THE RATIO METHOD EXPLAINED

EQUITY DERIVATIVES

What happens to my option when the underlying value is subject to a bonus issue, a (reverse) stock split, a rights issue, a special dividend, or a recapitalisation?

The Ratio Method explained

When a stock is subject to one of these events, the option is adjusted using the ratio method. Adjustments to the option are made on the evening before the effective date. This ensures that on the effective date, the exercise price remains in line with the (theoretical) price of the shares. The lot size is adjusted to make sure that the economic value of the option (exercise price x lot size) remains unaffected.

Ratio method explained

The necessary elements to calculate the adjustment ratio are:

P	=	The official closing price of the cum entitlement share on the Relevant Stock Exchange
E	=	Value of the entitlement per share
O	=	Cum amount of shares (old)
N	=	Ex amount of shares (new)

$$\text{Adjustment Ratio} = \frac{(P - E) * \left(\frac{O}{N}\right)}{P}$$

The lot size of the option is divided by the adjustment ratio. The exercise price of the option is multiplied by the adjustment ratio.

Bonus issue example

Company A issues 1 bonus share for every 10 shares held. The official closing price of company A is €35.68

$$\text{Adjustment ratio} = \frac{(35.68 - 0)\ x\ {}^{10}\!/_{11}}{35.68} = 0.90909$$

Exercise price before the Bonus Issue:	Exercise price on the effective date:
30.00	**27.27**

On the effective date the lot size has changed from 100 to **110**.

Stock split example

Company B effects a share split. Each existing share is replaced by 2 new shares. The official closing price of company B is €33.88

$$\text{Adjustment ratio} = \frac{(33.88 - 0) \times 1/2}{33.88} = 0.50000$$

Exercise price before the Stock Split:	Exercise price on the effective date:
30.00	**15.00**

On the effective date, the lot size has changed from 100 to **200**[*].

Reverse stock split example

Company C effects a reverse split. Each 2 existing shares are replaced by 1 new share. The official closing price of company C is €16.25

$$\text{Adjustment ratio} = \frac{(16.25 - 0) \times 2/1}{16.25} = 2.0000$$

Exercise price before the Reverse Stock Split:	Exercise price on the effective date:
15.00	**30.00**

On the effective date, the lot size has changed from 100 to **50**.

Rights issue example

Company D announces a rights issue. Shareholders receive one right for each share. Every 10 rights allow for the purchase of 1 new share at a purchase price of €65.00 per share. The new shares are not entitled to receive the announced dividend of €2.00 per share. The official closing price of company D is €100.00

The value of the entitlement has to be determined first. The necessary elements to calculate the value of the entitlement are:

- E = Theoretical value of an entitlement
- P = The official closing price of the cum entitlement share on the Relevant Stock Exchange
- S = Subscription price of one new share
- d = Dividend to which new shareholders are not entitled
- h = Number of existing shares specified as eligible for the entitlement
- r = Number of new shares specified as the entitlement
- x = 1

$$E = \frac{P - d - S}{\left(\frac{h}{r} + x\right)}$$

In the above example the value of the entitlement is: $\frac{100 - 2 - 65}{10 + 1} = 3^{**}$

As a result, the Adjustment ratio is: $\frac{(100 - 3)\ x\ 1/1}{100} = 0.97000$

Exercise price before the Rights Issue:	Exercise price on the effective date:
90.00	**87.30**

On the effective date, the lot size has changed from 100 to **103**.

Special dividend example

Company E announces payment of a special dividend of €5.00 and an ordinary dividend of €1.00 per share. On the effective date, the share will trade "ex" special and ordinary dividend. The official closing price of company E is €28.59

$$\text{Adjustment ratio} = \frac{(28.59 - 1 - 5) \times 1/1}{28.59 - 1} = 0.81877$$

Please note that "P" is corrected to take account of the price effect of the ordinary dividend going "ex" on the effective date.

Exercise price before the Special Dividend:	Exercise price on the effective date:
25.00	**20.47**

On the effective date, the lot size has changed from 100 to **122**.

Recapitalisation example

Company F announces a share consolidation and a return of capital. Shareholders will receive €6.00 per share in cash. At the same time, seven existing shares are replaced by six new shares. The official closing price of company F is €47.55

$$\text{Adjustment ratio} = \frac{(47.55 - 6) \times 7/6}{47.55} = 1.01945$$

Exercise price before the Recapitalisation:	Exercise price on the effective date:
40.00	**40.78**

On the effective date, the lot size has changed from 100 to **98**.

General remarks

For bonus issues and (reverse) stock splits the adjustment ratio can simply be represented as:

$$\text{Adjustment Ratio} = \frac{O}{N}$$

Please note that a covered option seller may need to reinvest the entitlement (e.g. the special dividend or return of capital) to keep the position covered. For instance, a special dividend may need to be used to purchase additional shares to cover the increased lot size.

For all Euronext equity options, there is a mechanism to compensate for rounding differences that occur when the lot size is adjusted. For further details please refer to 'equalisation payments' in the Euronext Derivatives Corporate Actions Policy.

Further information:

https://derivatives.euronext.com/en/trading/corporate-actions

* For all contracts, whenever possible, the positions will be changed rather than the lot size (therefore instead of one option for 200 shares, there will be two options for 100 shares).

** For the purpose of calculating the adjustment ratio, the theoretical value of entitlement is not rounded.