

Excerpt on Cost of Capital

From the following presentation

Valuation Forum

Correlation of Cash Flow and Cost of Capital

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Cost of Capital

What is the Cost of Capital?

The cost of capital is the expected rate of return that the market participants require in order to attract funds to a particular investment.

Source: Cost of Capital, Applications and Examples, Fourth Edition

Cost of Capital - Three Perspectives¹

- ASSET: Rate that should be used to discount the present value of future expected cash flows.
- LIABILITY: The economic cost to the firm of attracting and retaining capital in a competitive environment.
- INVESTORS: The return one expects and requires from an investment in a firm's debt or equity.

¹Ibbotson SBBI 2011 Valuation Yearbook, Morningstar

Components of Cost of Capital

How Many Components Make up the Cost of Capital?

- Risk Free Rate – Investment free of default risk.
- Additional Premium – Additional premium an investor requires to compensate that investor for taking on risk of particular investment.

Cost of Equity

- Risk Free
 - Equity Risk Premium
 - Beta
 - Industry Risk Premium
 - Size Premium
 - Company Specific Risk Premium
- } Adjustments to the “Market”

Cost of Equity

Understand the Time Horizon of the Investment

Risk Free Rate

- Selecting the Risk Free Rate has a direct effect on the Equity Risk Premium.

$$ERP = R_m - R_f$$

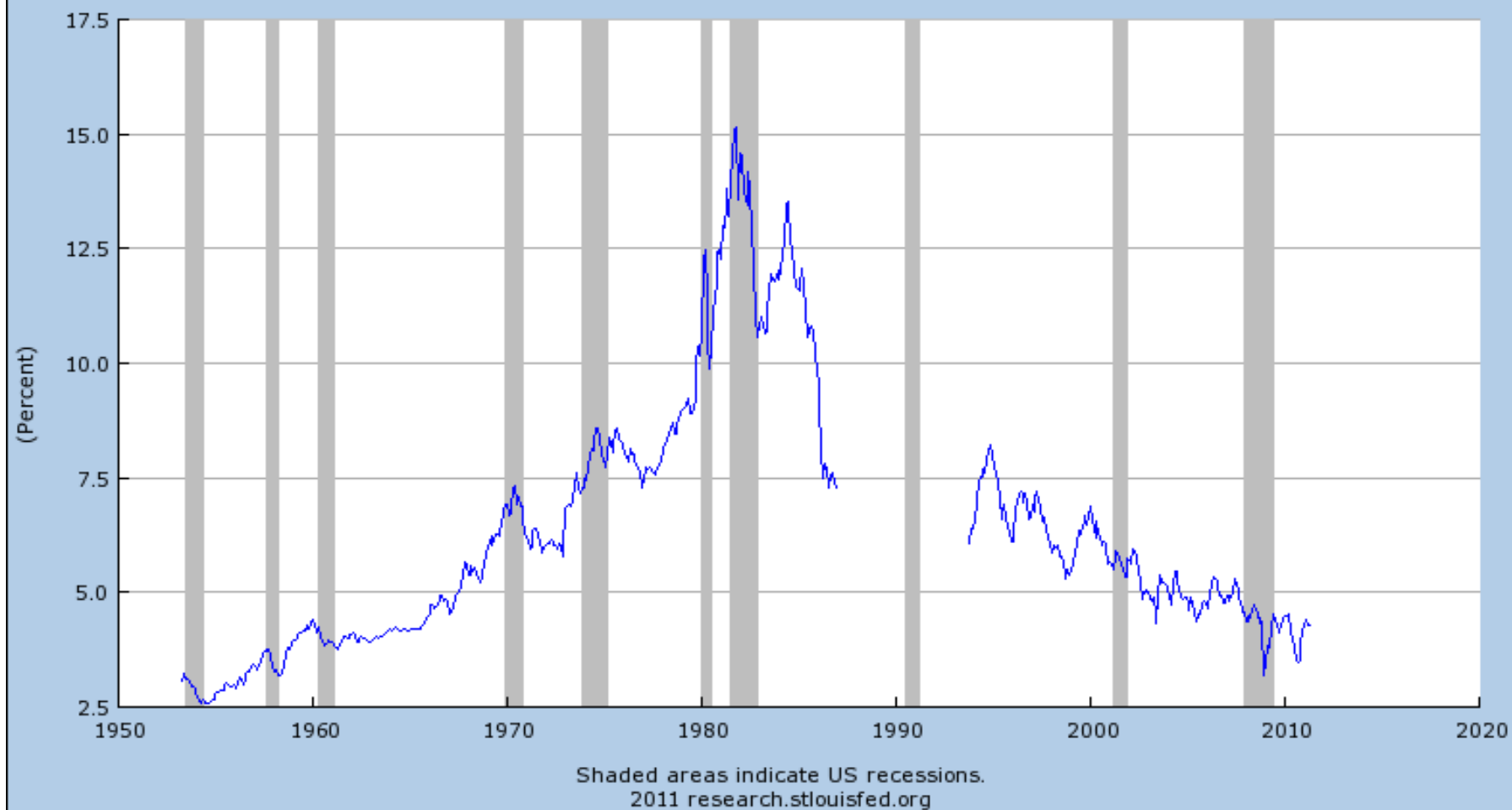
Source: Cost of Capital, Applications and Examples, Fourth Edition

Risk Free Rate

Analysts Typically use the 20 year U.S. Government Bond Rate for Build-up Method.

- 1) Closely matches time horizon or life of the investment.
- 2) Long term yield less susceptible to short term events
- 3) Matches empirical data used by Ibbotson and Duff & Phelps

20-Year Treasury Constant Maturity Rate (GS20)
Source: Board of Governors of the Federal Reserve System



20- Year Treasury Constant Maturity Rate
Source: Board of Governors of the Federal Reserve System



Equity Risk Premium

- Now that you understand the Risk Free Rate, What is the Appropriate Equity Risk Premium?

$$EPR = R_m - R_f$$

- Equity Risk Premium is a proxy for the market. Often expressed as:

$$ERP = RP_m$$

Equity Risk Premium

Long Term Horizon

- 1926 – Current
- Arithmetic Mean
- Unconditional
- Normal
- Ex-Post

Cyclical

- ERP fluctuates based on current business cycle
- Adjusted for current conditions
- Conditional
- Ex-Ante

Equity Risk Premium

(Historical/Unconditional/Ex Post)

- Theory that historical results are a valid alternative for current expectations about future returns.
 - Common in litigation settings, such as divorce and tax court valuations.

Historical Equity Risk Premium

Long-Horizon Equity Risk Premium by Decade (%)

1920s	17.6%
1930s	2.3%
1940s	8.0%
1950s	17.9%
1960s	4.2%
1970s	0.3%
1980s	7.9%
1990s	12.1%
2000s	-3.7%
2001-2010	-1.1%

*Source: Ibbotson SBBI
2011 Valuation Yearbook*

Historical Equity Risk Premium

Stock market Return and Equity Risk Premium Over Time

Length (Yrs)	Period Dates	Large Co. Stock	
		Arithmetic Mean Total Return (%)	Long-Horizon Equity Risk Premium (%)
85	1926-2010	11.8%	6.7%
70	1941-2010	12.6%	7.0%
60	1951-2010	12.3%	6.1%
50	1961-2010	11.2%	4.4%
40	1971-2010	11.8%	4.5%
30	1981-2010	12.2%	5.0%
20	1991-2010	11.0%	5.3%
15	1996-2010	8.9%	3.7%
10	2001-2010	3.6%	-1.1%
5	2006-2010	5.2%	0.8%

*Source: Ibbotson SBBI 2011
Valuation Yearbook*

Conditional/Ex Ante Equity Risk Premium

- Under this theory the ERP fluctuates with business cycles:
 - Lowest in periods of business expansion
 - Highest in periods of recession.
- Three Approaches
 - Bottom-up implied ERP Estimates (Source: Professor Damodaran)
 - Top-Down implied ERP Estimates (Source: Stephen Hassett)
 - Surveys (source: John Graham and Campbell Harvey)

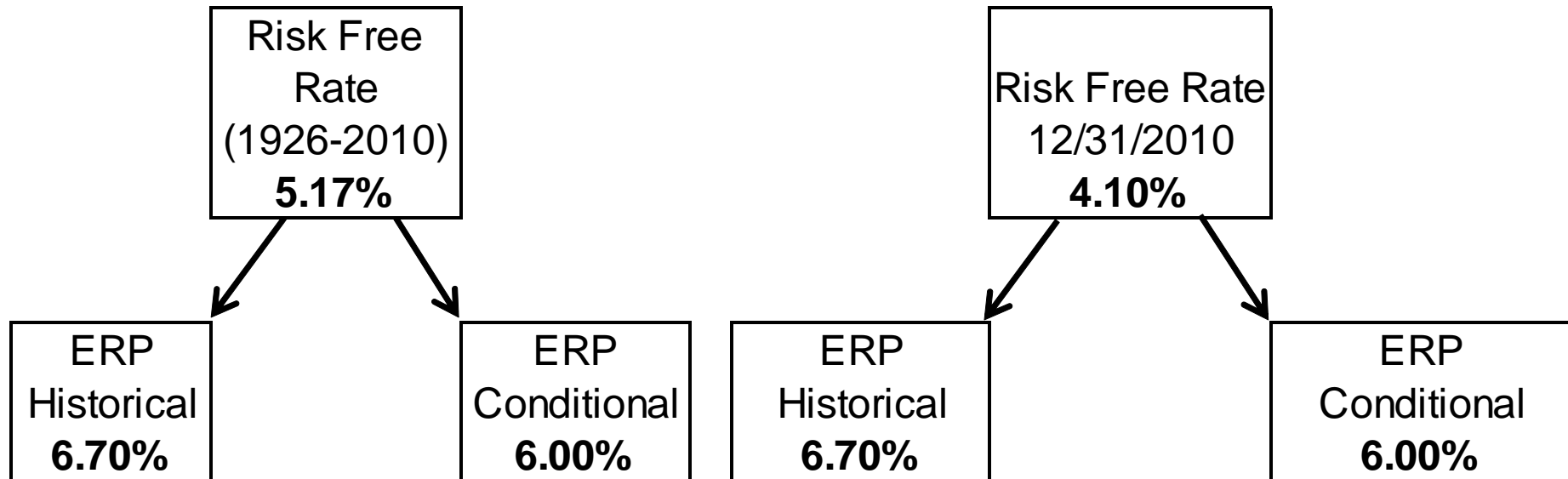
Source: Developing the Cost of Equity Capital: Risk-Free Rate and ERP During Periods of “Flight to Quality”, Roger Grabowski, ASA

Conditional/Ex Ante Equity Risk Premium

“Based on the studies and the data presented we conclude that a reasonable long-term range of conditional ERP estimates over the entire business cycle is 3.5% to 6.0%. This compares to the realized risk premiums for the periods 1926 – 2010 of 6.72%.”

Source: Developing the Cost of Equity Capital: Risk-Free Rate and ERP During Periods of “Flight to Quality”, Roger Grabowski, ASA

Recap: R_f & ERP



Beta Adjusted v. Non-Beta Adjusted Size Premium

- Table 7-4, 2011 Ibbotson® SBBI® Valuation Yearbook Reports Annual Return, Arithmetic Mean for the 10th Decile is 21%.
- Using the Key Variables at the end of the Yearbook, the calculation would be as follows:

TABLE C-1, Key Variables in Estimating the Cost of Capital
2011 Ibbotson® SBBI® Valuation Yearbook

Risk Free Rate	4.10%
Long Term ERP	6.70%
Size Premium 10th Decile	6.36%
Total	<u>17.16%</u>

What Happened to the 4%?

The difference is Beta for the 10th decile

- Using the buildup method, the size premium is based on “beta-adjusted size premium”
- Non-beta adjusted small stock premium assumes the subject company has the same systematic risk as the portfolio of small stocks used in the calculation of the size premium.
- A beta adjusted size premium isolates excess return due to size. In theory, it can be used without making any assumptions regarding the company’s systematic risk.

10th Decile

Based on Historical Data from 1920 - 2010

Arithmetic Mean Return	20.97%
Risk Free Rate	5.17%
	15.80%
Historical Equity Risk Premium	6.70%
Implied Size Premium	9.10%

Reported Size Premium	6.36%
Variance	2.74%

CAPM for the 10th Decile

Equity Risk Premium	6.70%
Beta	1.41
	9.45%
Historical Equity Risk Premium	6.70%
Systematic Adjustment due to Beta	2.75%

Ibbotson – Size Premium

Summary of the 10th Decile

Decile	Recent Number of Companies		Market Capitalization of Largest Company (in \$000)		Size Premium (Return in Excess of CAPM)	(Decrease) / Increase above 10th Decile
10w	221	13%	235,647		3.99%	
10x	167	10%	179,316		4.96%	
10a	388	23%	235,647		4.55%	-1.82%
10y	304	18%	143,379		9.15%	2.78%
10z	990	59%	85,670		12.06%	5.69%
10b	1,294	77%	143,379		10.06%	3.69%
10th	1,682	100%	235,647		6.37%	

The 10th Decile represents approximately 33% of total population of Companies and 1% of Total Market Capitalization

Duff & Phelps

Risk Premium Report Overview

- Data is reported from 1963 to the Present
- Eight Measures of Size, 25 Portfolios
- Five Exhibits to develop Cost of Equity Estimates
 - Exhibit A provides risk premia over risk free rate in terms of the total effect of market risk and size risk.
 - Exhibit B provides risk premia over CAPM

Duff & Phelps

Risk Premium Report 2012

- Pay attention to detail
 - Be on the look out for ERP Adjustment
 - Know what the current ERP Adjustment is
 - Understand when it applies
 - *The ERP Adjustment is always necessary when using “risk premia over the risk-free rate”, but is never necessary when using “risk premia over CAPM”*
 - Risk Free Rate – Understand the application of “Normalization”
- Understand which Study and Method is appropriate for your Valuation

Duff & Phelps

Risk Premium Report 2012 (continued)

- Understand which Study and Method is appropriate for your Valuation
 - Three Report Studies:
 - Size Study
 - Risk Study
 - High-Financial-Risk Study
 - 8 Methods (*5 Build-up Methodologies & 2 CAPM Methodologies*)

Case Study

Duff & Phelps: Risk Premium Report 2011

- From 1963-2010 the average annual long-term treasury income return was 6.9%.
- Average annual in the 2011 Report, the average annual return of the portfolios made up of the smallest companies was 21.1%

COE Summary

	Ibbotson 10th Decile Excess CAPM	Ibbotson Historical 1926-2010	Ibbotson Appendix C 12/31/2010	Ibbotson Conditional ERP	Duff & Phelps MVE 12/31/2010	Duff & Phelps MVE Historical
Risk Free	5.2%	5.2%	4.1%	4.1%	4.1%	6.9%
Equity Risk Premium	6.7%	6.7%	6.7%	6.0%	14.1%	14.1%
Size Premium	9.5%	6.3%	6.3%	6.3%		
Equity Risk Premium Adjustment					0.5%	
Total Before Company Specific & Industry Risk Premium	21.4%	18.2%	17.1%	16.4%	18.7%	21.0%
Industry Risk Premium		1.7%	1.7%	1.7%	1.7%	
Company Specific Risk	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Total Cost of Equity	24.4%	22.9%	21.8%	21.1%	23.4%	24.0%