



*Relative Total Shareholder Return Programs are rapidly gaining ground among Fortune 1000 companies with more than 200 new plans since 2007*

## RADFORD ALERT

### Relative Total Shareholder Return Plans: Valuation 101

The economic crisis over the last year has seen the increased scrutiny of executive compensation programs, and rekindled discussion on the most appropriate form of long-term incentives, from stock options to time-based shares to shares tied to company performance.

One of the new fastest growing forms of employee equity are Relative Total Shareholder Return (TSR) programs, which are rapidly gaining ground among Fortune 1000 companies, as a means to drive superior performance and link performance to long-term financial rewards. See an updated list of companies who have adopted a Relative TSR program at [www.RelativeTSR.com](http://www.RelativeTSR.com).

In short, these programs deliver rewards based on the relative standing of an organization among its peers. With typical market practice, awards are generally granted at the beginning of a three-year period across a broad spectrum of employees. At the end of the period, the awards vest according to a schedule reflecting the organization's ranking within an established index or group of customized peers.

We believe that as your organization considers implementation of a Relative TSR plan and alternative designs, it is critical to understand the valuation and modeling techniques that will drive your Topic 718 (formerly FAS 123(R)) compensation expense.

#### Overview of Topic 718 Valuation

A performance share based on Relative TSR would be considered a market condition under Topic 718 since vesting is contingent on share price performance. Therefore, the effect of the market condition is reflected in the grant date fair value of the award. The most common technique used to value this complex instrument is a Monte Carlo simulation.

A Monte Carlo simulation model projects future stock prices for the granting company and its peers based upon a risk-neutral stock price framework (similar to the financial modeling used for other employee equity such as Black-Scholes or a binomial model). In fact, using identical assumptions, a Monte Carlo simulation would yield identical results to a Black-Scholes or binomial model. However, a Monte Carlo simulation allows for greater flexibility and customization of the assumptions and plan design parameters which is necessary to value a Relative TSR program

#### Assumptions

In addition to the Share Price and the length of the Performance Period, the valuation of a Relative TSR award needs to make assumptions such as Expected Volatility, Risk-Free Rate of Return, and Expected Dividend Yield.

**A performance share based on Relative TSR is considered a market condition, and requires Monte Carlo simulation**

Most companies are familiar with and have a methodology for setting these assumptions for the valuation of traditional time-based stock options. However, in valuing Relative TSR awards, industry best practice requires that future stock prices be simulated with respect to their correlations, and therefore require correlation coefficients. The remainder of this article summarizes the valuation considerations of Relative TSR awards.

**Expected Volatility** – Generally, the determination of expected volatility should be done using a consistent process as performed with other employee equity instruments under Topic 718, therefore using a combination of implied, historical, or peer volatility. However, one of the assumptions – the correlation coefficients (see below) – can only be determined through historical measurement. Therefore, we have a dilemma: should we use the traditional approach for expected volatility or do we use only historical volatility for this award? Most companies simply use historical volatility for these valuations.

One alternative approach would be to simulate two distinct price paths in the valuation. Use one stock price path for purposes of projecting the final stock price (based on your traditional Topic 718 approach: implied, peer, or other), and use a second price path for purposes of determining the relative rank against your peers (based on historical analysis consistent with your correlation coefficients).

**Risk-Free Rate** – Consistent with other instruments under Topic 718, the risk-free rate should be determined based on US Treasury zero-coupon yields over a period of time commensurate with the performance period. For entities based in jurisdictions outside the US, the risk-free interest rate is the implied yield currently available on zero-coupon government issues denominated in the currency of the market in which the share primarily trades.

**Expected Dividend Yield** – The modeling of stock price movements, considering the plan specific treatment of dividend payments during the performance period, can be challenging. There are two features that must be considered when modeling TSR plans.

The first feature is the calculation of the payout percentage. The most common way in which payout percentages are calculated is to assume that dividends are reinvested into each issuing entity as they are paid. This approach ensures that employees of companies that have high dividend yields are not unfairly punished due to dividend payments. Here, modeling is very straightforward. The assumption of a zero percent dividend yield accomplishes this and is mathematically equivalent to the assumption that dividends are reinvested as they are paid.

The second feature that must be considered is the payment, or lack of payment, of dividends that are paid during the performance period. Unless the plan states that dividends are to be paid in an identical manner as to how the payout percentages are calculated, a second price path should be generated for the granting company. The second price path should be used to calculate the final stock price in the simulation and should take into account the treatment of dividend equivalents during the performance period. If dividends are paid in cash as opposed to shares it must be considered a liability as specified by Topic 718. The liability should be tracked separately and marked to market at every reporting period.

**Correlation Coefficients** – Although there are many practical solutions to applying correlation coefficients into simulated stock prices, we believe that best practice in the Topic 718 industry has evolved using two approaches:

- 1) Cholesky decomposition<sup>1</sup> (a matrix of pair-wise correlation coefficients for each competitor) - In doing so, it requires building a matrix of correlation coefficients between each company in the simulation. For example, observe the matrix below where Company 1 is the issuing company of Relative TSR awards:

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<sup>1</sup> Cholesky decomposition is a decomposition of a symmetric, positive-definite matrix into the product of a lower triangular matrix and its conjugate transpose. Learn more at [http://en.wikipedia.org/wiki/Cholesky\\_decomposition](http://en.wikipedia.org/wiki/Cholesky_decomposition)

**The selection of appropriate peers has a real effect on the underlying Topic 718 valuation. Observe that the use of more tightly correlated peer companies creates lower Topic 718 valuations**

	Company 1	Company 2	Company 3	Company 4	Company 5
Company 1	1.00	0.80	0.70	0.60	0.50
Company 2	0.80	1.00	0.72	0.80	0.61
Company 3	0.70	0.72	1.00	0.67	0.63
Company 4	0.60	0.80	0.67	1.00	0.64
Company 5	0.50	0.61	0.63	0.64	1.00

2) Single correlation coefficients between the issuing company and each competitor with an appropriate base index:

	Index
Company 1	0.52
Company 2	0.50
Company 3	0.55
Company 4	0.60
Company 5	0.65

For practical considerations, the simulation time is prohibitive for situations with larger peer groups. As a general rule of thumb at Radford, we have built the standard of practice such that we apply the Cholesky approach when based upon 30 companies or less. If more than 30 companies need to be simulated, then we apply the more simplistic single Index correlation coefficient. For example, if the competitor group was each component of the S&P 500, we would need to calculate 124,750 distinct correlation coefficients or 500 Choose 2. It is easy to see how the administrative and practical considerations make the use of the Cholesky distribution prohibitive.

$$124,750 = \frac{500!}{2! \times 498!} = \frac{500 \times 499}{2!}$$

Generally speaking, the better the correlation coefficients (closer to 1.00), then the projected simulated payouts will have a more narrow distribution. The worse the correlation coefficient (closer to -1.00), the wider the distribution for the projected simulated payouts.

Further, if a wide distribution exists (worse correlation coefficients), then the valuation is going to increase, as there will be more variance in the payouts (more 0% payouts and also more 200% payouts). The effect of this causes a higher valuation, because the average of a 0% and a 200% more than offsets the effect of two separate 100% payouts.

**Illustration of Differences in Fair Values using a Zero Correlation as the Base Case**

All Companies Correlation Coefficients	Index Correlation Cumulative Decrease In Fair Value	Cholesky Pairwise Cumulative Decrease In Fair Value
0.0000	N/A	N/A
0.1000	-0.3%	-1.9%
0.2000	-0.6%	-3.8%
0.3000	-1.8%	-6.0%
0.4000	-2.7%	-7.8%
0.5000	-5.2%	-10.6%
0.6000	-6.9%	-13.4%
0.7000	-10.0%	-15.8%
0.8000	-13.8%	-19.5%
0.9000	-20.6%	-24.7%

***As a general rule of thumb at Radford, we have built the standard of practice such that we apply the Cholesky approach when based upon 30 comparators or less***

Two observations can quickly be seen from these results:

- (1) The more tightly correlated that the comparators are, then the *lower* the Topic 718 valuation; and
- (2) The use of the Cholesky decomposition will *lower* the Topic 718 valuation.

Please note that both of these observations are caused by creating simulations with a tighter distribution of simulated stock prices. Radford typically advises companies to establish a peer group that considers industry, revenue, market valuation and other factors, including correlations in stock price. The latter, while not a singular determining factor for peer group selection, is an important consideration prior to designing a Relative TSR plan.

### Summary

Relative TSR programs are quickly growing in popularity with more than 200 companies having incorporated Relative TSR into their incentive programs since 2007, including 26 in the Fortune 100. Notably the technology sector has seen Intel, Hewlett-Packard, Motorola, and Yahoo! all adopt Relative TSR plans in 2009 alone.

We believe that as your organization considers implementation of a Relative TSR plan and alternative designs, it is critical to understand the valuation and modeling techniques that will drive your Topic 718 compensation expense. The selection of appropriate peers have a powerful effect on the underlying Topic 718 valuations, and companies should consider the use of more advanced modeling techniques such as the Cholesky decomposition. One solution to help with the design of your Relative TSR plan is through the use of Radford's proprietary database and calculation tool **PeerPicker**, which sifts through more than 4,000 publicly traded companies to identify the companies that are most highly correlated by stock price. Learn more about the tool at [www.PeerPicker.com](http://www.PeerPicker.com)

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