# EVALUATION OF CAPITAL INSTRUMENTS GRANTED WITHIN SHARE BASED PAYMENT TRANSACTIONS

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***Abstract:***
*Determining the fair value of equity instruments granted in share-based payment transactions is very difficult because it takes into account many variables: the exercise price of the option, the life of the option, the current price of the underlying shares, the expected volatility of the share price, the dividends expected on the shares and the risk-free interest rate for the life of the option. These depend on another factors, that makes the process of determining the fair value too hard. The paper proposes to present these factors minutely and try to give an advice for the company which must establish the fair value of the option.*

***Key words:*** *stocks, share options, fair value, accounting policies*

***JEL classification:*** *M41*

Evaluation of capital instruments consists in the fair value evaluation of actions and share warrants, focusing on the terms and conditions that contain elements common to providing shares or share options of employees. Therefore, the presentation is not exhaustive. Moreover, due to the evaluation problems the focus is put on shares and share options assigned to employees, assuming the fair value of shares and share options is evaluated at the date of assignment. However, many of the evaluation problems that will be discussed (for instance, Determination of expected volatility) is applied in the context of fair value determination of shares or share options provided to third parties others than employees at the date when the entity obtains goods or the third party supplies the service.

**Shares**

For the shares assigned to employees, the fair value of shares will be calculated at the market price (or an estimated price if shares are not transacted publicly), adjusted in order to consider the terms and requirements in which shares have been assigned.

For instance, if the employee has not the right to receive dividends during the lawful period, this factor has been considered when estimating the fair value of the shares assigned. Similarly, if shares are the purpose of transfer restrictions after the lawful date, that factor should be taken into account, but only to the extent wherein restrictions subsequent to the lawful period affect the price that a participant would pay for a share. For instance, if shares are transacted actively on a liquid market, restrictions on transfer subsequent to the lawful period have an unsignificant effect on the price of which a participant to the market would pay. Restrictions concerning the transfer or other restrictions that exist during the lawful period should not be taken into consideration when we estimate the fair value of shares assigned, because restrictions occur due to the existence of requirements to have the right to benefits.

**Share warrants**

For share warrants assigned to employees, market prices are not available in many cases, because the options assigned are the purpose of the terms and requirements that do not apply to the option transaction. If there are no options transacted with similar

terms and requirements, the fair value of share options assigned should be estimated by applying a share option evaluation pattern. These factors should be taken into consideration when estimating the date of assigning the fair value of share option. For many entities, this could prevent the use of the Black-Scholes-Merton method, that does not allow the exercise prior to maturity of option and could not reflect suitably the effects of early exercise. Also, it does not provide the possibility that expected volatility and other pattern input would change during the life time of option. However, for share options with a relatively low contract life time or that should be exerted within a short period of time after the date entitled to receive benefits, the factors identified above could not be applied. Under these circumstances, the Black-Scholes-Merton pattern can produce a value that is approximately the same with that of a flexible option evaluation pattern.

All option evaluation patterns consider the following factors:

a) the exercise price of option
b) life time
c) current price of shares (backing asset)
d) volatility of share price
e) dividends expected for shares held
f) risk free interest rate for life time of option.

Other factors that participants to the market should take into consideration when setting the price (except lawful requirements and reload elements that are excluded from the fair value evaluation.

For instance, a share option assigned to an employee, it usually cannot be exerted during the specified period (for instance during the period entitled to receive benefits or during the periods specified by shapers of security markets). To this factor it should be taken into account if the applied option evaluation pattern would assume that the option could be exercised any time during the life time. However, if an entity uses an option evaluation pattern that evaluates options that can be exercised only at the end of their life time, none adjustment is required for the incapability to exercise during the period entitled to receive benefits (or other periods during the life time of option), because the pattern assumes that options cannot be exercised during those periods.

Similarly, another factor common to the employees' share options is the opportunity of early exercise of options, for instance, because the option is not clearly transferable or because employees should exercise all lawful options until stopping the employees' activity.

Factors that a participant to the market does not consider when setting the price of a share option (or other equity capital instrument) should not be considered at the fair value estimation of share options assigned (or other equity capital instrument).

**Input of option evaluation model**

When estimating volatility and dividends related to shares, the goal is to approximate the prospects that would be reflected in a current exchange price of the market or negociated for an option. Similarly, when estimating the effects of early exercise of employees'share options, the goal is to approximate expectations that a remote third party that has access to detailed information about the behaviour of option exercise by employees would develop being based on information available on the date of assignment.

It is often likely that there is a range of reasonable expectations about future volatility, dividends and exercise behaviour. In this case, an expected value should be calculated, by weighting each sum within the range with the occurrence related probability.

Expectations concerning the future are generally based on modified experience, if differences are expected in the future compared to the past. In some cases, identifiable

factors can indicate that non-adjusted historic experience is a relative forecast of future experience. For instance, if an entity with two different business lines, in which one is less risky than the other, historic volatility could not be the best information that we can rely when determining the reasonable expectations for the future.

Under other circumstances, historic information could not be available. For instance, a newly listed entity has a few information about historic data related to volatility of share price. Unquoted or newly quoted entities are shown below.

As a conclusion, an entity should not rely its volatility related estimations, the exercise behaviour and dividends on historic information without taking into consideration to the extent which the past experience is expected to be reasonably estimated.

**Expected early exercise**

Employees exercise share options earlier, from various reasons. For instance, the employees' share warrants are normally non-transferable. As a result, employees exercise the share options earlier, because it is the only way for employees to liquidate their position. Also, employees that stop working are asked to exercise their options within a short period of time, thus the share options cannot be exercised. This factor determines the early exercise of share options by employees. Other factors that determine the early exercise are the dislike to the risk and lack of patrimony diversification.

The means whereby expected effects of early exercise are taken into consideration and depend on the type of applied option evaluation pattern. For instance, the early exercise could be taken into account by using an estimation of the expected life time of option (that, for an employee's share options, is the period from the date of assignment until the date when the option is expected to be exercised) as an input in the option evaluation pattern (for instance the Black-Scholes-Merton method). Alternatively the early exercise could be shaped in a binomial option evaluation pattern or other similar that uses the contract life time as input.

The factors taken into consideration when estimating the early exercise include:

a) length of the period entitled to receive benefits, because the share options cannot be exercised normally until the end of the period entitled to receive benefits. Thus, determination of implications related to the evaluation of early exercise is based on the assumption that option will provide benefits.

b) average duration of similar options is found in the past.

c) price of backing shares. Experience can indicate that employees tend to exercise their options when the price per shares reaches a certain level specified over the exercise price.

d) employees' years of service within organization. For example, the experience could indicate that older employees could exercise their option later than new employees.

e) expected volatility of backing shares. On average, employees could exercise their options earlier over more volatile shares than lower volatility shares.

The effects of early exercise could be taken into account by using an estimation of expected life time of options as an input in the option evaluation pattern. When expected life time of share options assigned to a group of employees is estimated, the entity could rely its estimation on the weighted average of expected life time for the entire group of employees or over the weighted average of life time for the subgroups of employees within the group, being based on more detailed data about employees' exercise behaviour (shown below).

The separation of assignment as regards options on groups of employees with a relatively homogenous exercise behaviour is very important. The option value is not a linear function of the terms of options; the value increases with a decreasing rate at the

same time with the length of time limit. For instance, if all the other assumptions are equal, though a two year option is more valuable than one a year, it does not value twice more. It means that by calculating the option value based on the weighted average life time that include the individual life times would overestimate the total fair value of the share options assigned. Separation of assigned share options on several groups, each of them having a relatively narrow range of life times included in the average life time, diminishes the overevaluation.

Similar analyses apply when using a binomial pattern or another similar pattern. For instance, the experience of an entity that assigns share options to a wide category of employees could indicate that employees in the executive management tend to have more share options than the average level employees; in their turn they have these share options more than the low level employees; and in their turn they have these share options a longer time that any other group. Moreover, employees who were asked to have a minimum sum of capital instruments, including share options, on average, could exercise share options later than employees that are not the purpose of these provisions. Under these circumstances, the separation of share options on a group of beneficiaries with a relatively homogenous exercise behaviour will result in a more accurate estimation of the total fair value of assigned share options.

**Expected volatility**

Expected volatility is the sum for which a price is expected to fluctuate during a period. Determination of volatility used in the share option evaluation patterns is the surveyed average square deviation of compound profitability rates of shares over a period of time. Volatility is usually expressed in annual terms that are comparable regardless the period of time used in calculation, for instance comments of prices daily, weekly or monthly.

The profitability rate (that can be positive or negative) of a share for a period measures how much a shareholder received dividends and appreciation (depreciation) of the share price.

The expected annual volatility of shares is the range through which the compound annual profitability rate is expected to be located within the range concerned two thirds of the time. For example, let's say that a share with an expected profitability rate of 12% has a volatility of 30%, represents the probability that the share profitability rate for a year should be between -18% (12%-30%) and 42% (12%+30%) is approximately two thirds.

Therefore, if volatility is higher, the possibility of obtaining a higher income for the instrument concerned is increasingly higher.

Factors taken into consideration when estimating volatility consist of:

a) Volatility involved in transactions with share options of the entity or the other transactioned instruments that include elements of share options (for instance convertible bonds)

b) Historic volatility of share price during the most recent period that is generally suitable to the expected terms of share option (considering the contract life time of share option and effects of early exercise).

c) The time of entity's shares that have been transacted. A newly listed entity could have a high historic volatility compared to similar entities that have been quoted a longer period of time. For the new quoted entities additional recommendations are shown below.

d) The volatility tendency to come back to the previous state, id est the average level in the long term, and other factors that indicate that expected future volatility could differ compared to the high volatility. For instance, if the share price of an entity has been very volatile for a certain period of time due to a major restructuring or a failed merger,

that period could not be taken into consideration when calculating the average annual historic volatility.
e) Accurate ranges for price observation. The observation price should be consistent from one period to another. For example, an entity could use the closing price of every week or the highest price of the week, but it should not use the closing price for some weeks and the highest price for other weeks. Also, the observation price should be expressed in the same currency as the exercise price.

**Newly quoted entities**

An entity should consider historic volatility of the share price for the most recent period that is generally suitable to the expected share option time. If a newly quoted entity has no enough information about historic volatility, however it should calculate the historic volatility for the longest period for which the transaction activity is available. Also, historic volatility of similar entities could be considered. For example, an entity that has been quoted for only a year and assigns share warrants with an expected average life time of 5 years could consider the pattern and level of historic volatilities of entities in the same industry for the first six years wherein the shares of those companies have been transacted publicly.

**Non-quoted entities**

A non-quoted entity will not have historic information when estimating the expected volatility. Some factors that should be taken into consideration are shown below.

In some cases, an unquoted entity that issue regularly share options or shares to employees (or other third parties) could set a domestic market for its shares. Volatility of those shares could be considered when the expected volatility is estimated.

Alternatively, the entity could consider historic or involved volatility of similar quoted entities, for which information about the price of shares or share options are available, is used when the expected volatility is estimated. This could be suitable if the entity relied the value of its shares on the price of shares of the similar quoted entities.

If the entity does not rely the estimations of the share value on the price of shares of similar quoted entities, and used another methodology for the share evaluation, the entity could get an estimation of expected volatility consistent with the evaluation methodology. For instance, the entity could evaluate the shares based on the net assets or based on earnings. The expected volatility of the value of net assets or earnings could be considered.

**Expected dividends**

If expected dividends could be taken into consideration when the fair value of shares or assigned share options depend on the third party has the right to receive dividends or dividend equivalent.

For instance, if share options have been assigned to employees and they have the right to receive dividends related to backing shares or dividend equivalents (that could be paid in cash or applied to reduce the exercise price) between the date of assignment and date of exercise, the assigned share options should be evaluated as if dividends for backing shares will not be paid, id est input for expected dividends will be zero.

Similarly, when the date of assignment as regards the fair value of shares assigned to employees is estimated, any adjustment for expected dividends is not required if employees have the right to receive dividends paid during the period entitled to receive benefits.

Therefore, if employees have not the right to receive dividends during the period entitled to receive benefits (or before the exercise, in case of a share option), evaluation of rights at the assignment date, related to shares or share options should take into consideration the expected dividends. When the fair value of an assigned share option is estimated, the expected dividends should be included in the application of a

share option evaluation pattern. When the fair value of assigned shares is estimated, that evaluation should be reduced to the present value of dividends expected to be paid during the right period to receive benefits.

Generally speaking, the share option evaluation patterns require the expected dividend efficiency. However, the patterns can be changed so as they rather use the sum of expected dividend than efficiency. An entity could use both the expected efficiency or expected payments. If the entity uses the latter version, it should consider the historic pattern of rising the dividends.

Generally speaking, the assumption about expected dividends should rely on the publicly available information. An entity that does not pay dividends and that has no plans to do so should assume an expected dividend efficiency of zero. However, an entity that merges that has no dividend payment history could expect to start paying the dividends during the time of waiting the employees' share options. Those entities could use an average of previous dividend efficiency (zero) and the dividend efficiency of a suitable comparable group.

**Risk free interest rate**

The risk free interest rate is usually the current involved efficiency of the issues of zero coupon governmental bonds in the currency of the country wherein the exercise price is expressed, with a term equal to that expected of the share option that is evaluated (being based on the remained contract duration of share option and considering the effects of early exercise). The use of a suitable substitute could be required, if there are no issues of governmental bonds or circumstances that indicate that the involved efficiency of zero coupon issues is not representative for the risk free interest rate (for instance inflationary economies). Also, a suitable substitute could be used if participants on the market could determine the risk free interest rate using the substitute concerned, rather than the efficiency of the issues of zero coupon governmental bonds, when the fair value of share option is estimated with a duration equal to the expected term of share option being evaluated.

In conclusion, the adoption of IFRS 2 requires the selection of some new accounting policies related to the evaluation of share based payments, thus:

| **Elements** | **Accounting policies** |
|---|---|
| Evaluation pattern | Black-Scholes-Merton, binomial pattern |
| Current price of shares | The closing price on the assignment date, average course of day on the assignment date, week average for the period when assignment has been carried out |
| Expected volatility | There are different calculation methods of this sum (based on historic experience, implicit volatility or both) |
| Expected dividends | The entity can choose between different methods: based on previous experience, expected future dividends, experience of competitors, or a combination of these methods |
| Risk free interest rate | Similarly with the determination of the current price per share, an entity should set the way of obtaining this rate |

In conclusion, the shares assigned to employees will be evaluated by reference to the market price of the company's shares or to an estimated price in case of unquoted entities, adjusted according to the terms and requirements of share assignment, except the requirements of coming into their own. If within the period of meeting the requirements for coming into their own, the shares do not give the right to dividends, this issue will be taken into account when calculating their fair value. The issue of share options assigned to employees is even more complicated as regards evaluation because of inexistence of some similar marketable share options as those assigned to employees are subject to certain terms and thus some similar ones cannot be found on the market.

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