Fair Value

1 Valuation Variables

Table 1 below shows the variables used in the respective valuation models as well as a short description of how these variables are determined.

Table 1

Variable	Source
Volatility of the underlying share (options)	360 days historic volatility (250 trading days) excluding the five trading days with the largest absolute change of the underlying share price
Interest rate	Interbank or Government bond rate for the relevant currency and time to expiration at the time of adjustment. If the time to expiration at adjustment is between two interest rates the Exchange shall use interpolation to determine the interest rate.
Future Dividends	Dividend estimates from Reuters or similar data provider will be used for the adjustment. If an estimate is unavailable historic data may be used.
Underlying share price	Volume Weighted Average Price (VWAP) on the day of the adjustment
Exercise price	The exercise price of the series
Time to expiration	Number of days between the date of adjustment and the original expiration date.

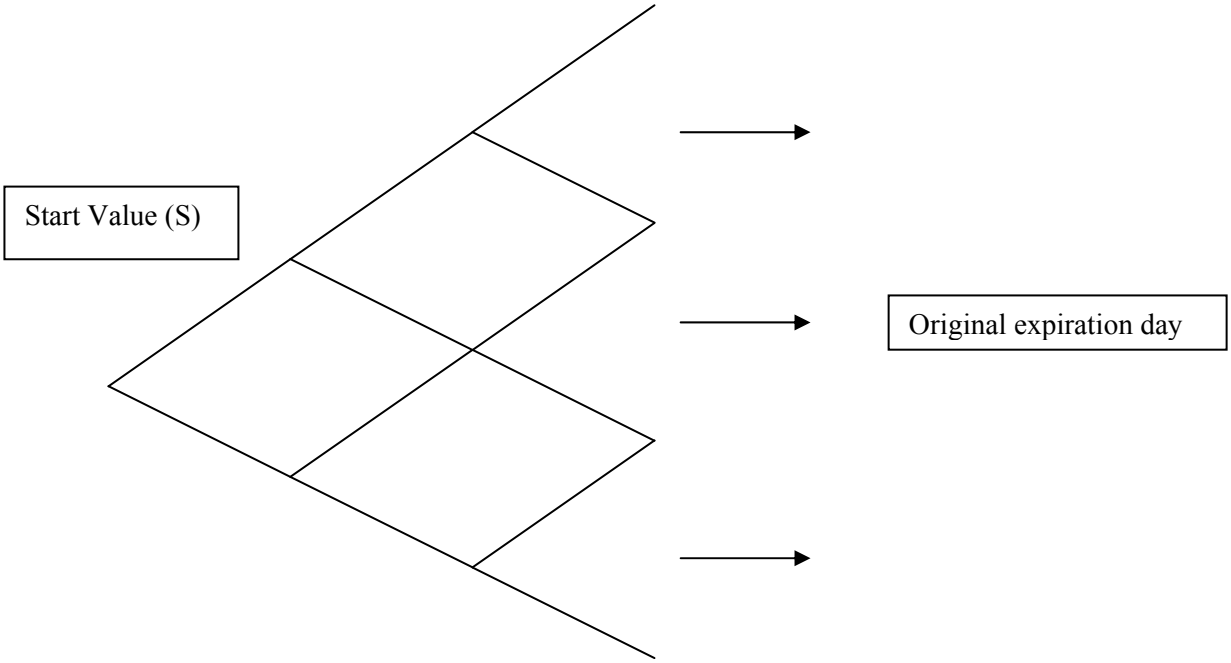
When the bid has been made public the Exchange shall publish the volatility and dividend estimates that will be used to calculate the Fair Value in an exchange notice. A bid is considered to be public when a price has been mentioned by the bid company and may also include an indicative bid. The underlying share price and the interest rate can change until the time of the adjustment and is published in an exchange notice at the time of the adjustment. Re-calculation of the Exercise Price may occur in certain cases between the time of the bid being made public and the date of adjustment according to "Addendum SEax, Fiax, DKax, ISax– Re-calculation rules"

2 Options

2.1 Valuation model for American Style Options

Cox Ross Rubinsteins valuation model for options (Binomial Pricing Model) will be used when calculating Fair Value. The difference between the intrinsic value and Fair Value will be settled separately. No settlement of time value will be made if the difference between intrinsic and Fair Value is negative.

To determine Fair Value a matrix of underlying share prices is created. The starting value is equal to VWAPcum less the present value of eventual dividends. The matrix is divided into 100 periods.



The underlying prices at each period is calculated according to the formula below:

$$u = \frac{(a^2 + b^2 + 1) + \sqrt{(a^2 + b^2 + 1)^2 - 4a^2}}{2a}$$

$$d = \frac{1}{u}$$

$$p = \frac{a - d}{u - d}$$

$$a = e^{(r-q)\Delta T}$$

$$b^2 = a^2(e^{\sigma^2 \Delta T} - 1)$$

σ = Volatility of the underlying
t = Time to expiration
n = Number of periods (100)
u = Relative increase in the underlying share price at every up movement in the binomial model.

At every period the share price is calculated by multiplying (up movement) or dividing (down movement) previous share price, excluding the present value of eventual dividends, with the factor (u). The present value of the dividend is then added back to the share price.

The intrinsic value of the option is decided in the model by the following formula:

$$c = \max(S - X, 0)$$
$$p = \max(X - S, 0)$$

where
c= value of call option

p= value of put option
S= Underlying share price
X= Strike price

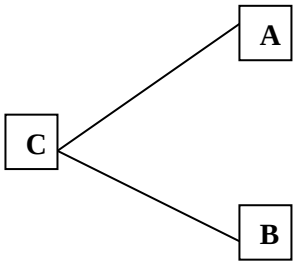
The probability of a underlying share price increase is calculated by using the following formula:

$$K = \frac{\left(e^{rt/n} - \frac{1}{u}\right)}{\left(u - \frac{1}{u}\right)}$$

The probability of a underlying share price decrease (L) is calculated by using the following formula:

L = 1-K

By using the value of the option at expiration together with the probabilities for an increase or decrease the value of the option at each period in the binomial matrix is calculated as described below:



$$C = \left(K * A + L * B\right) * e^{-rt/n}$$

If the value of the option is lower than the intrinsic value at any period in the matrix the intrinsic value will be used for further calculations.

2.2 Valuation model for European Options

The Black-Scholes Method is used for calculating the Fair Value for European options. The difference between intrinsic value and Fair Value is settled separately.

The options theoretical value is calculated by using the following formula:

$$c = S^* e^{-qT} N(d1) - Xe^{-rT} N(d2)$$
$$p = Xe^{-rT} N(-d2) - S^* e^{-qT} N(-d1)$$
where
$$d_2 = \frac{\ln(S^*/X) + (r - q + \sigma^2/2)T}{\sigma\sqrt{T}}$$
$$d_1 = d_2 + \sigma\sqrt{T}$$

c = theoretical value of a call option

p = theoretical value of a put option
S*= underlying share price adjusted for the present value of eventual dividends
X = strike price
N(x) = cumulative normal distribution function
r = riskfree interest rate
q = dividend yield
σ = volatility of the underlying share
T= time to expiration (years)

2.3 Valuation model for Binary options

A variant of the Black-Scholes Method is used for calculating the Fair Value for Binary options. As opposed to American and European options the settlement is made for the full theoretical value.

The options theoretical value is calculated by using the following formula:

$$c = Qe^{-rT}N(d_2)$$

$$p = Qe^{-rT}N(-d_2)$$

where

$$d_2 = \frac{\ln(S^*/X) + (r - q - \sigma^2/2)T}{\sigma\sqrt{T}}$$

c = theoretical value over
p = theoretical value under
S*= underlying share price adjusted for the present value of eventual dividends
X = strike price
N(x) = cumulative normal distribution function
r = riskfree interest rate
q = dividend yield
σ = volatility of the underlying share

3 Futures/Forwards

3.1 Valuation model Futures/Forwards

To compensate for lost time value and dividends the difference between the theoretical futures price and the underlying share price (VWAP) will be settled 1) separately for forwards alternatively 2) in connection to the ordinary expiration procedure for futures. The theoretical futures price is calculated by adjusting the VWAP for eventual future dividends, time to expiration and interest.

The calculation of the future/forward price is done according to the formula below:

$$F = \left(S - D^*\right)e^{r(T-t)}$$

where

F= Theoretical futures-/forward price

S= Underlying share price
T-t= Time to expiration
R= Interest
D*= Present value of future dividends (See formula below)

$$D^* = \sum_{i=1}^{n} D_i e^{-rt_i}$$

Di= Dividends occurring period i
D*= Present value of dividends
r= Interest
ti= Time to expiration (years)
n= total number of dividends during the future contracts term.