

## DATA & PUBLICATION UPDATE

### **Butler Pinkerton Model™ Finds Another Application In SFAS 123R**

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While working on a recent engagement to value employee stock options to comply with SFAS 123R reporting requirements, we uncovered yet another use for the Total Cost of Equity and Public Company-Specific Risk Calculator™.

SFAS 123R, *Share-Based Payment*, states in paragraph A22:

A nonpublic entity will need to exercise judgment in selecting a method to estimate expected volatility and might do so by basing its expected volatility on the average volatilities of otherwise similar public entities. For purposes of identifying otherwise similar entities, an entity would likely consider characteristics such as industry, stage of life cycle, size, and financial leverage.

This is a good start. However, by using the Butler Pinkerton Model™ (BPM) you do not need to look at volatilities for public companies that are similar to your subject company, and then “exercise judgment,” which brings in a level of subjectivity. Instead, you can look at your specific private company and determine its implicit volatility using its total cost of equity (TCOE).

#### **Theory and application**

Remember Professor Aswath Damodaran's equation for TCOE:

$$\text{TCOE} = \text{risk-free rate} + \text{Total Beta} \times \text{ERP},$$

where ERP stands for equity risk premium and Total Beta is defined as:

$$\text{Total Beta} = \frac{\text{standard deviation of stock}}{\text{standard deviation of market}}.$$

Also remember that TCOE captures all risk, including company-specific risk; and that standard deviation and volatility are one and the same.

In our 123R engagement, we first used the BPM to calculate the guideline comparables' TCOE and their company-specific risk. Using these benchmarks, we determined an appropriate forward-looking TCOE for our private company, which was equal to 28.7%. (We discuss the specific calculations below). We then used the TCOE in the income approach (discounted cash flow method) to calculate the fair value of our subject company's underlying equity.

#### **Calculations**

In calculating this forward-looking TCOE, we used a risk-free rate equal to 4.7% and a forward-looking equity risk premium equal to 5%. Implicit in our conclusion (28.7%) is the annual standard deviation, or volatility, of the market and of *our subject company*. This is a key observation. While we used more than one benchmark, we can make our point with just one guideline, as follows:

Guideline comparable #1's Total Beta = 2.57 and its weekly standard deviation = 0.0431. These are outputs of the Calculator. To calculate the weekly standard deviation of the market one simply manipulates the formula described above:

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## Butler Pinkerton Model™

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Weekly standard deviation of market = Weekly standard deviation of stock/Total Beta

This results in the weekly standard deviation of the market =  $0.0431/2.57 = 0.0168$ . To annualize, just multiply by the square root of 52 since there are 52 weeks in a year.

Thus, the annual standard deviation of the market used to calculate our subject company's as well as our guideline's TCOE is equal to

$0.0167 \times 52^{0.5} = 12.09\%$  where  $52^{0.5}$  is the same as the square root of 52.

Now, we only have one unknown in the following equation:

$$TCOE_{pc} = 4.7\% + \text{Total Beta} \times \text{ERP}$$

where "pc" stands for private company

$$28.7\% = 4.7\% + (\text{annual standard deviation}_{pc} / \text{annual standard deviation}_m) \times \text{ERP},$$

where "m" stands for market

$$24.0\% = (\text{annual standard deviation}_{pc} / 12.09\%) \times 5\%$$

$$24.0\% = 0.4136 \times \text{annual standard deviation}_{pc}$$

$$58.0\% = \text{Annual standard deviation}_{pc}$$

This is the expected forward-looking volatility that matches the discount rate that we deemed appropriate to value the underlying equity in our private company. Thus, it is a perfect "apples to apples" comparison. If you use the income approach to valuation, you no longer have to "exercise judgment" in calculating volatility of privately held companies (other than your judgment in arriving at a TCOE).

Of course, you can always compare this conclusion to public companies' historical volatilities, implied volatilities, and volatilities used in their own calculation of stock option expense under 123R.

In summary, we now have at least three uses for the BPM:

- 1) To assist in determining the TCOE for a subject private company;
- 2) To assist in determining the company-specific risk for your subject company; and
- 3) To exactly match your subject company's expected volatility with its appropriate forward-looking TCOE in FSAS 123R valuations.

**Note:** The authors' articles describing the first two of these applications are available as Free Downloads at [BVRResources.com](http://BVRResources.com).

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