

# Using Duff & Phelps Equity Risk Premiums with Fundamental Measures of Accounting Risk

Footsteps. The sound you hear behind you is the Duff & Phelps ("D&P") Risk Premium Report gaining traction. You know we've arrived when we start writing about using the "other" analytical tools afforded by the D&P data. This article is about one of those tools.

To recap, the D&P report is used to develop a discount rate. The D&P equity risk premium component<sup>1</sup> of the discount rate is calculated using 1963 to present average historical equity returns from up to eight different measures of size, e.g., total sales, total assets, etc. For each D&P measure of size, the analyst selects the equity risk premium from a portfolio<sup>2</sup> that is closest to the corresponding size measure of the subject company. All of this allows an appraiser to estimate an equity/size risk premium using eight different measures of company size. Pretty slick.

We all accept that there is an inverse relationship between size and risk: the smaller the firm, the higher the risk. With Ibbotson, one only has to look at the increase in the beta-adjusted size premium (or the non-beta-adjusted small stock premium) on Table 7-5 of the *Yearbook* as the size of the decile decreases. With D&P, one can look at any of the eight measures of company size to see the increased equity risk premium as the size of the portfolio group decreases.

But each time the appraiser chooses an average historical equity return for a given measure of size from a given portfolio, there is an implicit assumption that the risks of the subject company are quantitatively similar to the risks of the average company in the subject portfolio. If the risks of the subject company are not the same as the average company in the portfolio, the calculated discount rate should be different (i.e.,

higher or lower) for the subject company. Risk differences between the subject company and the average company in a portfolio can arise due to leverage, operating risks, or other factors. D&P allows us to explicitly consider operating risks. Even slicker.

As a proxy for operating risk, D&P employs easily understood fundamental measures of accounting risk. Starting with the eight different measures of risk for each of the 25 size-ranked portfolios from Exhibits A-1 through A-8 (for use with the build-up method), D&P calculates three measures of operating risk.

- The first measure is operating margin, calculated as average operating income for the last five years divided by average sales over the same time period.<sup>3</sup> Hypothesis: the lower the margin, the higher the risk.
- The second measure is coefficient of variation of operating margin, calculated as the standard deviation of the operating margin over the last five years divided by the average operating margin over the same time period. Hypothesis: the greater the coefficient of variation, the higher the risk.
- The third measure is coefficient of variation of return on equity, calculated as the standard deviation of return on book value of equity for the last five years divided by the average return on book value of equity over the same time period. Hypothesis: the greater the coefficient of variation, the higher the risk.

The results are presented in Exhibits C-1 through C-8 and show that the greater the risk, as measured by historical accounting information, the greater the rate of return earned by investors. That is, as the size of the portfolio group decreases, all of the above hypotheses test true. Thus, the D&P data demonstrates that as company



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size decreases, fundamental measures of accounting risk increase – buttressing the argument that small companies are inherently more risky<sup>4</sup>

Next, D&P takes all of the companies in its data set and, *without regard to size*, re-sorts the 25 portfolios by the three measures of operating risk.<sup>5</sup> Exhibit D-1 presents companies ranked by operating margin, Exhibit D-2 presents companies ranked by coefficient of variation of operating margin, and Exhibit D-3 presents companies ranked by coefficient of variation of return on book value of equity.

How is this helpful to appraisers? Let's not lose sight that, ultimately, the discount rate is a proxy for the risk that the subject company will not achieve the cash flows projected by the analyst. So, what if you are valuing a "small" company that has healthy operating income margins and low volatility (as measured by the coefficient of variation of operating income and return on book value of equity)? This may result from factors such as patent protection, lack of competition, or a stable geographic/market. *Continued on next page*

## *expert* TIP

**Direct fundamental comparisons of risk using Duff & Phelps can assist in the determination of risk premiums.** ■ ■

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## FINANCIAL VALUATION - BURKERT, continued

### Duff & Phelps Risk Characteristic

|  | <u>1</u><br>Operating<br>Margin | <u>2</u><br>CV of<br>Operating<br>Margin | <u>3</u><br>CV of<br>Return on<br>Equity |
|--|---------------------------------|--|--|
| <b>Subject Company</b>                   | <b>15.0%</b>                    | <b>14.0%</b>                             | <b>33.0%</b>                             |
| <b>EQUATES TO</b>                        |                                 |  |  |
| <b>Portfolio Rank</b>                    | <b>8th</b>                      | <b>16th</b>                              | <b>14th</b>                              |
| <b>Portfolio Characteristic</b>          | <b>14.6%</b>                    | <b>13.9%</b>                             | <b>32.6%</b>                             |
| <b>R<sup>2</sup> of Regression Model</b> | <b>0.77</b>                     | <b>0.84</b>                              | <b>0.75</b>                              |
| <b>Smoothed Average ERP</b>              | <b>8.51%</b>                    | <b>9.30%</b>                             | <b>8.80%</b>                             |
| <b>Used (1=Yes; 0=No)</b>                | <b>1</b>                        | <b>1</b>                                 | <b>1</b>                                 |
|  | <b>8.51%</b>                    | <b>9.30%</b>                             | <b>8.80%</b>                             |
| <b>Median D&amp;P ERP</b>                | <b>8.80%</b>                    |  |  |
| <b>Average D&amp;P ERP</b>               | <b>8.87%</b>                    |  |  |

ket niche. Is the small company *really* that risky in terms of achieving the projected cash flows? The information in Exhibits D-1 through D-3 can be used by an appraiser to calculate an "alternative" equity risk premium or perhaps garner support to better estimate company specific risk.

Above is an example of how an alternative equity risk premium could be calculated assuming a "small" firm has a five-year average 15 percent operating margin, a 14 percent coefficient of variation of operating margin, and a 33 percent coefficient of variation of return on book value of equity.<sup>6</sup>

Alternatively, an appraiser could use this information to infer, *ceteris paribus*, that a smaller component for company-specific risk is appropriate. Either way, the D&P Risk Premium Report provides great information that allows appraisers to better triangulate in on an appropriate cost of equity capital. 



<sup>1</sup> In D&P, this component is actually a combined market risk premium and size risk premium.

<sup>2</sup> There are 25 portfolios (analogous to Ibbotson's 10 deciles) for each measure of size.

<sup>3</sup> For the 2008 Risk Premium Report, with data through 2007, the five year period would be 2003-2007.

<sup>4</sup> The weakest correlations of operating risk and size occurred with operating margin and sales and employees.

<sup>5</sup> This means that there could be a mixture of "big" firms and "small" firms within a given portfolio that is stratified by a measure of operating risk.

<sup>6</sup> D&P data from the 2008 Risk Premium Report.