

The usage of the black scholes modules on the stock market

[Business](#), [Work](#)



The Black Scholes model is a mathematical model of financial markets used to calculate how the value of financial instruments in the market varies over time. The model is instrumental in calculating the European Call Option. The model assumes that the financial instrument provides no dividends over its course of life and that, those highly valued financial assets have a constant drift and volatility in the financial market. On stock option application, the model illustrates the time value of money with its constant variation of the price while taking into consideration the expiry date of the option as well as its strike price. The international financial and accounting standards recognizes the Black Scholes Model in share valuation and compensation.

Description

The formula of the Black Scholes Model is given as :

Where V = Current value of option with time t until expiry date.

P = Current price of the underlying stock

$N(d1)$ = Probability that a deviation less than $d1$ will occur in a standard normal distribution. $N(d1)$ and $N(d2)$ represent areas under a standard normal distribution function.

X = is the exercise price of the option

e = is exponential function ≈ 2.7183

KRF = is the risk-free interest rates

t = time until the option expires (the option period)

$\ln P/X$ = natural logarithm of P/X

δ^2 = Variance of the rate of return on the stock

The Model thus can be said to be a function of the stock price (P), the option time until the expiry date (t), the exercise price of the option (X), the variance of the underlying stock in the financial market (δ^2) as well as the risk free rate of the stock (KRF).

On Corporate Financial Reporting

International standards sets the principles and guidelines on how financial markets are valued, compensation done and reported. The International Financial Reporting Standard (IFRS) No. 13 Fair Value Measurement (2011), The Statement of Financial Accounting Standards (IFRS) No. 123 Revised (2004) Share-Based Payment, as well as The International Financial Reporting Standard (IFRS) No. 2 Share-based Payment (2004) are the leading guidelines offering the basis for evaluation and reporting. However, the US GAAP (Generally Accepted Accounting Principles) differs with the IFRS principles on fair value measurement. Aboody et al (2006) explains that the difference comes from the fact the US GAAP provides a limited scope of valuation and reporting unlike the IFRS which is principled based.

The Black Scholes Model provides the company with the cost and all the expenses, both directly and indirectly of granting an option. The International Financial Reporting Standard No. 2 recognized and explains the valuation costs of the company granting the options; and how it must be expensed. However, as noted by Murphy and Hall (2002), the company must

differentiate between the cost being met by the firm and the value of the executive. He notes that “ for financial 7 accounting purposes, what should matter is the company’s cost of granting an option (which is given under the model) not the value of the option to the executive recipient” (Hall and Murphy 2002, 15).

Stocks in the financial markets are known to ever change; ever changing forfeiture rates and or late/early exercise of the options. The Black Scholes model however gives such consideration when calculating the fair value of the options. The model thus is in line with the requirements of IFRS 2 and The Statement of Financial Accounting Standards (SFAS) No. 123R which explicitly requires that the company considers the market prices in initially despite the varying terms and conditions of various options. The Black Scholes Model comes in estimating this “ initial” price, and as provided by IFRS No 2 (2004, B5), “ the entity shall consider factors that knowledgeable, willing market participants would consider in selecting the option pricing model to apply.”

The Black Scholes Model have in the recent past been used in the valuation of the Employee Stock Options. The Model parameters provides a going concern considerations in all its components; the volatility rate with risk free interest rate as well as the yields of the dividends within a given priod of time until its expiry. The International Standards, both IFRS and SFAS did not provide how valuation of the options are done but rather focused on whether the employee options’ costs were to be met by the company or not.

According to Marquardt (2002), the Black Scholes Model provides the best

estimates in valuing the options being granted to employees and thus has been instrumental in reporting in the financial statements of the company issuing.

The use of the Black Scholes Model is critical in share dilution and its impact to the company. The model is used in the valuation of the options; and where new options are granted, considerations on the impact of the capital structure of the company is first studied and evaluated. New options tends to dilute the share-control of the existing stakeholders. The model thus chips in to give fair valuation and thus no negative impact of the capital structure of the company. This is supported by the International Financial Reporting Standard (IFRS) No. 123R which notes that “ For public entities, the [IASB] Board expects that situations in which such a separate adjustment [for the potential dilutive effect] is needed will be rare”.

One of the assumptions of the Black Scholes model is the exercising of the option in its expiry date. This provides an avenue of trading, compensation and reporting of the non-traded share issues which are only redeemable when matured. The model however can give a higher price valuation on the same. To counter this overvaluation, the Financial Reporting Standards requires the use of average option life issued during the previous financial years to give the an approximate expected life of an option being granted. While non-tradability of the options can results in disadvantage to the company, Cronqvist and Nilsson (2005) argues that the valuation is solely on the worth of the company and not on stakeholders.

One of the parameters of the Black Scholes Model is the variance of the rate of return of the stock option. The model recognizes the volatility nature in the financial markets. The model provides best estimation based on implied volatility. However, both International Financial Reporting Standard (IFRS) No. 2 and The Statement of Financial Accounting Standards (SFAS) No. 123R, requires the use of either historical volatility or implied volatility. Where differences are material over the years, justification of the same should be provided to support the statement.

The Employee Stock Options can be valued using the standard stock options or the Black Scholes Model. Even though both models can provide estimated values, the Black Scholes model gives an upper due to the longer expiry times of the Employee Stock Options than the standard stock options. The difference in the expiry time of Employee Stock Option vis-a-vis the standard stock option leads to difficulty in estimating the variation. Using the Black Scholes Model can however result in overcharging of the costs of the Employee Stock Options.

The Black scholes Model has therefore impacted the reporting element especially on shares valuation across the financial markets. While international standards such as International Financial Reporting Standard (IFRS), The Statement of Financial Accounting Standards (SFAS) and US Generally Accepted Accounting Principles (US GAAP) provides guidelines and principles basis for valuation and reporting, the Black Scholes Model provides a more elaborative, flexible and easier way to value stocks and options while considering the financial dynamics of the market.

Further impact of the Black Scholes Model on corporate financial reporting can be done by relaxing its assumptions. Say, suppose the company introduces the transactions costs, will it affect the company's capital structure and its reporting element? If the dividends are given by the company on the underlying options, the impact on the capital structure of the firm will be seen.