

Option Expensing Alert

Model Overview



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Background

In what the Wall Street Journal called “among the most far reaching steps FASB has made in its 30 year history,” on June 15, 2005, FAS 123R took effect, requiring companies to account for employee stock option grants as an expense for fiscal years beginning on or after that date. FAS 123R eliminates the choice formerly available under FAS 123 for companies to use the APB 25 intrinsic value method and mandates fair value expensing with very limited exceptions. The formerly available intrinsic value method results in no compensation expense, as options are typically issued at the money with zero intrinsic value.

These new disclosures, while intended to improve the visibility of option-related compensation expense, also give companies a great deal of leeway in determining the value of options. Companies can choose which model to use (Black-Scholes, binomial lattice, Monte Carlo) and, equally importantly, the values for critical input parameters to the chosen valuation model: volatility, risk-free interest rate, dividend yield and option term length. The flexibility of these choices, together with their interactions within the complex fair-value models, demand that investors critically evaluate the option valuation and accounting assumptions that companies adopt under FAS 123R.

Analysts must pay close attention to the option pricing model assumptions for companies with a significant option expense. One way to evaluate the quality of these assumptions is to apply a standard methodology for developing assumptions and apply them to a standard option pricing model. By comparing the disclosed option expense to an expense developed through a standard model and assumptions, an analyst can assess the extent to which a company may be making aggressive (or conservative) assumptions in determining option value.

ISS' Options Expensing Valuation Model

The ISS Options Expensing Alert is based upon a Hull-White lattice model. This model is being used for a number of reasons.

1. The model explicitly assumes suboptimal early exercise (the tendency for employees to exercise their vested options prior to the options' contractual maturity), the most salient feature of employee stock options.

Suboptimal early exercise can happen for several reasons. Typically an employee must exercise vested options prior to termination of employment to avoid forfeiture. Empirical studies of option exercise behavior indicate employees often follow an exercise strategy whereby they exercise vested options once the company's stock price reaches a certain multiple of strike price. Thus, the true value of an ESO once it has vested is determined by (a) the exercise strategy of the employee and (b) the possibility that the employee may be forced to exercise the ESO early or forfeit it because he or she leaves the company.

Accordingly, an option-pricing model which incorporates assumptions concerning suboptimal early exercise should yield a better estimate of an employee stock option's “true” value. The Black-Scholes formula, which cannot be modified to accommodate real-life conditions such as suboptimal

early exercise, is insufficient and inappropriately applied when it comes to valuing employee stock options. Only a lattice model (for example, a binomial or trinomial model), with its flexible nature, can be customized/programmed to include assumptions concerning suboptimal early exercise, vesting, and other exotic contingencies.

2. In contrast to the Black-Scholes formula, a lattice model can be designed to accommodate dynamic assumptions of expected volatility and dividends over the option's contractual term, and estimates of expected option exercise patterns during the option's contractual term, including the effect of blackout periods.

As such, the design of a lattice model more fully reflects the substantive characteristics of a particular employee share option or similar instrument. Regardless of the valuation technique or model selected, an entity shall develop reasonable and supportable estimates for each assumption used in the model, including the employee share option or similar instrument's expected term, taking into account both the contractual term of the option and the effects of employees' expected exercise and post-vesting employment termination behavior.

A lattice model can accommodate estimates of employees' option exercise patterns and post-vesting employment termination during the option's contractual term, and thereby can more fully reflect the effect of those factors than can an estimate developed using a closed-form model and a single weighted-average expected life of the options.

3. The Hull-White lattice model is superior to the Black-Scholes formula and the standard lattice model.

Following are some of the ways that the Hull-White lattice model is preferable for options valuation that alternative models:

- It explicitly incorporates the employee's early exercise strategy – its does this by assuming that exercise occurs when the stock price is a certain multiple of the exercise price during the post-vesting period.
- It explicitly considers the possibility that the employee will leave the company after the vesting period – it does this by assuming a certain rate of employee turnover during the post-vesting period. The employee turnover rate can be directly estimated from historical data on employee turnovers for the category of option holders being considered. The early exercise multiple can should be set equal to the average ratio of the stock price to the exercise price when employees have historically voluntarily exercised their options.
- The standard Cox, Ross, Rubenstein binomial model has been customized to incorporate the aforementioned assumptions of post-vesting exercise behavior and employee turnover to accurately value employee stock options. The binomial lattice is constructed in the usual way. The rules for calculating the value of the option at each node in the binomial lattice are as follows:
 - Prior to vesting, the option cannot be exercised.
 - At each post-vesting node where the underlying stock price is at least M times the exercise price, the option is immediately exercised.

- At each post-vesting node there is a probability p that the option will terminate – the option is immediately exercised if it is in the money and forfeited if it is out of the money.

4. **The Hull-White model fully meets the requirements for valuing options under FAS 123R.**

FASB's preference for such a model is evident throughout FAS 123R. In fact it has become a de facto standard for IFRS 2 and FASB 123R compliant ESO valuation due to its strong theoretical basis and the ease of estimating the various inputs required.

ISS' Assumption Methodology

ISS applies a standard methodology to develop each input parameter for the Hull-White model. Following is the rationale for our method for each key input parameter:

1. **Volatility** - The company's historical stock price volatility used in ISS' fair value calculation for options granted during the most recent fiscal period. Historical volatility is calculated as the square root of the average squared daily stock price return over the most recent four-year period. Historical volatility is annualized by multiplying by the square root of 252, the approximate number of trading days per year.
2. **Dividend Yield** - The company's disclosed dividend yield used in ISS' fair value calculation for options granted during the most recent fiscal period. ISS' model uses the company's disclosed dividend yield and assumes that the yield remains constant over the course of the option's term.
3. **Risk-Free Interest Rate** - The current constant-maturity yield on U.S. Treasury notes most closely matching the term length of employee stock options (generally between 4.5% and 5%). ISS' model assumes a constant risk-free rate over the course of the option's term.
4. **Suboptimal Exercise Factor** – The stock price-to-exercise price ratio at which suboptimal early option exercise is assumed, generally between 1.5 and 3. Empirical data from actual exercise patterns at S&P 1500 companies indicate a median price ratio for exercise of 2.0, which is the ISS assumption applied in the Options Expensing Alert.

ISS' Options Expensing Alert is intended to provide a consistent methodology for reviewing the assumptions that the companies in the coverage universe have used in implementing options expensing and, using a SFAS 123R/SAB 107 compliant valuation methodology, potential valuation implications associated with a company's options expensing methods. The Alert does not, and is not intended to, provide an opinion as to the merits of any covered company's options expensing methods. In no way should the contents herein be interpreted as an indication of ISS' likely vote recommendation on any particular situation.