$ New number of shares = $\text{old number of shares} \times [(A + B) \times (1 + C / A)] / A$	
a2) If stock distribution is applicable after rights(one action applicable to another)	increases
Adjusted price = $[\text{closing price} \times A + \text{subscription price} \times C] / [(A + C) \times (1 + B / A)]$ New number of shares = $\text{old number of shares} \times [(A + C) \times (1 + B / A)] / A$	
a3) Stock distribution and rights (neither action is applicable to the other)	increases
Adjusted price = $[\text{closing price} \times A + \text{subscription price} \times C] / [A + B + C]$ New number of shares = $\text{old number of shares} \times [A + B + C] / A$	
b) Price-weighted indices with weighting factors: Adjusted prices = see above [combination stock distribution (dividend split) and rights offering] New weighting factor = $\text{old weighting factor} \times \text{closing price} / \text{adjusted price}$	unchanged
13. Addition / deletion of a company	Divisor
No price adjustments are made. The net change in market capitalization (for price weighted indices: the change in units) determines the divisor adjustment.	

8. CORPORATE ACTIONS AND ADJUSTMENTS

14. Free Float and shares changes

Divisor

No price adjustments are made. The net change in market capitalization (for price weighted indices: the change in units) determines the divisor adjustment. Please refer to 8.2 for further details.

8. CORPORATE ACTIONS AND ADJUSTMENTS

8.2. FREE FLOAT FACTORS AND SHARE ADJUSTMENTS

Ordinary adjustments:

The free float factors and outstanding number of shares are reviewed on a quarterly basis based on the most recent available data. The final data are published on the quarterly underlying data announcement dates and implemented on the quarterly implementation dates. The review cut-off date for free float data is the fourth Friday of the month preceding the review month, i.e. of February, May, August and November. Data arriving after the cut-off dates are implemented in the following quarterly review.

Extraordinary adjustments:

The indices are updated with changes to the number of shares and/or free float factors due to corporate actions. The timing depends on the magnitude of the change:

- » Changes to the number of shares due to stock dividends, splits, rights issues etc. are implemented immediately and effective the next trading day.
- » Changes greater than ± 10 percent to the number of shares from one trading day to the next are announced immediately, implemented two trading days later and effective the next trading day after implementation.
- » Free float factor changes greater than \pm five percent from one trading day to the next are announced immediately, implemented two trading days later and effective the next trading day after implementation.
- » Changes to the combined free float adjusted number of shares greater than ± 10 percent from one trading day to the next are announced immediately, implemented two trading days later and effective the next trading day after implementation.
- » All other applicable changes are announced on the next quarterly underlying data announcement date, implemented on the quarterly implementation date and effective the next trading day after implementation.

8.3. MERGERS AND TAKEOVERS

A merger or takeover is deemed successful, if it has been declared wholly unconditional and has received the approval of all the regulatory agencies with jurisdiction over the transaction.

Changes are announced immediately, implemented two trading days later and become effective on the next trading day after implementation.

For events that involve the takeover of US or Canadian companies, the changes are announced based on the expected completion date before being declared wholly unconditional.

The result of a merger or a takeover is one surviving stock and one or more non-surviving stocks that may not necessarily be de-listed from the respective trading system(s). The rules below are only applied if at least one company in this transaction is a component of the STOXX Benchmark indices. Any surviving stock that does not qualify and the non-surviving stock(s) are deleted immediately.

Generally, the non-surviving stock(s) are deleted at the last traded price of the security. If any non-surviving stock is not trading anymore (delisted or suspended before its deletion), a new artificial

8. CORPORATE ACTIONS AND ADJUSTMENTS

price based on the acquisition/merger terms is calculated and the company is kept/deleted with this price instead of the last traded one. For the calculation of the artificial price only ordinary cash and stock terms will be used. Other instruments such as Contingent Value Rights will not be considered.

Payment Type	Artificial Price
Cash	Deletion Price = Cash term
Stock	Deletion Price = Close price acquirer*Stock term
Cash & Stock	Deletion Price = Cash term + Close price acquirer*Stock term
Cash or Stock	Deletion Price = Cash term

A surviving stock that qualifies for the STOXX Benchmark indices is added to the indices as follows:

- » STOXX Benchmark indices: The surviving stock replaces the largest of the original stocks.
- » STOXX Size indices: The surviving stock replaces the original stock that belonged to the largest affected Size index.
- » STOXX Blue-Chip and other indices: If one of the original stocks was a component, it is replaced by the surviving stock. Separate buffer rules and additional requirements for individual indices may apply according to specific index methodology.
- » STOXX Select Dividend indices: If one of the original stocks was a Select Dividend component, then it is replaced by the surviving stock, if it was ranked at or above the lower buffer limit on the currently valid Select Dividend selection list. A surviving stock that falls below the lower buffer limit, is replaced by the highest-ranked non-component on the selection list.

8.4. SPIN-OFFS

Each spin-off stock is temporarily added to all affected indices, including the fixed component indices, based on an estimated price. As a precondition a listing on one of the eligible exchanges, pricing and instrument reference data must be available. If the spin-off company does not qualify based on the rules set out below, it will be deleted at the close of the day it starts to trade with traded price being available. Separate buffer rules and additional requirements for individual indices may be applied according to specific index methodology, as outlined in the STOXX methodology guide.

Changes are announced immediately, implemented two trading days later and become effective on the next trading day after implementation.

STOXX Benchmark, Bluechip and derived indices:

- » Each spin-off stock qualifies for addition, if it lies within the upper (higher) buffer on the latest selection list for the specific index. The spin-off replaces the lowest ranked stock in that index, as determined by the latest selection list

Qualifying spin-off stocks are added in sequence:

- » The largest qualifying spin-off stock replaces the original stock in the index
- » The next qualifying spin-off stock replaces the lowest ranked stock in the index

8. CORPORATE ACTIONS AND ADJUSTMENTS

» Likewise for the other qualifying spin-off stocks

STOXX Total Market and derived indices:

» The spin-off stock is added, if it qualifies for the STOXX TMI indices as of the latest quarterly review list

8.5. SECTOR CHANGES

The indices are updated with the sector changes; the timing depends on the cause of the change:

- » Changes due to corporate actions: Announced immediately, implemented two trading days later and effective the next trading day after implementation.
- » Changes in the primary revenue source: Announced on the quarterly component announcement dates, implemented on the quarterly implementation dates and effective the next trading day after implementation.

8. CORPORATE ACTIONS AND ADJUSTMENTS

8.6. ILLIQUIDITY, BANKRUPTCY AND DELISTING

» Stocks are deleted if their illiquidity is due to not being traded for 10 consecutive trading days as observed during the quarterly Review of the STOXX Total Market indices as stated in STOXX Index Methodology Guide section 6.1.2.

» Stocks are deleted if being suspended from trading for 10 consecutive days. A company will be deleted from the index based on the traded stock price on its primary market, if available, or else the OTC stock price; if neither price is available, the company will be deleted at close in local currency of 0.0000001.

» Stocks are deleted following official delisting. A company will be deleted from the index based on the traded stock price on its primary market, if available, or else the OTC stock price; if neither price is available, the company will be deleted at close in local currency of 0.0000001.

» Stocks are deleted following ongoing bankruptcy proceedings: a company that has filed for bankruptcy will be deleted from the index based on either the traded stock price on its primary market, if available; if the last price is not available, the company will be deleted at close in local currency of 0.0000001.

Changes are announced immediately, implemented two trading days later and become effective the next trading day after implementation.

8.7. PAYMENT DEFAULTS AND DIVIDEND DATA CHANGES

A correction is applied, when a dividend is declared unpaid (payment default) or the dividend amount is changed by the company after the ex-date². The following rules apply:

» For indices that held the affected company on the ex-date a negative reinvestment is applied via a divisor adjustment to correct the index points previously added.

» A correction will be accepted only, if the payment default is discovered within 3 months after the original ex-date.

» Past index values (history) are not corrected.

» The index parameters (number of shares, free float factors, weighting cap factors, currency rates, divisors) effective on the day prior to the correction date are used.

² If the ex-date falls before the launch date the index is not corrected.

9. 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.

9.1. EXERCISE OF DISCRETION

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

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 maintain the integrity of the market or economic reality by aiming to ensure that indices remain representative and can be replicated, taking into account, inter alia, some, or all of the following:
 - Relevance of the event to the STOXX indices
 - Trading accessibility of the affected market
 - Availability of alternative markets
 - Ability of market participants to replicate the index or, where applicable, the results of the index review
 - Public information related to the events and their development in the foreseeable future
- The body or person(s) exercising discretion must act honestly, reasonably, impartially and in good faith.

As part of the decision-making process, STOXX may consult with external stakeholders.

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.*

9. DISCRETION

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 committees (hereafter also referred to as “STOXX Committee(s)”) are involved in the decision-making process relevant for the indices governed by this Guide:

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

The following table provides an overview of the cases in which STOXX Committees may exercise discretion regarding the index methodology, its limitations and its application:

Case	Responsible STOXX Committee
Index Termination (Cessation or Transition)	IGC
Non-rule-based Correction (treatment of calculation error)	IOC, 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, IGC
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
Extreme or exceptional market conditions or analogous extraordinary situations to be addressed in a fast track way	IGC
Periodic review of current index methodologies (e.g. matching of underlying interest) including initiation of ad-hoc reviews of benchmarks or benchmark families and clarification of methodologies (if required).	IGC
Decisions on rule changes for existing indices (Changes to methodology).	IMC, IGC
(Annual) Review of the control framework (including identification of operational risks and definition of measures that address operational risks).	IOC, IMC

9. DISCRETION

Review and approve reports on monitoring of outsourced service providers, contributors, risks and incidents reporting (Art. 10 BMR relevant)	IGC
Consideration and follow-up on the implementation of remedial actions based on results of internal and external audits	IGC
Monitoring of input data (including input data from contributors).	IOC, IGC
Review and approval of special cases identified during index review	IOC, IMC, IGC
Review and approval of complex corporate actions (disagreement on treatment of corp. action or application of rules)	IOC, IMC, IGC
Decisions with respect to complaints	IGC
Review and approve periodic reporting requirements under the Periodic Review Policy	IGC
Review and approve changes in case thresholds of significant or critical benchmarks exceeded and notify competent authority.	IGC

This section applies in the event of Limitations that occur due to:

- » insufficient rules, meaning the absence of a methodology rule, provision or procedure which leads to a failure when 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.:
 - performance of the index can no longer be physically replicated
 - insufficient index constituents to fulfil the requirements of the index methodology;
- » 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;
- » data insufficiency, meaning a scenario in which the calculation of an index is no longer possible due to insufficient data quantity or quality;
- » failure to produce index values as intended;
- » market disruption which results in the performance of the index being unable to be tracked;
- » events with a market impact that by their nature could reasonably not be foreseen, or events whose impact on an index or the economic reality the index intends to represent, cannot be determined in advance. Events covered in this section include, but are not limited to, events of natural, social, political, economic nature that may negatively impact regional or global societies or economies. Examples may be, but are not limited to, the following: (i) change to currency convertibility or restriction on capital flows announced by a country; (ii) market disruption, e.g. an event that materially negatively influences the aggregated liquidity, capitalization or tradability of an entire market; (iii) exchange closure, (iv) government intervention, (v) pandemic, (vi) natural catastrophe.

If a Limitation has occurred, the IGC shall decide if and how the Limitation shall be rectified (Discretionary Rule, see Section 9). Any such rectification may comprise deviations from the index methodology which may apply as long as the Limitation persists (Discretionary Rule, see Section 9).

In this context, STOXX may also decide to cancel an index review.

If a Limitation that could justify the cancellation of an index review occurs two or fewer dissemination days before the scheduled review implementation day, the review will be performed as planned, if reasonably possible. This aims to avoid last minute changes and not undermine the trading activity that may have already been performed.

If a review is cancelled, STOXX aims to perform it at the next scheduled review of the index or at the next quarterly review date (3rd Friday of March, June, September and December), whichever comes first and subject to the then prevailing market conditions.

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 9). 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.

10. LIMITATIONS

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.

11. 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.

11.1. 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 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.

11.2. REVIEW PROCEDURE

11.2.1. INITIATION OF METHODOLOGY REVIEW

The IMC proposes an annual methodology review schedule for approval by the IGC (Discretionary Rule, see Section 9).

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. Committees (Discretionary Rule, see Section 9).

11.2.2. DECISION AND ESCALATION

The following STOXX 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 11.3),
- b) the change is triggered by an Unclear Rule or Insufficient Rule (as part of a Limitation, Section 10), or
- c) it relates to a request for a market consultation
- d) financial products relating to the index have a notional value/notional amount of more than EUR 100 mn.

If any of the conditions a) to d) above is met, the decision is taken by IGC.

11.3. 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.

In case the proposed changes to the Index Methodology are deemed material, a consultation will be performed in accordance to STOXX Consultation Policy.

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

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

11. METHODOLOGY REVIEW

b) a substantial change of the index methodology in aspects such as, but not limited to, the ones listed below and that would result in altering the overall concept or the nature of the index:

- i) calculation methods or formulas with a substantial impact on the index performance, or
- ii) rules regarding the determination of index constituents by application of the index methodology, or
- iii) rules regarding the determination of the weights of index constituents by application of the index methodology,
- iv) rules regarding the treatment of corporate actions.

On the contrary, index methodology updates resulting from the application of existing methodology principles or minor clarifications of existing rules or corrections without altering the overall concept or the nature of the index are generally considered non-material.

The IMC determines whether an amendment is material as defined above. In case such determination is not possible, the proposed amendment shall be treated as material.

In case of Changes to Methodology STOXX consults with reasonably affected stakeholders (“Stakeholders”) prior to take decision.

Stakeholders mean (a) persons or entities who have an index license with STOXX regarding a benchmark administered by STOXX (Subscriber) and/or as far as STOXX is reasonable aware (b) persons or entities and/or third parties who own contracts or financial instruments that reference a benchmark administered by STOXX (Investors)

Taking into account the Principle of Proportionality, STOXX informs affected Stakeholders as follows:

- either via public consultation open to the entire market and performed via STOXX website;
- or, when the relevant Stakeholders are known, on a restricted basis directly on the Stakeholders e-mail address.

STOXX shall inform in writing the Stakeholders on:

- the key elements of the proposed Relevant Changes
- the rationale for any proposed Relevant Changes

11. METHODOLOGY REVIEW

- the specific questions to be answered
- the deadline for receiving feedback
- the timeline of implementation of the Relevant Changes
- contact details where to provide feedback
- relevant definitions

The consultation shall enable Stakeholders to submit comments.

The standard consultation period shall be 1 month with the option to shorten or extend this period.

The IGC may decide, taking into consideration the principles stipulated in the Index Guides and in the Terms of Reference Appendix, to shorten the 1-month period in the following cases:

- in extreme or exceptional market conditions or analogous extraordinary situations
- in urgent cases, such as a situation in which the Index cannot be replicated anymore;
- in situations where there is no known Stakeholders impact or only a limited number of Stakeholders;
- in order to align the effective date of a proposed change with Index Maintenance; e.g. an Equity/Bond Index Rebalancing, Index Review, and Corporate Action Adjustment, or
- any other similar cases applying the principle of proportionality.

The IGC will consider the feedback received and decide whether the Relevant Changes shall become effective.

The IGC is not bound by any feedback received. Moreover, if the received feedback is ambiguous, or if no Stakeholders participated, the IGC may decide to conduct another consultation, which again will not be binding.

If the IGC decides that the Methodology Change shall become effective, STOXX will communicate a timeline on the implementation of the relevant changes, if not already communicated in the consultation material.

STOXX will after the consultation make available the Stakeholders feedback received in the consultation and STOXX's summary response to those comments, except where confidentiality has been requested by the respective Stakeholders.

11. METHODOLOGY REVIEW

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.

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 Stakeholders in the consultation together with a summary of its response to that feedback, except where confidentiality has been requested by the respective Stakeholders.

The effective date for benchmark methodology changes is aligned, where feasible, with the periodic benchmark reviews dates when the benchmark composition is changed, and a rebalancing is triggered to avoid extra ordinary impact for clients. Material methodology changes should generally be publicly announced 3 months prior to implementation. IGC may decide to shorten the notice period:

- a) In exceptional or urgent cases such as extreme or exceptional market conditions or analogous extraordinary situations
- b) in situations where there is no stakeholder impact and where it has been agreed that the notice period has to be shortened but immediate communication is not possible. A case that requires urgent action is for example a situation in which the investor's ability to replicate the index benchmark performance with his or her portfolio is no longer ensured. In such cases, changes or amendments to the published index methodology ("Index Guides") must be made on the same day the new rule or change is implemented.
- c) to align with the period benchmark review dates and the rebalancing of the benchmarks.

In case of any proposed material change in its methodology, STOXX shall share its view on the key elements of the methodology that will be impacted by a proposed material change. Furthermore, STOXX shall include an assessment as to whether the representativeness of the benchmark and its appropriateness for its intended use are put at risk in case the proposed material change is not put in place. In case of any changes or amendments to the Index Guides, Operations and Product will work together to ensure both the public and subscribers are provided

11. METHODOLOGY REVIEW

with detailed information about the nature and rationale of the change as well as the implications and terms for the new methodology to enter into force.

Product is responsible for adding any change or amendment to the benchmark methodology in the respective Index Guides. Any change or amendment must also be added to the Index Guides' change history.

11.4. 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 9). 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 9). 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.

12. 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.

12.1. 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.

12.2. NON RULE-BASED CORRECTION

If the above-outlined rule-based error correction cannot be applied, relevant STOXX Committees 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 9).

An index should be restated, when the performance of the index can no longer be replicated. A suspension of index dissemination is triggered when STOXX Committee 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 9)).

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.

13. CONTACT AND CUSTOMER SUPPORT

13.1. STOXX CUSTOMER SUPPORT

For questions regarding our indices, please contact our Customer Support team:

- » Available from 07:30 to 22:00 CET on STOXX trading days
- » Phone: +41 43 430 72 72
- » Fax: +41 43 430 72 72
- » E-Mail: customersupport@stox.com