Employee Stock Option Expense

Reporting Trends under FAS 123R

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Background

In December 2004, the Financial Accounting Standards Board (FASB) revised its requirements for how U.S. companies account for the expense of employee stock option grants. No longer could companies report the options' intrinsic value – which, since options typically had a strike price equal to the closing price of the underlying share on the day of the grant, was typically zero. For fiscal years beginning after June 15, 2005, companies are required to report the fair value of option grants as a compensation expense, one which drops directly to the bottom line as a charge against net income.

The intention behind this far-reaching policy change is clear. Companies will improve disclosure and reflect option expense on the income statement for what it is: a compensation cost. While this information had typically been available in the footnotes, this enhanced disclosure increases transparency and gives investors a better sense of the economic impact of option grants within GAAP financials. It also raises the stakes for companies, who will attend very closely to their calculation of option values, their effects on earnings, and the reaction of investors.

Valuing Options

Fair value estimates for options, like all derivatives, are ideally market-driven. The fair value of an option is the price that a buyer and seller would agree upon in a liquid and open market. Employee stock options, however, are difficult, if not impossible, to value by market mechanisms, primarily because they are in almost all cases nonmarketable. In addition, they typically vest over a period of years, making them unexerciseable for significant portions of the contract length. Employees also typically must exercise (or forfeit) options upon terminating employment with the granting company.

In response to this need, some companies are attempting to create markets for their employee stock options. Zions Bancorporation, for instance, has developed a class of securities (ESOARS) that mimic the returns actually realized by employee recipients of stock option grants. By selling these securities to investors, a company can establish a market value for the option grant. The SEC has given preliminary approval to using these prices in valuing employee stock options. From a different angle, Google, in its typically innovative fashion, has simply made its newly granted non-executive stock options transferable.

For the most part, however, companies must calculate values for stock option grants using financial models. These standard models require several input assumptions, key among them an estimate of the underlying share price's future volatility. But more importantly, the same problems that bedevil market valuation of employee stock options – nonmarketability, vesting periods, forced exercise and forfeitures – pose significant challenges for model-driven valuation. While option theory dictates that options should almost always be held to expiration, the reality of employee behavior is otherwise: employees exercise early due to termination, tax considerations, or beliefs about future returns, and employees forfeit unvested shares. Any pricing model must account for these special features of employee options, either by including them in the model or making adjustments to key assumptions.

Together, these features leave companies with much flexibility in the calculation of option prices. A company chooses among different pricing models. It estimates future share price volatility and has much flexibility in methods to do so. It attempts to adjust for the particular features of employee stock options – and if it uses the Black-Scholes pricing model, all these adjustments are lumped together into a single assumption about the expected term of the options. This is, needless to say, a difficult estimate to make, as historical experience provides almost no insight into this estimate. The SEC's gives some indication of this difficulty in SAB 107, where it offers a simplistic "plain vanilla" formula.[1]

Lattice models, such as the Hull-White option model, allow these different characteristics to be modeled separately with explicit and easier-to-estimate assumptions (see Table 1).

Table 1. Pricing models handle employee stock option characteristics differently

	Model	
Employee Option Characteristic	**Black-Scholes**	**Hull-White/Lattice**
Options are not exerciseable during vesting period	Adjust expected term assumption	Explicitly modeled through vesting assumption
Stock-price-driven early employee exercise	Adjust expected term assumption	Explicitly modeled through exercise multiple
Employee turnover after vesting period	Adjust expected term assumption	Explicitly modeled as early exercise

Transparency and improved disclosure is the goal of FAS 123R. But all this flexibility leaves an investor in an unusual situation: two companies with nearly identical characteristics (size, stock price volatility, industry sector, employee base) might make exactly the same stock option grants, making the economic value of the grants equal. But these companies would have enough leeway in choosing a valuation model and assumptions that they could end up calculating very different values. How can an investor make comparisons between these two companies? Better disclosure has not yielded complete transparency.

Standardizing Options Expense

To get a better sense of the scope of this problem, ISS has collected some of the first mandatory disclosures under FAS 123R, a sample of 36 companies with fiscal year end dates from August-October, 2006. We have also developed a standardized methodology for calculating stock option values, based on the FAS-preferred Hull-White lattice model that explicitly accounts for suboptimal employee exercise patterns, and option exercise and forfeitures due to pre- and post-vesting employee termination. ISS has also developed standard model inputs: a uniform risk-free rate assumption and the consistent use of historical volatility with the same look-back period for all companies. ISS does not use implied volatility from market-traded options due to serious limitations, most notably the vastly different option expiration periods (market options rarely trade more than two years out, where employee options expire in 7-10 years). [2]

[1] SEC Staff Accounting Bulletin No. 107, retrieved from http://www.sec.gov/interps/account/sab107.pdf.

[2] See ISS' "Option Expensing Alert Model Overview" at http://www.issproxy.com/institutional/oea.jsp.

By using a consistent model and assumptions, ISS is able to calculate an adjusted stock option expense that is directly comparable across companies, and also re-calculate company earnings per share based on this expense. These data also allow us to analyze how companies, in aggregate, are valuing stock options and identify some patterns of behavior that investors may find useful in their decision-making processes.

Initial analysis of these data indicates that companies are consistently, and in some cases significantly, understating the expense of employee stock options, even under the new accounting regulations. 89% of companies in our sample reported option values lower than our adjusted value. The average company's reported value was 29% lower than the adjusted value; when the handful of companies reporting higher option values are excluded, the average disclosed option value was 33% lower than the adjusted value. The ratio of the reported and adjusted values – the adjusted price differential – varies significantly across the sample, however: adjusted values range from 84% higher than reported value all the way down to 7% lower than reported.

The financial impact of these understatements is nontrivial. Using ISS' option values derived from the Hull-White model, we recalculated net income and EPS to determine an adjusted EPS. We found that the average company's reported EPS is 2.3% higher than our adjusted EPS. Here, too, there is much variation, with corrections ranging from 30% downward to 5% upward.

Model Choice and Model Inputs

Why are ISS' values higher than company-reported values? Despite considerable discussion of volatility by both FASB and the SEC, we are not seeing significant deviations, in aggregate, between company volatility assumptions and historical volatility. In our sample, the average volatility assumption made by companies is almost identical to the average historical volatility experienced, and companies were equally likely to estimate a higher-than-historical volatility (which would yield a higher option expense) as to estimate a lower-than-historical volatility. The average size of the difference between the estimated and historical volatility was relatively small in any event, at 3.62%.

Table 2. Volatility estimates

	# of companies	Average difference between historical and estimated volatility
Estimate higher than historical	21	3.92%
Estimate lower than historical	15	3.40%
Total	36	3.62%

We did find a meaningful correlation between the size and direction of ISS' adjustment to option value and the ratio of reported and historical volatility (r =.56). That is, the deviations that companies are making away from historical volatility are having a meaningful impact on the option values they calculate. For the sample as a whole, however, these deviations of company's volatility assumptions from historical volatility are about as likely to result in higher as lower option value.

Much of the protest in 2004 and 2005 against expensing stock options was directed at the most commonly used option model, the Black-Scholes model, which in unmodified form significantly overstates the value of employee stock options. It might come as a bit of a surprise, then, to find that nearly three quarters of the 36 companies in the sample are still using Black-Scholes to calculate option expense. This choice is more understandable, however, when we realize that companies are able to adjust the expected term of the options to account for employee stock options' distinguishing characteristics (vesting periods, nonmarketability and suboptimal exercise behavior). The average company's expected term for option grants is 56% of the contractual term length, which pushes the option values down significantly.

What, then, is driving the difference between companies' reported and the ISS-adjusted option values? It comes down mainly to model choice. Recall that while the Hull-White model used by ISS makes empirically verifiable assumptions for each the distinguishing features of employee stock options (suboptimal exercise behavior, post-vesting termination, vesting periods), the Black-Scholes model requires that all these assumptions be lumped into an opaque, hard-to-estimate "expected term" assumption.

The effects of model choice, therefore, can be assessed by analyzing the relationship between companies' expected term assumptions and the "adjusted option differential" (the ratio of disclosed value to the ISS' Hull-White value). We approached this in several ways. First, we calculated the ratio of companies' expected term to the contractual term, to get a sense of the relative magnitude of companies' term length adjustments. This term length ratio is strongly correlated (r = .65) with the adjusted option differential. Not unsurprisingly, we also found low (but non-zero) correlation (r = -.11) between the term length ratio adjustment and difference between reported and historical volatility, indicating that companies' deviations from from historical volatility and downward term length have a nearly independent effect on the adjusted option differential.

Together, this suggests that the relative effects of the two deviations on valuation can be estimated. A regression of the adjusted option differential against standardized ratios of historical to reported volatility and expected to contractual term (see Table 3) indicates that a one standard-deviation variation in term length assumption has approximately 20% greater impact on the adjusted option differential than would a one-standard-deviation variation in the volatility.

Table 3. Regression results for term length and volatility effect on

Parameter	**Coefficient**	**t-stat**	**p-value**
Intercept	0		
Ratio of expected to contractual term length	0.593735	5.955094	9.85E-07
Ratio of reported to historical volatility	-0.49953	-5.01024	1.67E-05
Adjusted R Square	0.626707		
p-value	<1E-08		

It is entirely appropriate that companies adjust expected term length downward – they must reflect the reality of employee stock options. But investors should pay close attention to the scale of this adjustment – of the input variables into the commonly used Black-Scholes model, term length has the most impact on the final value estimation, larger than the effect of volatility (our analysis of risk-free rate and dividend yield assumptions showed minimal incremental impact on the adjusted option differential).

Conclusions

These results indicate that institutional investors must pay special attention to the series of assumptions that companies are making in their expected option term length disclosure. Not only does this assumption propagate across other assumptions (defining time period for volatility, risk-free rate, and dividend yield assumptions, for example), but the number itself is opaque, difficult to estimate directly and not particularly amenable to historical estimation methods. Binomial and trinomial lattice models, such as the Hull-White model, offer far better transparency into the most important model inputs and their impact on option value.

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.