

8 CALCULATION MODEL

8.1 Input Data Specification

The calculation of the DJSI STOXX is based on the following input data:

- Real time stock prices
- Real time currency rates
- Number of shares outstanding for each stock class
- Corporate action information and data

8.2 Input Data Sources

The input data for the calculation of the DJSI STOXX are obtained from several reliable sources, including:

- Relevant stock exchanges / trading systems
- Regulatory agencies
- Companies involved

8.3 Input Data Monitoring

Various verification and audit procedures are implemented to ensure that the real time stock price and currency rate input-data feeds are of the highest accuracy, consistency and quality.

These procedures include:

- Data filters
- Quality assurance tools
- Computerized range-check warning systems for both ticker plant and real time index systems
- Verification against secondary sources

8.4 Input Data Corrections

Every effort is made to prevent erroneous input data from affecting the real time DJSI STOXX.

Any incorrect or missing data - e.g. stock prices, currency rates, number of shares outstanding and corporate actions - are corrected immediately.

However, as the index is calculated in real time, an incorrect index value will not be retroactively corrected.

8.5 Index Formula

The DJSI STOXX, the DJSI STOXX ex All, the DJSI EURO STOXX, and the DJSI EURO STOXX ex All indexes are calculated with the Laspeyres formula below:

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

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) (if index is capped, otherwise

equals 1)

X_{it} = Exchange rate from local currency into index currency (i.e. either EUR or USD)

for company (i) at time (t)

M_t = Free float market capitalisation of the index at time (t)

D_t = Divisor of the index at time (t)

The DJSI STOXX 40 and the DJSI EURO STOXX 40 are calculated with the following formula:

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

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 (i.e. either EUR or USD)

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)

8.6 Index Data Accuracy

The accuracy of the input, computational and output data is specified below:

- Input and other underlying computational data: rounded to 7 decimal places

- Index divisors: rounded to integers
- Index values: rounded to 2 decimal places

8.7 Index Divisor Adjustments

The index divisors for the DJSI STOXX, the DJSI STOXX ex All, DJSI EURO STOXX, and the DJSI EURO STOXX ex All are adjusted as follows in response to corporate actions affecting the market capitalization of the components:

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

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 (i.e. either EUR or USD)

for company (i) at time (t)

ΔMC_{t+1} = The difference between the closing market capitalisation of the index and the adjusted closing market capitalisation of the index: For companies with corporate actions effective at time (t+1), the free float market capitalisation 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 capitalisation calculated with closing prices, number of shares at time (t) and free float factor at time (t)

The index divisors for the DJSI STOXX 40 and the DJSI EURO STOXX 40 are adjusted as follows in response to corporate actions affecting the price or the weighting factor of the components:

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

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)

X_{it} = Exchange rate from local currency into index currency (i.e. either EUR or USD)

for company (i) at time (t)

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

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

Shareholders will receive 'B' new shares for every 'A' share held (where applicable)

If the new shares have a dividend disadvantage - i.e. the new shares have a different dividend from the old shares - the price for these new shares will be adjusted accordingly (taking into account the withholding tax).

Cash dividend (applied for return index only): Divisor ↘

adjusted price = closing price - dividend announced by the company * (1 - withholding tax)

Special cash dividend (applied for price and return index): Divisor ↘

adjusted price = closing price - dividend announced by the company * (1 - withholding tax)

Split and reverse split: Divisor ↔

adjusted price = closing price * A / B

new number of shares = old number of shares * B / A

Rights offering: Divisor ↗

adjusted price = (closing price * A + subscription price * B) / (A + B)

new number of shares = old number of shares * (A + B) / A

Stock dividend: Divisor ↔

adjusted price = closing price * A / (A + B)

new number of shares = old number of shares * (A + B) / A

Stock dividend of another company: Divisor ↘

adjusted price = (closing price * A - price of the other company * B) / A

Return of capital and share consolidation: Divisor ↘

adjusted price = [closing price - dividend announced by company * (1 - withholding tax)] * A /

B

new number of shares = old number of shares * B / A

Repurchase of shares / self tender: Divisor ↘

adjusted price = [(price before tender * old number of shares) -

(tender price * number of tendered shares)] / (old number of shares - number of tendered shares)

new number of shares = old number of shares - number of tendered shares

Spin-off: Divisor ↘

adjusted price = (closing price * A - price of spun-off shares * B) / A

Combination stock distribution (dividend or split) and rights offering

For the above corporate action, the following additional assumptions apply:

Shareholders receive B new shares from the distribution and C new shares from the rights offering for every A shares held.

If A is not equal to one share, then all the following 'new number of shares' formulae need to be divided by A:

- **if rights are applicable after stock distribution (one action applicable to other): Divisor** ↗

adjusted price = [closing price * A + subscription price * C * (1 + B / A)] / [(A + B) * (1 + C / A)]

new number of shares = old number of shares * [(A + B) * (1 + C / A)] / A

- **if stock distribution is applicable after rights (one action applicable to other): Divisor** ↗

adjusted price = [closing price * A + subscription price * C] / [A + B + C]

new number of shares = old number of shares * [A + B + C] / A

- **stock distribution and rights (neither action is applicable to the other): Divisor** ↗

adjusted price = [closing price * A + subscription price * C] / [A + B + C]

new number of shares = old number of shares * [A + B + C] / A

8.8 Index Divisor Corrections

If an incorrect index divisor is discovered within five days of its occurrence, then it is corrected immediately to prevent the error from propagating.

If the incorrect index divisor is discovered more than five days after its occurrence, then it is corrected immediately if the correction is feasible and if the error is deemed significant. This decision is the responsibility of the DJSI STOXX Index Design Committee.