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A Method to Adjust the Cost of Equity Capital for Prevailing Market Conditions

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The basic cost of capital build-up approaches using the Duff & Phelps "CRSP" and Risk Premium Report data employ the formula K = RFR + ERP + SP. In this formula, K is the cost of capital, RRF is the risk free rate, ERP is the equity risk premium, and SP is a size premium. The *2014 Valuation Handbook* presents, among others, the cost of equity capital components shown in Table 1 (on next page) through calendar year 2013.

The conventional valuation approach is to modify the historical cost of equity capital to a current cost by substituting a current risk free rate for the historical risk free rate used in the CRSP and Risk Premium Report calculations. As

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Chairman's Corner

We all rely on high-quality professionals with the specialized skills we need to perform the services that set our firms apart. One great way to encourage and retain promising professionals is to recognize their value. That's one of the many reasons the AICPA established the Standing Ovation Recognition Program, which spotlights young CPAs in forensic accounting and business valuation who exhibit exemplary professional achievement. Recipients will be featured in a press release on the FVS Section site, in the FVS conference brochure and during the town hall at our annual conference. Partners and managers are encouraged to submit nominations on behalf of your top talent.

And if you're new to valuation or forensics, you should be aware of two great programs that match with you mentors who are seasoned professionals who can help you develop your skills. If you want to advance your knowledge and your career, take the time to learn more about the ABV Mentor program or the CFF Mentor program.

Meanwhile, whether you're a relatively new partner or have long experience in the field, consider volunteering for membership on the 2015-2016 FVS committees. I can tell you from personal experience that it offers excellent learning experiences and the chance to network with highly skilled professionals and develop long-lasting friendships. If you are interested in participating, be sure to apply at https://volunteers.aicpa.org/.

Carol Carden, CPA/ABV, CFE, ASA

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Table 1
Historical Cost of Equity Capital Estimated as of December 31, 2013

	CRSP		Risk Premium Report		
				Portfolio 25	
	S&P 500	Decile 10z	S&P 500	Exhibit A-1	Exhibit B-1
Historical average annual risk free rate	5.09%	5.09%	6.68%	6.68%	6.68%
Historica CAPM equity risk premium	6.96%	9.38%	4.95%	n/a	6.33%
Size premium over CAPM	–	12.12%	–	n/a	1-.25%
Arithmetic risk premium	n/a	n/a	–	16.58%	n/a
Historical cost of equity capital	12.05%	26.59%	11.63%	23.26%	23.26%

Table 2
Growth Rate Expectation Implied by the S&P 500 as of December 31, 2013

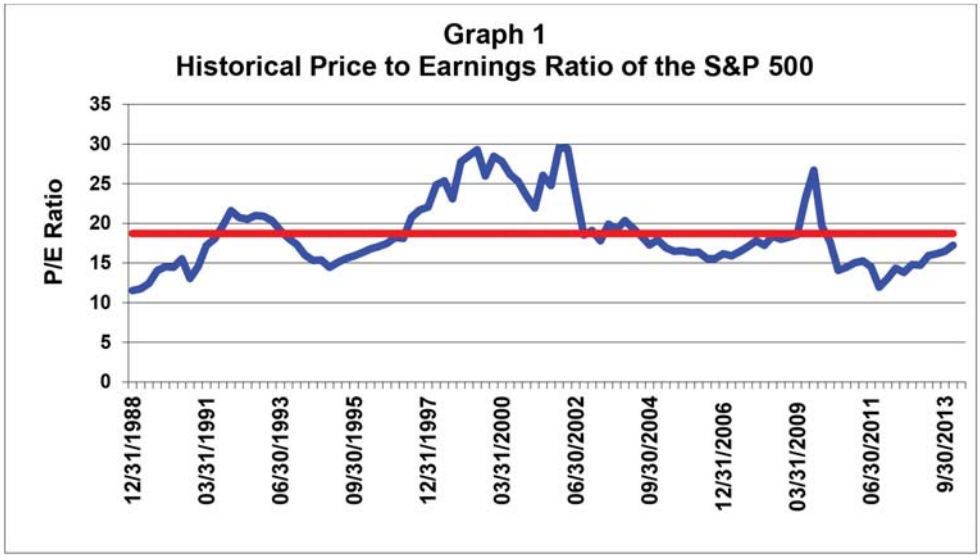
	CRSP	Risk Premium Report
Historical cost of equity capital of the S&P 500 (Table 1)	12.05%	11.63%
Historical S&P 500 market capitalization rate 1988-2013	- 5.35%	- 5.35%
Implied expected growth of earnings and cash flows	6.70%	6.28%

of December 31, 2013, substituting the 3.72% nominal yield on 20-year U.S. Treasury bond maturities for the reported historical average risk free rates would lower the estimated costs of equity capital by 137 basis points using CRSP and 296 basis points using the Risk Premium Report. The result is an increase in asset valuations. Much has been written regarding this illogical result in the present environment of quantitative easing by the Federal Reserve Bank (the Fed) that has artificially lowered the risk free rate. The weak economy that has required quantitative easing should result in *reduced*, not *increased* asset valuations, and *larger,* not *smaller,* costs of capital. Accordingly, the *2014 Valuation Handbook* provides guidance at Exhibit 3.9 (page 3-24 of the Handbook) regarding adjusted equity risk premiums intended to capture some or all of the risk free rate distortion created by the Fed's policy during the most recent recession.

The purpose of this article is to offer a way of adjusting cost of equity capital estimates to reflect current market conditions, not proposed by either the conventional approach or the *2014 Valuation Handbook* guidance, to resolve issues not addressed by those approaches.

Let's start with this well-known formula: CR = K – g, where CR is the capitalization rate of an investment, K is the cost of capital (discount rate) and g is the expected growth rate of cash flows. We also know that CR = E/P, where E is (typically) the last twelve months of earnings associated with an asset and P is the price of the asset. Understanding these fundamental valuation truths allows us to isolate the market consensus of the long-term growth rate of earnings. This consensus is implied by the difference between the long-term capitalization rates (E/P)

Graph 1
Historical Price to Earnings Ratio of the S&P 500



of, for example, the S&P 500, and the estimated cost of capital to market participants. The formula also isolates the market consensus of the long-term growth of cash flows, because, in the long term, earnings and cash flows are equal.

The market informs us regarding investors' capitalization rate requirements. From January 1, 1988, to December 31, 2013, the historical trailing four quarters P/E ratio of the S&P 500 averaged 18.70 times historical annual earnings, as shown in Graph 1. The inverse of this ratio translates to a corresponding capitalization rate of 5.35% for the market as a whole.

Graph 1 demonstrates that as of December 31, 2013, the market was valuing earnings at a rate that is less than the historical average. As of that date, the P/E ratio of the S&P 500 was 17.23 times historical earnings for the preceding 12 months with a corresponding capitalization rate of 5.80% for the market—8.4% less than during the previous 26 years. The comparatively lesser valuation makes sense considering the economic malaise that has prevailed in recent years.

Readers will note the sharp peak in the P/E ratio during 2009. This occurred because the market value of the S&P 500 did not drop commensurately with the very sharp decline in earnings during the economic crisis of that time. The market may have expected a recovery of equity prices or may have been disconnected from the reality of corporate earnings. Regardless, for a short time, the market valued stocks more than it has historically. This fact discloses the importance of determining fair market value in a manner consistent with prevailing market conditions.

Because we know that CR = K – g, we also know that K – CR = g. As of December 31, 2013, the historical cost of equity capital for the S&P 500

Table 3
Adjusting Equity Cost of Capital for Market Conditions as of December 31, 2013

	CRSP	Risk Premium Report
Current capitalization rate of the S&P 500	5.80%	5.80%
Implied expected growth of earnings and cash flows (Table 2)	6.70%	6,28%
Current cost of equity capital of the S&P 500	12.50%	12.08%

Table 4
Details of Market-Based ERP Calculated Using the CRSP Data in the Duff & Phelps 2014 Valuation Handbook (Exhibit 7.3)

	Calendar Year 2013
Current minus historical market capitalization rate (5.80% - 5.35%)	0.45%
Historical CAPM beta – decile 10z	x 1.35
CAPM equity risk premium on capitalization rate change	0.61%
Historical equity size premium in excess of CAPM – decile 10z	12.12%
Historical CAPM equity risk premium for the S&P 500	÷ 6.96%
Ratio of historical excess CAPM – decile 10z	1.74
Current minus historical market capitalization rates (5.80% - 5.35%)	0.45%
Current market increase in excess of CAPM equity risk premium	0.78%
Incremental increase in small company ERP – decile 10z (βcm)	1.39%

Table 5
Simplified Calculation of Market-Based ERP Using the CRSP Data in the Duff & Phelps Valuation Handbook (Exhibit 7.3)

	Calendar Year 2013
Historical CAPM equity risk premium – decile 10z	9.38%
Historical equity size premium in excess of CAPM – decile 10z	12.12%
Total historical equity risk premium – decile 10z	21.50%
Historical CAPM equity risk premium for the S&P 500	÷ 6.96%
Ratio of historical decile 10z-to-market equity risk premium	3.09
Current minus historical market capitalization rate (5.80% - 5.35%)	0.45%
Incremental increase in small company ERP – decile 10z (βcm)	1.39%

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estimated using the CRSP portion of Table 1 was 12.05%. Estimated using the Risk Premium Report portion, it was 11.63%. Subtracting the historical market capitalization rate of 5.35% from these estimates implies that the market expected future earnings and cash flow to grow at the rates of 6.70% and 6.28%, respectively. See Table 2.

If we assume that all changes in the capitalization rate of the market devolve into changes in the required equity risk premium, then isolating the implied historical cash flow growth rate allows adjustments of cost of capital for the prevailing market conditions as of a specific valuation date. As previously stated, the four trailing quarters of S&P 500 earnings as of December 31, 2013, yielded a

Table 6
Market-Based ERP Calculated Using the Risk Premia Data in the Duff & Phelps Valuation Handbook (e.g. Exhibit B-1

	Calendar Year 2013
Historical ERP in excess of CAPM – portfolio 25	10.25%
Historical ERP predicted by CAPM – portfolio 25	6.33%
Historical arithmetic average ERP – portfolio 25	16.58%
Historical ERP for the market	÷ 4.95%
Ratio of historical ERPs	3.35
Current minus historical market capitalization rates (5.80% - 5.35%)	0.45%
Incremental increase in small company ERP – decile 10z (βcm)	1.51%

Table 7
Historical and Current Cost of Equity Capital for Small Companies
As of December 31, 2013

			Risk Premium Report			
	CRSP		Portfolio 25			
	Decile 10z		Exhibit A-1		Exhibit B-1	
	Historical Market	Current Market	Historical Market	Current Market	Historical Market	Current Market
Market capitalization rate	5.35%	5.80%	5.35%	5.80%	5.35%	5.80%
Expected earnings and cash flow growth	6.70%	6.70%	6.28%	6.28%	6.28%	6.28%
Cost of equity capital for the S&P 500	12.05%	12.50%	11.63%	12.08%	11.63%	12.08%
Equity risk premium predicted by CAPM	9.38%	9.99%	n/a	n/a	6.33%	6.91%
Size premium over ERP predicted by CAPM	12.12%	12.45%	n/a	n/a	10.25%	10.75%
Arithmetic average risk premium	n/a	n/a	16.58%	17.64%	n/a	n/a
Adjustment to avoid double counting ERP (Table 1)	−6.96%	−6.96%	−4.95%	− 4.95%	−4.95%	−4.95%
Historical and current cost of equity capital	26.59%	27.98%	23.26%	24.77%	23.26%	24.77%

P/E ratio of 17.23 and an implied capitalization rate of 5.80%. Adding the historical implied earnings and cash flow growth rate expectation and the current capitalization rate of the market provides a cost of capital estimate that has been adjusted for current market conditions. Using the example illustrated in Table 2, if the expected growth of earnings and cash flows using the CRSP portion of Table 2 (i.e., 6.70%) is added to the current market capitalization rate as of December 31, 2013 (i.e., 5.80%), the adjusted cost of equity capital for the market as a whole would be 12.50% instead of 12.05%—a 3.7% increase in the cost of equity capital. Similarly, using the Risk Premium Report portion of Table 2, the adjusted cost of equity capital would be 12.08% instead of 11.63%—a 3.9% increase in cost of equity capital. Table 3 demonstrates this step.

Table 8

The Market-Adjusted Cost of Equity Capital at Other Dates

CRSP Cost of Equity Capital as of December 31, 2011			
	Unadjusted	**Market Adjusted**	**Percentage Change**
S&P 500	11.77%	14.06%	19.5%
Decile 10z companies		32.92%	27.6%
CRSP Cost of Equity Capital as of June 30, 2001			
	Unadjusted	**Market Adjusted**	**Percentage Change**
S&P 500	12.98%	11.54%	(11.1)%
Decile 10b companies	23.01%	20.96%	(14.6)%

Smaller companies' market-adjusted costs of capital can be estimated by adding these components to the current cost of equity capital for the market as a whole: (1) the conventional size premiums estimated by CRSP and Duff & Phelps, (2) the incremental size premium attributable to the difference between the current and historical market capitalization rates (β_{cm}), and (3) any non-systematic factors. Component (2) is calculated for a CRSP decile 10z valuation subject using Table 4.

The calculation in Table 4 can be simplified using the example in Table 5.

Component (2) is calculated in Table 6 for a Risk Premium Report portfolio 25 valuation subject.

As of December 31, 2013, the historical market cost of equity capital of a decile 10z company determined using CRSP was 26.59%, as shown in Tables 1 and 7. Adjusting for current market conditions results in a current market cost of equity capital of 27.98%—a 5.2% cost increase. Similarly, the historical market cost of capital of a portfolio 25 company using Exhibits A-1 and B-1 of the Risk Premium Report and the post-1963 size beta was 23.26%, as shown in Tables 1 and 7. Adjusting for current market conditions results in a current market cost of equity capital of 24.77%—a 6.5% cost increase.

The minor differences of cost of equity capital discussed above make sense considering how close the market conditions prevailing as of December 31, 2013, were relative to the historical average. More extreme adjustments (both increases and decreases) of cost of capital occur when the prevailing market conditions are farther from the historical mean P/E ratio. Table 8 provides some examples.

Without regard to specific company risks, the formula for estimating the current cost of equity capital using CRSP is:

$$K_{cm} = K_H - ERP_H + ERP_{CAPM} + \beta_{SIZE} \times (CR_{cm} - CR_H) + SP_H + (SP_H \div ERP_H) \times (CR_{cm} - CR_H)$$

Where,

K_{cm} = cost of equity capital for the current market (e.g., 27.98%)

K_H = historical cost of equity capital for the market (e.g., 12.05%)

ERP_H = historical equity risk premium of the market (e.g., 6.96%)

ERP_{CAPM} = historical equity risk premium predicted by CAPM (e.g., 9.38%)

β_{SIZE} = historical CAPM size beta (e.g., 1.35)

CR_{cm} = capitalization rate of the current market (e.g., 5.80%)

CR_H = historical capitalization rate of the market (e.g., 5.35%)

SP_H = size premium in excess of ERP predicted by CAPM (e.g., 12.12%)

Appraisers can derive a market-adjusted terminal value capitalization rate by simply subtracting the estimated future growth rate of earnings and cash flows from the market-adjusted cost of capital. Readers may ask how to reconcile the implied earnings and cash flows growth rate of the market to the greater or lesser growth rates of a valuation subject. This concern is addressed in discounted cash flow models of valuation by the growth rate(s) that the appraiser builds into the discount periods. It is also addressed in capitalization models of valuation by the growth rate subtracted from the adjusted cost of equity capital or weighted average cost of capital to derive a capitalization rate. The fact that the growth rate expected by the market or a market segment may differ from the growth rate(s) assumed by the appraiser has no significance to the fungible rate of return required by the market or a market segment.

Useful Under Any Market Condition

The method described in this article allows analysts to objectively estimate cost of capital under any market condition with a high degree of reliability. It has the advantage of avoiding arbitrary adjustments of the risk free rate by allowing the market to directly indicate the necessary adjustment to the cost of equity capital.

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Assembled Workforce RUL and Business Combinations

By Edward S. Mactas, FSA

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Introduction

Valuation analysts are frequently asked to value an organization's assembled workforce under the cost approach. This value is dependent on the years of future service the workforce will provide to the organization, commonly referred to as the remaining useful life (RUL). The RUL and the workforce value will be relatively high if employee attrition rates are relatively low. Because attrition rates for a longer-tenured workforce are typically lower than those for a shorter-tenured workforce, the value of a longer-tenured workforce is greater. Consequently, assembled workforce valuation results can be improved by reflecting employee attrition in the determination of the RUL for an assembled workforce. In this article, we discuss how the RUL of an assembled workforce can be determined.

In business combinations, an "acquiring" entity establishes an opening balance sheet reflecting the fair value of the assets acquired — including the value of identifiable intangible assets and goodwill — and liabilities assumed. When identifiable intangible assets are valued using an excess earnings method, the cash flow from the identifiable intangible asset is reduced by contributory asset charges, including a charge for the fair value of an assembled workforce. We describe a refinement to the valuation of the assembled workforce in this context to better reflect the true cost of replacing the *service capacity* of the assembled workforce. Specifically, one can include differences in employee attrition (and the resulting RUL) between existing and newly hired employees to produce a more relevant and reliable measure of identifiable intangible assets that derive value from the assembled workforce.

RUL of an Assembled Workforce

The analysis of RUL for an assembled workforce is similar to that for other intangible assets. In the chart below, we outline certain aspects of the analysis

Customer Relationships	Assembled Workforce
Customer historical attrition rates	Employee historical attrition rates
Customer relationship tenure to date	Employee tenure to date with the organization
Customer relationship RUL	Employee RUL with the organization
Customer relationship expected total life	Employee expected total life with the organization