

8 CALCULATION MODEL

8.1 Input Data Specification

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

- § Real time stock prices
- § Real time currency rates
- § Number of free float shares
- § Corporate action information and data

8.2 Input Data Sources

The input data are obtained from several 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 and consistency.

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 World.

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 World indexes are calculated with the Laspeyres formula below:

$$\text{Index}_t = \frac{\sum_{i=1}^n (p_{it} \cdot q_{it} \cdot X_{it}^{\text{USD}})}{C_t \cdot \sum_{i=1}^n (p_{i0} \cdot q_{i0} \cdot X_{i0}^{\text{USD}})} \cdot \text{base value} = \frac{M_t}{B_t} \cdot \text{base value}$$

The divisor (D_t) is different for the price and return indexes because of the different dividend treatments.

The formula can be simplified as follows:

$$\text{Index}_t = \frac{M_t}{D_t}$$

$$D_t = \frac{B_t}{\text{base value}} = \text{divisor at time (t)}$$

n = the number of stocks in the index

P_{i0} = the closing price of stock (i) at the base date (31/12/1998)

q_{i0} = the number of free float shares of stock (i) at the base date (31/12/1998)

P_{it} = the price of stock (i) at time (t)

q_{it} = the number of free float shares of stock (i) at time (t)

C_t = the adjustment factor for the base date market capitalization

t = the time the index is computed

M_t = free float market capitalization of the index at time (t)

B_t = adjusted base date market capitalization of the index at time (t)

X_{it}^{USD} = cross rate: domestic currency in USD of company (i) at time (t) {applies only to

companies that are not traded in USD}

base value = 1,000 on the base date; i.e. December 31, 1998

8.6 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 are adjusted as follows in response to corporate actions:

$$D_{t+1} = D_t \cdot \frac{\sum (P_{it} q_{it}) \pm \Delta MC_{t+1}}{\sum (P_{it} q_{it})}$$

where:

D_t = divisor at time (t)

D_{t+1} = divisor at time (t+1)

P_{it} = stock price of company (i) at time (t)

Q_{it} = number of free float shares of company (i) at time (t)

ΔMC_{t+1} = free float market capitalization calculated with adjusted closing prices and new number of free float shares at time (t+1) minus free float market capitalization calculated with closing prices and number of free float shares at time (t), of companies with corporate actions effective at time (t+1)

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

Shareholders will receive 'B' new shares for 'A' currently held shares (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 \uparrow

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

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

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

Split and reverse split: Divisor $\frac{A}{B}$

adjusted price = closing price * A / B

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

Rights offering: Divisor \uparrow

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

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

Stock dividend: Divisor $\frac{A+B}{A}$

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

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

Stock dividend of another company: Divisor \uparrow

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

Return of capital and share consolidation: Divisor \uparrow

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 \uparrow

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 \uparrow

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, then all the following 'new number of shares' formulae need to be
divided by A:

§ Rights are applicable after stock distribution: Divisor \uparrow

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

§ Stock distribution is applicable after rights: Divisor \uparrow

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: Divisor \uparrow

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.

If a divisor error is discovered more than five days after occurrence, the adjustment will
depend upon how significant the error is, how far back the error occurred and the feasibility of
performing the adjustment. This decision is the responsibility of the DJSI World Index Design
Committee.