

Taking Stock of Option Expensing

EMPLOYEE STOCK OPTIONS (ESOs) have always had a value, but until recently the accounting cost for the most commonly issued ESOs was \$0. New accounting standards requiring a non-zero expense for ESOs in the profit and loss statement (P&L) have raised the bar for ESO valuation. Actuaries have the skills and experience to help companies clear this new hurdle.

Traditional accounting for plain-vanilla ESOs was very favorable to the issuing companies. For this flavor of ESO, the compensation expense was measured as of the date the grant was made, with the expense calculated as the excess of the stock's market price over the option's exercise price. As plain-vanilla ESOs typically had an exercise price equal to the market price on the grant date, the difference, and the resulting compensation expense, was \$0. Not surprisingly, due to this special accounting treatment, the plain-vanilla ESO was an extremely popular compensation device.

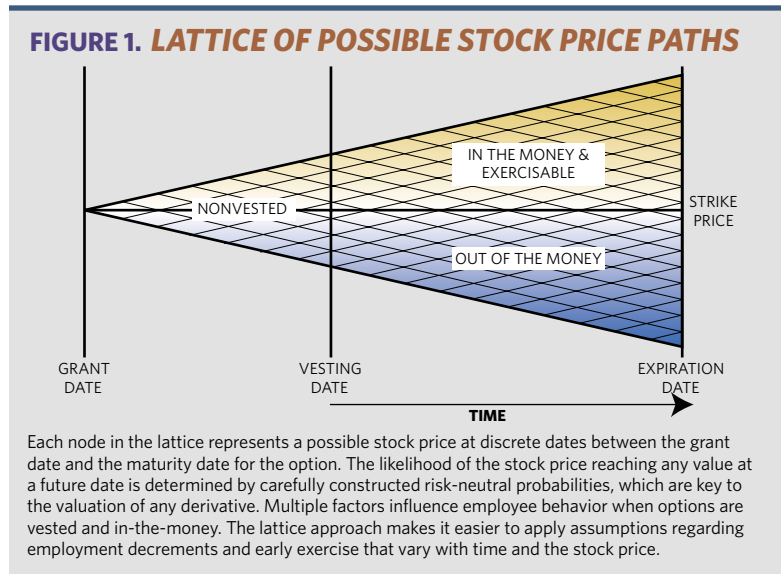
Two years ago in these pages ("Breaking Into the Black-Scholes Black Box," March/April 2003), when the international accounting standard for ESOs was in the exposure draft stage and the Financial Accounting Standards Board (FASB) had just added an ESO accounting project to its agenda, Paul Carrett and Keith Martland, two Australian actuaries, sounded a wake-up call to the actuarial profession. Improved disclosure of ESOs was coming, and actuaries could assist issuing companies by doing what we do best—developing and applying mathematically rigorous and auditable valuation methodologies. The Institute of Actuaries of Australia issued Guidance Note 510: Valuation of Share Based Payments in July 2003 to assist actuaries working in the area.

The New Standards

Fast-forward two years to 2005. The accounting standards setters have finalized their standards. The International Accounting Standards Board (IASB) released International Financial Reporting Standard No. 2, Share-Based Payment (IFRS2), in February 2004. IFRS2 required companies to

recognize a cost for ESOs in the profit-and-loss statement, based on a fair value methodology, effective for annual reporting periods beginning after Jan. 1, 2005.

After a deliberation period featuring significant protest from many ESO-issuing companies and legislative efforts to preclude a new standard, FASB issued Statement of Financial Accounting Standard No. 123 (revised 2004), Share-Based Payment (FAS123R), in December 2004, requiring companies to recognize a fair value expense for ESOs in the first interim reporting period beginning after June 15, 2005.



A subsequent extension by the Securities and Exchange Commission (SEC) delayed the required implementation of ESO expensing under FAS123R until the first interim reporting period of the first *fiscal year* beginning after June 15, 2005, providing calendar-year filers with a six-month reprieve.

During this time, the Academy formed the Employee Stock Options Task Force. The task force met with representatives of FASB and the SEC to discuss the actuarial profession's role in ESO valuation. The task force also spread the word to the profession through webcasts and break-

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out sessions at conferences. As of October 2005, the task force had completed a draft practice note on ESO valuation that is currently undergoing internal review.

The Valuation Models

Generally, under the accounting guidelines, the fair value of an ESO grant is measured as of the date of issuance, with the result then adjusted for expected pre-vesting forfeitures and recognized as compensation cost over the period from the date of issuance to the date of vesting. While FASB's March 2004 exposure draft had expressed a preference for the use of a lattice-based approach for ESO valuation in place of the Black-Scholes-Merton formula (BSM), FAS123R doesn't mandate the valuation model to be used. This allows actuaries and other financial and mathematical professionals to continue developing valuation methodology.

Companies have been required to cal-

culate ESO fair values for footnote disclosure since the issuance of the original FAS123 in 1995 and have applied BSM almost to the exclusion of other valuation methods. In some ways, using BSM for ESO valuation is like trying to fit a square peg into a round hole, but industry practice has developed around this method due to expedience. Only recently has the phrase "binomial model" (a subset of the family of lattice-based models) really worked its way into the popular ESO lexicon.

Model selection is only one piece of the puzzle. A focus on model selection without an equally rigorous focus on the assumption-setting process misses the point. Both BSM and binomial models are based on the same mathematical underpinnings, and under the same set of simplified assumptions, both models will resolve to the same answer. The extra utility of the binomial model comes from its ability to incorporate

assumptions that vary with time and stock price. (See the text box below for more details on common valuation models.)

Both types of models require substantial analysis in the assumption-setting process in order to provide justifiable results. The enhanced focus on assumptions and on the additional resources necessary for data collection is likely to be a more significant change for many companies, making the transition from BSM to a lattice-based model seem like a non-event.

The Assumptions

While FAS123R doesn't mandate which option valuation model should be used, the following variables must be included in the option valuation: exercise price, market price, expected volatility, expected life, expected dividends, and risk-free interest rates. (See the text box below for definitions of these required inputs.)

SUPER MODELS

Three of the most common models likely to be used in ESO valuation are the closed-form Black-Scholes-Merton formula, the open-form lattice (binomial) model, and Monte Carlo-type simulations.

► BLACK-SCHOLES

The Black-Scholes-Merton formula was first published in 1973, when computers were slower and less prevalent than they are today. Its basic formula consists of two terms that describe:

- 1) the expected benefit of acquiring a stock outright, and
- 2) the present value of paying the exercise price at the expiration date.

The fair value of the option is determined by subtracting the second term from the first.

Because the original formula was developed to value exchange-traded European options, some

ESO features violated implicit assumptions of the formula, requiring modifications to value ESOs. This model, for example, does not allow for the explicit recognition of some time-oriented characteristics of ESOs. The early exercise of an option was typically accounted for by making an ad hoc reduction of the option term to an "expected life," which was then used as a formula input.

► LATTICE MODELS

Sometimes referred to as binomial models (which are actually a subset of the family of lattice models), this family of option pricing models can explicitly accommodate time-oriented features, such as vesting restrictions and early exercise behavior, that are typically found in ESOs.

Intrinsic value and remaining time value are calculated at each node along a lattice of potential stock price paths (see Fig. 1), and

discounted subject to vesting and early exercise conditions to determine the grant-date fair value of the option.

Because the model develops values at each time step, economic assumptions such as volatility and the risk-free rate of return can be assumed to vary through time. Lattice models can also be modified explicitly to value performance-based ESO features. At the other extreme, if all assumptions are simplified to those used in the Black-Scholes-Merton formula, both models will yield the same fair value.

► MONTE CARLO SIMULATIONS

Under Monte Carlo techniques, a large number of simulations (often greater than 1,000) of market price evolution scenarios for the underlying stock are developed over future exercise periods to provide estimates of the possible value of the option at different points.

The use of such simulations allows for the modeling of a broad range of performance conditions and provides a greater degree of flexibility when valuing complex ESO features or employee behaviors.

REQUIRED INPUTS

Dividends—expected dividends during the option term

Expected life—the expected time until exercise, forfeiture, or expiration of an option

Market price—the current price that a stock is trading for in the market at the date an option is granted

Risk-free rates—the interest rates used to discount potential future cash flows to the grant date

Exercise price—the amount an employee must pay to exercise the ESO

Volatility—a measure of the expected fluctuation in the market price of the stock

With the exception of expected volatility, each of these variables is known for traded stock options. Future dividends may be in question but typically can be forecast with a high degree of accuracy over the short life of a traded option. But as ESOs commonly have contractual terms of 10 years, long-term forecasts of both volatility and dividends are required. And, of course, many employees exercise their options long before the end of the contractual term. Reflecting this “suboptimal early exercise” behavior presents a real challenge to the valuation process.

When developing an assumption for volatility, the objective is to estimate the volatility assumption that marketplace participants would use to value the exchange price for the option. Unlike many of the popular short-term forecast volatility models used today, ESO pricing requires models that forecast the average volatility or the term structure of volatility for the next 10 years. FAS123R suggests that the expected volatility assumption be developed by looking at historical stock price volatility and, if applicable, the implied volatility extracted from prices of exchange-traded equity options on the company’s shares or convertible bonds issued by the company.

Implied volatility is the volatility assumption that forces an option-pricing model’s price equal to the observed market price. For companies whose stock has only recently been listed, the volatility assumption should be developed based on the historical and implied stock price volatility of other companies of the same industry, stage of life cycle, size, and degree of financial leverage.

The assumption for future dividends should be based on the company’s dividend policy and its historical pattern of dividend payments. Although average dividend yields are relatively low today (less than 2 percent for the S&P 500), their impact can be significant on the calculated value of options.

While some solid research exists on patterns of early exercise behavior, much more is needed. Research shows that employees tend to exercise in-the-money

options shortly after satisfying vesting requirements and are more likely to exercise the more the stock price moves above the exercise price.

An employee may exercise options early (if in-the-money) for many reasons. Some are related to employment status, such as termination or retirement. Pension actuaries are experienced with developing assumptions for changes to employment status. But an employee may also exercise options early for reasons of liquidity. The employee elects to take the money today and forgo any future upside potential provided by holding the option. This behavior is likely driven by several factors and requires a more complex model.

The first step is to gather extensive exercise data over different periods and economic environments, employee categories, industries, and stock price movements. The second step is to use this data to construct models to predict exercise behavior. Such models integrate assumptions about changes to employment status and liquidity preferences and share some of the features of mortgage prepayment models and models that predict insurance premium lapse rates.

We expect the actuarial profession to play a major role in developing the models and assumptions needed to estimate fair values for ESOs. In fact, the Employee Stock Options Task Force is in the initial stages of a project to develop a database of exercise experience.

What Options Do Companies Have?

As with most employee benefits that actuaries work with, long-term incentives such as ESOs have competing human resources and corporate finance issues. In the brave new world of FAS123R and IFRS2, we can expect that finance officers will heighten their scrutiny of these plans.

Newly public companies with a clean slate can structure long-term incentives and design specific programs to meet corporate goals without favoring one approach over another based on an accounting advantage. Existing companies with

long-standing programs will take a hard look at future ESO grants in response to the new accounting standards. Some likely reactions to the new ESO price tag include decreasing the size of future grants, restricting the eligible pool of employees, and adding performance hurdles to the plan design. While each of these actions can reduce the fair value underlying the accounting expense, each also carries competing human resources issues.

For companies looking to enhance employee/shareholder alignment, a seemingly logical approach involves the use of performance-based ESOs. Indeed, several companies have done so already. The vesting schedule can be tied to the achievement of predetermined objectives. In a more complex approach, the vesting schedule can be tied to one goal and the number of options can be tied to another. These hurdles reduce the fair value of the grant and help ensure that recipients aren’t the beneficiaries of equity market fluctuations that might not reflect real performance gains.

Strategic Planning

Companies will always need compensation tools that focus on sustained performance and value creation. Stock options can play this role in many situations, but ESO holders are not faced with the same value equation as shareholders, who face downside risk as well as upside potential. Now that all long-term incentive vehicles will generate a non-zero accounting expense, companies looking to align rewards programs tightly with shareholders may be more tempted than in the past to develop “blended” plans, using an array of compensation vehicles to achieve multiple objectives.

Actuaries enjoy a long history of helping companies reconcile the conflicting corporate finance and human resources issues inherent in many employee benefit plans. In concert with compensation professionals, actuaries can help companies design long-term incentive programs that focus on critical performance objectives and align the interests of employees and shareholders, while also considering the new accounting realities. ●