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The Specific Company Risk of Abnormal Levels of Debt

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Generally speaking, a company's assets are financed by a combination of equity and debt. The weighted average cost of capital ("WACC") represents the blended cost of each component of the capital structure, weighted according to its separate market value.[1] But should the value of the enterprise fluctuate with changes in the combination of equity and debt, or should the cost of equity increase or decrease for changes in the investment risk to equity arising from changes in debt levels?

According to Valuing a Business, The Analysis and Appraisal of Closely Held Companies, Fourth Edition:

> In the context of cost of capital, we define risk as the degree of uncertainty as to the realization of the expected future returns. For a given level of expected future returns, the market will pay more to the extent that realization of those returns is more certain and less to the extent that their realization is less certain. In other words, for a given level of expected prospective economic income, the lower the risk, the higher the present value, or conversely, the higher the risk, the lower the present value.[2]

The concept of an equity risk premium stems from the tradeoff between risk and return in which a higher rate of return is required to attract investors to take on riskier investments. The risk free rate in the market is often considered to be the rate on long-term U.S. government bonds. Conversely, an investment in stocks is far riskier, as companies can easily suffer losses during times of economic downturn or even go bankrupt. The greater risk associated with the stock investments demands a compensatingly greater potential reward, commonly described as the "equity risk premium." Within the stock investment subset, companies with no debt are generally far less risky than companies carrying a great deal of debt. Unfortunately, the

[1] Pratt, Reilly, and Schweihs, Valuing a Business, The Analysis and Appraisal of Closely Held Companies, Fourth Edition, page 184.

[2] Pratt, Reilly, and Schweihs, Valuing a Business, The Analysis and Appraisal of Closely Held Companies, Fourth Edition, page 161.

commonly used methodology of unlevering and relevering beta fails to account for the equity costs of abnormal capital structures. This point will be demonstrated using Duff & Phelps' equity risk premium, including the beta adjustment.

The standard generally accepted cost of equity formula is expressed as

$$E(R_i) = R_f + B(RP_m) + RP_s + RP_u$$ [3]

and incorporates one or all of the following elements:

1. A basic equity risk premium is over the risk-free rate selected as the base.[4] This element is generally obtained from sources such as Ibbotson's Stocks, Bonds, Bills, and Inflation Valuation Yearbook and Duff & Phelps Risk Premium Report. These firms analyze historical capital markets data and the relationships between risk measures and realized returns actually experienced by equity investors.
2. One or more coefficients modifying the basic equity risk premium based on industry or other characteristics expected to affect the degree of risk for the subject investment.[5] This element is generally calculated using industry beta statistics, or from sources such as Ibbotson which provides a table of adjustments broken down by 4-digit SIC codes.[6]
3. An element reflecting the size effect.[7] This element is generally obtained according to size stratifications, from sources such as Ibbotson and Duff & Phelps, which analyze the market. Duff & Phelps provides multivariate formulae whereby the size adjustment can be estimated for any size of business. Significantly, the size adjusted premia can be adjusted for any combination of equity and debt by unlevering and relevering beta. This article does not take issue with that approach. Instead, the purpose of this article is to demonstrate that adjusting the cost of equity capital by unlevering and relevering the cost of equity in the generally accepted manner using beta does not capture all of the economic consequences of debt levels that differ from a given industry norm.

[3] Duff and Phelps Risk Premium Report 2009, at page 12.

[4] Pratt, Reilly, and Schweihs, Valuing a Business, The Analysis and Appraisal of Closely Held Companies, Fourth Edition, page 162.

[5] Id.

[6] There are mathematical issues associated with using Ibbotson's industry risk adjustments in conjunction with Duff & Phelp's size adjustment. See 2009 Duff & Phelps Risk Premium Report at pages 3 and 4.

[7] Pratt, Reilly, and Schweihs, Valuing a Business, The Analysis and Appraisal of Closely Held Companies, Fourth Edition, page 162.

4. A final adjustment reflecting judgments about investment-specific risk not captured in the first three elements.[8] A number of "non-systematic, specific company" discounts and premia are used by some practitioners when using the cost of equity formula. Often such arbitrary adjustments have included minority discounts, control premia, and key person discounts. However, according to Ibbotson Stocks, Bonds, Bills, and Inflation 2009 Valuation Yearbook:

> Use of these discounts and premia is more controversial, primarily because it is difficult to quantify their size; generally, the magnitude of the premia or discount is set. In addition, these premia do not necessarily represent rewards an investor receives for taking on a specific risk. For instance, does having a majority owner increase or decrease the risk of the business? Most would agree that the risk of a business does not change with ownership.
>
> In some cases, however, a controlling owner may have influence on decisions that affect the risk of a business. Quantifying the effect of this controlling party in terms of a premium is not easily accomplished. Unlike other risk premia, a control premium is not readily measurable. An additional complication is that it is possible for some of these additional factors to be present as part of the size premia.
>
> In attempting to account for controlling interests or key people, it may be preferable to include these items when projecting cash flows, rather than making arbitrary adjustments to the discount rate. A probability weight can be assigned to the expected future cash flows based on the influence of these factors under various scenarios. From this probability distribution, the expected cash flow can be determined. By discounting these expected cash flows at a pure discount rate, one can achieve a cleaner analysis.[9]

It is my opinion that such non-systematic, specific company discounts and premia are often wholly arbitrary and subjective, and allow the appraiser to fabricate a desired answer.

In my experience, except for the effects of abnormal structures, it is rarely true that such discounts and premia cannot be quantified and incorporated into the appraiser's projection of future earnings and cash flows. Capital structure deviations from the industry norm on the other hand are necessary cost of equity adjustments because failure to account for very high costs of extreme debt levels results in extremely over-valued business interests. Fortunately, the cost (or benefit) of abnormally high (or low) debt levels is easily and objectively measurable.

Modigliani-Miller Theorem

The Modigliani-Miller Theorem is a financial theory stating that the market value of a firm is determined by its earning power and the risk of its underlying assets that is independent of the

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[8] Id.
[9] Ibbotson SBBI 2009 Valuation Yearbook at page 32.

way it chooses to finance its investments or distribute dividends. The basic idea is that it does not make a difference whether a firm finances itself with debt or equity. Modigliani explains the Theorem as follows:

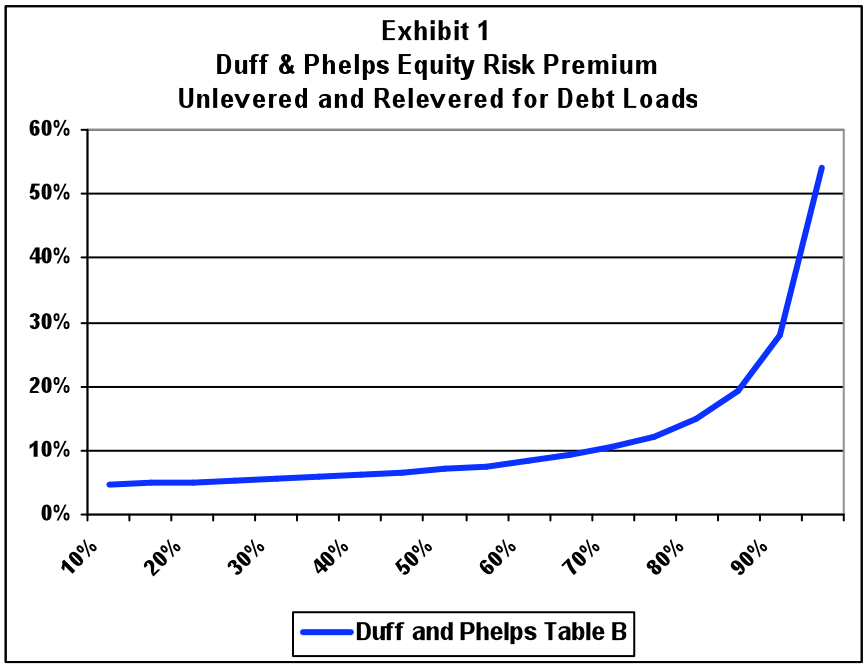
> . . . with well-functioning markets (and neutral taxes) and rational investors, who can 'undo' the corporate financial structure by holding positive or negative amounts of debt, the market value of the firm – debt plus equity – depends only on the income stream generated by its assets. It follows, in particular, that the value of the firm should not be affected by the share of the debt in its financial structure or by what will be done with the returns – paid out as dividends or reinvested (profitably).[10]

Modigliani and Miller suggest that as the debt structure increases or decreases from the industry norm, there should be no change in the value of the enterprise. This in turn suggests that WACC should remain unchanged as the capital structure deviates from the industry norm.

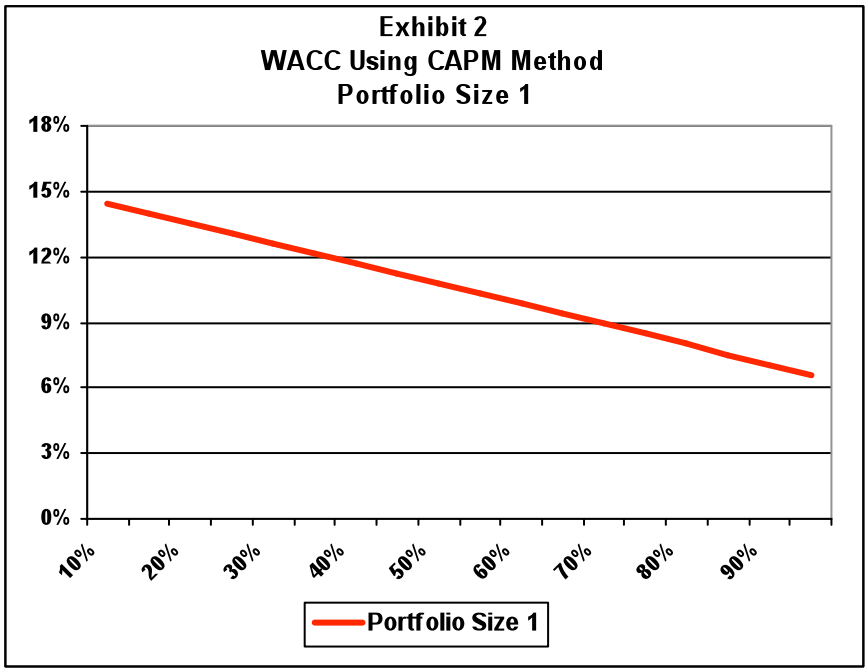
Calculating the Equity Risk Premium using the Duff & Phelps Methodology

The 2009 edition of the *Duff & Phelps Risk Premium ("ERP")* Report presents historical equity risk premiums and size premiums for 25 size-ranked portfolios using eight alternative measures of company size. Duff & Phelps recommends the "smoothed" average risk premium as the most appropriate indicator for most of the portfolio groups. Smoothing techniques are used to reduce irregularities or random fluctuations in time series data. I relevered and "smoothed" the risk premiums for each of the eight alternative measures of company size, and averaged the results. This provided me with the equity risk premium over the risk free rate. Exhibit 1 demonstrates the increasing cost of equity associated with the different debt levels using the Duff & Phelps methodology.

[10] The Collected Papers of Franco Modigliani: The Theory of Finance and Other Essays, Vol. 3, page xiii.



I then calculated the WACC for a portfolio level 1 company with debt structures ranging from 10% to 90%, unlevering and relevering the equity risk premia for each debt level. The expected result should be a WACC that is unaffected by the change in the debt structure, but as demonstrated in Exhibit 2, a declining WACC results. This fact yields the illogical result of higher enterprise values, and therefore higher equity values, as businesses stack on more and more debt.



The next step in my analysis is to calculate the weighted average cost of capital ("WACC") using the Build-Up method. The Build-Up Method is a widely recognized method of determining the after-tax net cash flow discount rate, using the sum of risks associated with various classes of assets. I calculated the WACC using the Duff & Phelps arithmetic mean return and the equity risk premiums in excess of market calculated after the effects of relevering and "smoothing". I made the WACC calculations for the portfolio size rank 1. This represents the maximum company size ranking used by Duff and Phelps. The following example assumes no specific company risk and a 25% debt structure.

Duff & Phelps Portfolio Size Rank 1

	Table B
Arithmetic mean return	10.97%
Equity risk premium D&P	5.29%
Specific company risk	0.000%
Industry risk	0.000%
Cost of equity capital	16.260%
Percentage common equity	75%
Weighted average cost of equity	12.195%
Pre-tax interest rate	6.000%
Tax benefit of interest deduction at 41%	-2.460%
After-tax cost of interest	3.540%
Percentage debt	25%
Weighted average cost of debt	0.885%
Weighted average cost of capital ("WACC")	13.080%

In order to calculate a WACC that fully compensates for the specific risk (or benefit) of the debt load differing from the industry average, a factor must be included in the WACC calculation to normalize the cost of equity so that the resulting WACC is constant across all capital structures. Below I calculated the WACC for a portfolio size 1 company using three different capital structures and including a factor to account for the specific company risk (or benefit) of each scenario:

WACC for Portfolio Size 1, Using Three Different Capital Structures
(Portfolio Size Rank 1)

	Less Risky	Industry "Norm"	More Risky
Portfolio Size Rank 1 Debt Percentage	10%	25%	90%
Arithmetic mean return per D&P (includes risk free rate and equity risk premium)	10.97%	10.97%	10.97%

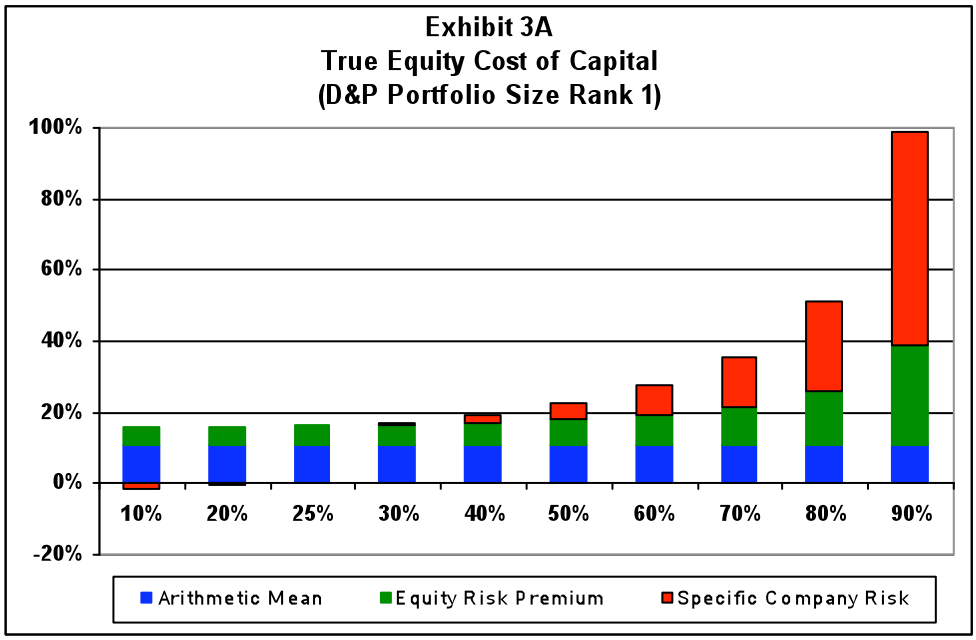
Equity risk premium in excess of CAPM per D&P	4.71%	5.29%	27.85%
Specific company risk of abnormal debt	-1.540%	0.000%	60.120%
Cost of equity capital	14.140%	16.260%	98.940%
Percentage common equity	90%	75%	10%
Weighted cost of equity	12.726%	12.195%	9.894%
Pre-tax interest rate	6.000%	6.000%	6.000%
Tax benefit of interest deduction at 41%	-2.460%	-2.460%	-2.460%
After-tax cost of interest	3.540%	3.540%	3.540%
Percentage debt	10%	25%	90%
Weighted cost of debt	0.354%	0.885%	3.186%
Weighted average cost of capital ("WACC")	13.080%	13.080%	13.080%

Exhibits 3A and 3B display the changes that occur in the cost of equity as the debt structure increases from 10% to 90% while holding the WACC constant. The equity risk premium per Duff & Phelps is an increasingly larger factor. This is to be expected as the risk associated with any returns will increase as the percentage of debt increases. However, the specific company risk factor necessary to account for all of the risks to equity of increasing debt loads eventually becomes the largest component of the cost of equity.[11] This is a systematic risk, despite being specific to the valuation subject.

The sum of all systematic risks constitutes the cost of equity capital. Failing to recognize the risks of higher than normal debt levels overstates the value of the enterprise.[12] While the cost of equity capital is increasing a great deal, the weighted equity cost can be seen sloping downward (See Exhibit 3B) as the percentage of debt increases nonetheless. This is due to the decreasing weight being placed on equity as the percentage of debt increases. However, the sum of the weighted cost of equity and the weighted cost of debt still yields a constant WACC.

[11] Note that for leverage scenarios that are less than the norm, an equity discount is appropriate. This is because businesses with less leverage are less risky to their equity owners.

[12] Mike Adhikari in his article (*Advanced Growth Model Reduces the Risk of Overvaluing from 'Constant WACC'*) states that, "Many financial experts correct only for changes in projected growth rates and do not for changes in WACC. This often ignored "constant WACC" assumption can cause significant overvaluation." Mr. Adhikari further states that, "APV (Adjusted Present Value) clearly spells out that the only value of debt is its tax shield. If we were to assume that tax deductibility of interest is disallowed, then according to APV, debt has no value. This clearly is not true in real life." Mr. Adhikari is incorrect because the change in the debt structure up or down should not have any effect on the overall WACC. The WACC should remain constant with the specific company risk factor accounting for the additional risk to equity of increasing debt loads.



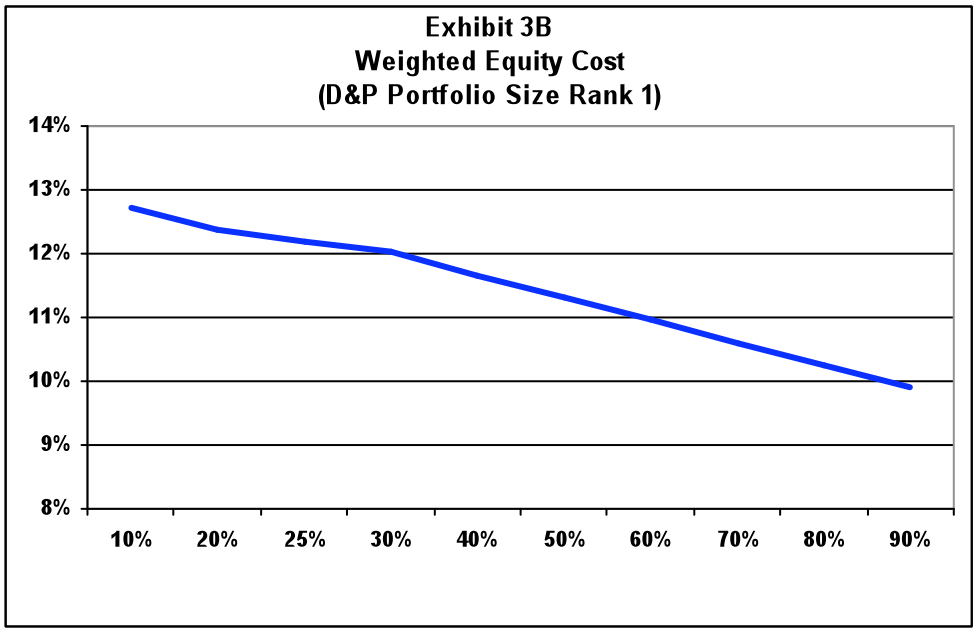
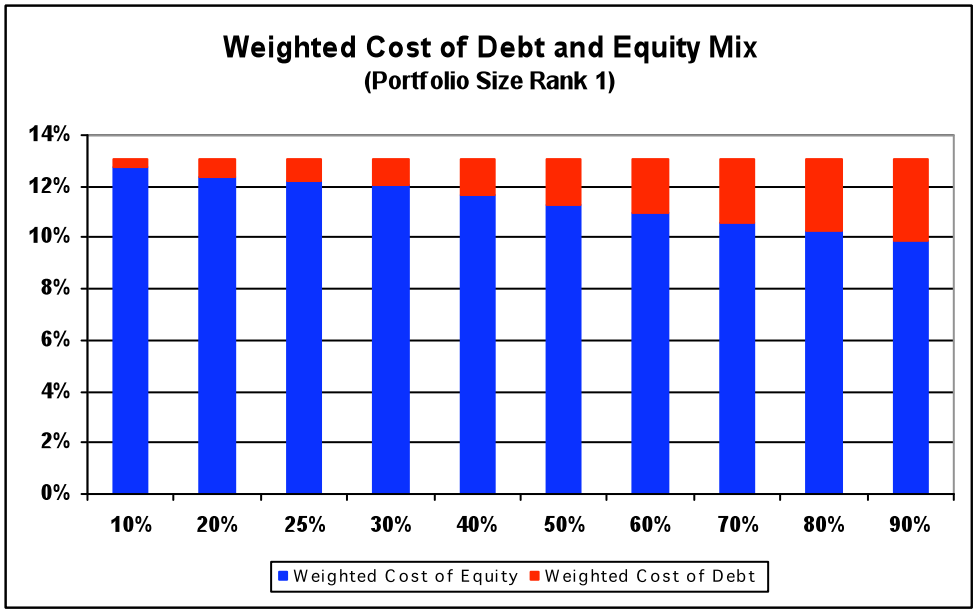


Exhibit 4 shows the relative costs of equity and debt as the debt loads in the scenario increase from 10% to 90%.



With the recognition that enterprise values are constant across all capital structures, calculated equity costs of capital determined solely by unlevering and relevering beta will result in inaccurate discount rates. The approach of determining the normalized WACC and solving for the cost of equity after adjusting debt/equity relationships allows the business appraiser to precisely determine the systematic risks (or benefits) of specific abnormal capital structures.

It should be noted that the specific company risk is the result of subtraction of the normalized WACC. Once the normalized WACC has been determined the true weighted cost of equity is easily determined for any abnormal debt structure.