

SHARE-BASED PAYMENT VALUATION RELATIVE TOTAL SHAREHOLDER RETURN PLANS

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INTRODUCTION

The economic crisis that started in 2008 resulted in an increased scrutiny of executive compensation programs, and generated discussion on the most appropriate form of long term incentives. The main objective of any executive compensation plan is to align compensation with shareholders' objectives while retaining and motivating the leadership team. The total shareholder return (TSR) plans offer a viable solution and their popularity is increasing significantly.

The total shareholder return (TSR) is used as a measure of the company's return of its own stock against the performance of its competitors over a given period of time. The TSR of the company (as compared to the TSRs of its competitors) is then used as the metric to determine whether vesting of the award is achieved and at what payout level. It should be noted that relative TSR eliminates both the "rising tide lifts all boats" effect and the "falling tide sinks all boats" effect, i.e., the award holder can realize value from the underlying award as long as the company outperforms its competitors (regardless of market conditions).

In 1995, in Great Britain, the Greenbury Report suggested that Remuneration Committees should consider "linking rewards to a company's performance compared with others in the sector and not rewarding Directors for sector-wide share price increases which have little to do with their own efforts." As a result, relative TSR plans have started to be applied in Europe, but they have recently grown in usage in the United States. According to a recently completed analysis by Equilar, 34 companies in the S&P 100 index used relative total shareholder return (TSR) metrics for their performance-based incentive plans in fiscal year 2008. This count includes plans with annual and multi-year performance periods and plans payable in cash or equity. Because in a volatile market it can be difficult for companies to identify absolute performance goals (e.g., where vesting is dependent on the company achieving a specified target stock price), relative TSR is likely to become a predominant long-term performance measure.



Among the benefits of TSR plans we mention the following:

- Focus executives and employees on how they impact the success of the company;
- Builds credibility with shareholders by ensuring that companies pay for the required performance;
- Realize pay-for-performance alignment;
- Maximize “return on reward investment.”

TSR COMPUTATION

Usually, the TSR plans define a Performance Start Date and a Performance End Date that are applicable to all companies. Most TSR plans evaluate the stock performance for each company during the time period from the Performance Start Date until the Performance End Date, using one of the following formulas:

$$\text{TSR} = \frac{\text{End Average Stock} - \text{Start Average Stock}}{\text{Start Average Stock}}$$

$$\text{TSR} = \frac{\text{End Average Stock} + \text{Dividends} - \text{Start Average Stock}}{\text{Start Average Stock}}$$

$$\text{TSR} = \frac{\text{End Average Stock (adjusted for reinvestments)} - \text{Start Average Stock (adjusted for reinvestments)}}{\text{Start Average Stock (adjusted for reinvestments)}}$$

In all cases, it is necessary to calculate the stock average value for a given time period (e.g., 10 business days) at the start and at the end of the performance period. In general, the End Average Stock value is computed based on the last business days ending with the Performance End Date. The Start Average Stock value is computed based on either:

- The first business days starting with the Performance Start Date; or
- The last business days ending with the Performance Start Date.

It should be noted that some TSR plans used the stock value, as opposed to the average stock value, at the start and end of the Performance period. However, this approach is not recommended by the ABI Guidelines on Policies and Practices (2009):

“4.9 The calculation of starting and finishing values for TSR should be made by reference to average share prices over a short period of time at the beginning and end of the performance period. Lengthy averaging periods should be avoided.”

The first TSR formula listed above does not take into account the effect of the potential dividend distributions during the Performance period. This may result in an underestimated stock performance. The other two TSR formulas listed above do account for the potential dividend distributions during the Performance period in order to achieve dividend protection. The TSR based on the last formula is not sensitive to the dividend distribution policy of any company.

The adjustment for reinvestments assumes that for each company we start with a portfolio containing one share of stock. Whenever there is a dividend distribution, the cash dividend is reinvested immediately in the underlying stock. The number of additional shares resulting from



this reinvestment is equal to the cash dividend divided by the underlying stock value on the dividend payment date. The adjusted stock average is the average of the portfolio values, not the average of the stock values.

If the different companies (for which TSR values are computed) are traded in different currencies, then the ABI Guidelines on Policies and Practices (2009) recommend the conversion of the stock values in the same currency:

“4.10 Where TSR is used as a performance criterion and the chosen comparator group includes companies listed in overseas markets, it is essential that TSR be measured on a consistent basis. The standard approach should be for a common currency to be used. Where there are compelling grounds for the calculation to be based on local currency TSR of comparator group companies, then the reasons for choosing this approach should be fully explained.”

PAYOFF

Usually, the TSR plans define the payoff on the Performance End Date as a function of the company ranking based on the TSR of the company as compared to the TSRs of its competitors. As an example we provide the payoff from Table 1.

Table 1: TSR plan payoff

Percentile Rank	Percent of Target Award Earned
Above 90%	300%
90%	300%
30%	0%
Below 30%	0%

Using the PERCENTRANK function of MS Excel, the “**Percentile Rank**” values are computed for all Peer Group companies based on their TSR values. The “**Percent of Target Award Earned**” is computed through linear interpolation for any “**Percentile Rank**” between 30% and 90%. The actual number of shares awarded will equal the “**Target Award**” times the applicable “**Percent of Target Award Earned**.”

In this example, if the company is ranked at the top (i.e., its “**Percentile Rank**” is above 90%) then the award holder will receive 300% of the Target shares awarded. However, if the company is ranked at the bottom (i.e., its “**Percentile Rank**” is below 30%) then the award holder will receive nothing. Similarly, if the company is ranked in the middle (i.e., its “**Percentile Rank**” is 50%) then the award holder will receive 100% of the Target shares awarded.

Usually, the earned shares are transferred to the award holder for a zero price.

An important feature of the design of TSR plans is the payment, or lack of payment, of dividends (that are paid during the Performance period). Some TSR plans do not pay any dividends distributed during the Performance period. Other TSR plans pay in cash for the dividends (for



the Target shares only) distributed during the Performance period independent of the company's performance.

In order to achieve full dividend protection, some TSR plans do not pay any cash to compensate for the dividends during the Performance period. Instead, a number of performance-contingent shares (equivalent to the value of the dividends) will be added to the award share balance when dividends are paid. Future share additions will be based on the growing account balance enhancing the potential of the award. At the end of the performance period, the award holder will receive the full balance of performance-contingent shares based on the company's TSR performance.

TSR AWARD FAIR VALUE

According to Accounting Standards Codification™ (ASC) 718 (formerly FAS 123R), a performance share based on relative TSR is considered a market condition because 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 based on Monte Carlo simulations. Straja (1997) provides details regarding the stochastic modeling of stock prices.

We simulate the stock paths using the risk-neutral approach (i.e., all stocks grow at the risk-free interest rate). The returns are simulated using Gaussian (i.e., normally distributed) correlated random numbers. Straja (2004) presents random number generators required for Monte Carlo simulations.

The stochastic model may be viewed as an extension of the usual deterministic model for which the rate of return (μ) is viewed as a constant value subjected to noise perturbations. Denoting by the σ stock volatility and by y the dividend yield, the return of S between now (time t) and a future time T is normally distributed with (Chriss 1997 page 99; Hull 1993 page 212):

- The mean equal to $(\mu - y - \sigma^2/2)(T-t)$; and
- The standard deviation equal to $\sigma (T-t)^{1/2}$.

For a single stock, the simulated stock value is:

$$S(T) = S(t) * \exp[(\mu - y - \sigma^2/2)(T-t) + \varepsilon \sigma (T-t)^{1/2}]$$

In the above equation ε is an uncorrelated random number normally distributed with mean equal to zero and standard deviation equal to one.

For **correlated** stocks we must take into account the correlation matrix of the rates of return of those stocks. Using the Cholesky factorization (Jorion 1997 page 242) the correlation matrix R is factored as:

$$R = T * T'$$

In the above equation T is a lower triangular matrix with zeros on the upper right side, and T' is



the transpose of \mathbf{T} . As in the case of uncorrelated stocks, first we generate uncorrelated random numbers normally distributed with mean equal to zero and standard deviation equal to 1.0. These numbers are stored in an array $\boldsymbol{\varepsilon}$. The correlated random numbers normally distributed with mean equal to zero and standard deviation equal to 1.0 are computed as:

$$\boldsymbol{\eta} = \mathbf{T} * \boldsymbol{\varepsilon}.$$

Using subscript i as the stock identifier, the simulated stock values are:

$$S_i(T) = S_i(t) * \exp[(\mu_i - y_i - \sigma_i^2/2)(T-t) + \eta_i \sigma_i (T-t)^{1/2}]$$

It should be noted that under risk-neutral conditions all rates of return are equal to the risk-free interest rate.

For details regarding the Fair Value when the group of competitors includes companies traded both in the domestic market and a number of foreign markets please consult [Straja \(2010\)](#).

For each Monte Carlo simulation, we simulate the stock paths for all companies, compute the TSR values, rank the companies accordingly, determine the number of awarded common stock shares, and compute the corresponding payoff value. We repeat the above computations for a large number of Monte Carlo simulations. The Fair Value is the average of the discounted payoffs, using the risk-free interest rate as the discount rate. In order to assess the quality of the estimated Fair Value it is necessary to provide its standard error.

The Fair Value of the shares awarded is a function of the following estimated parameters:

1. The estimated risk-free interest rate;
2. The estimated volatilities (for all companies);
3. The estimated correlation matrix for the return rates (for all companies); and
4. The expected dividends to be distributed during the Performance period (for all companies).

In order to comply with Accounting Standards Codification™ (ASC) 718 (FASB December 2004; SEC 2005; PCAOB 2006), the risk-free interest rate should be estimated for the time period from the Grant Date until the Performance End Date.

In order to comply with Accounting Standards Codification™ (ASC) 718 (FASB December 2004; SEC 2005; PCAOB 2006), the historical volatilities and the correlation matrix should be estimated based on a historical timeframe equal to the time from the Grant Date until the Performance End Date. Additionally, it may be necessary to consider the implied volatilities, and the Fair Value should be computed based on the expected volatilities (i.e., a blend of the historical and implied volatilities). However, when faced with a large group of competitors (like S&P 500) the Fair Value may be computed based on the historical volatilities only. It should be



noted that for historical volatilities and the correlation matrix the stock prices should be adjusted for dividend distributions (Straja 2008).

The expected dividends for the Performance period may be estimated using the pattern of dividend distributions before the Grant Date. Straja (2009) provides details regarding the impact of dividends on the Fair Value.

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