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Saudi Authority for Accredited Valuers

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BV 202:
INCOME APPROACH & THE INTERNATIONAL COST OF CAPITAL

COURSE NOTES – STUDENT VERSION

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About This Course

The International Institute of Business Valuators emphasises that these course materials are not authoritative. They are intended to be used as a foundation for lectures and discussions, in conjunction with observations by the course instructors and students.

The valuation process and approaches presented in this course are:

- Not the only valuation process and approaches used by competent appraisers;
- Not the only way that individual valuation methods could or should be done; and
- Not to be taken as a "cookbook" process or approach that may be applied to any appraisal situation.

Appraisals must be based on full knowledge of the facts and circumstances of the subject company, its industry and the economic environment. A particular valuation process or approach that is relevant for one company at a particular point in time may not be appropriate for another company or a different point in time.

Course Overview

Purpose of BV 202

This course is an introduction to the income approach to value. It is the second course presented in the IIBV curriculum, following BV 201. It is assumed that the student has completed BV 201 and passed the exam, or has taken the 201 challenge examination. The purpose of the course is to bring together the concepts and tools of BV 201 with the new material of the income approach. After completion of the course, the student will have been introduced to all three approaches to value. The course will also introduce some new concepts necessary to address the correlation and conclusion of value.

It is important to note that the course is *introductory* in nature. The assumption is that although the student may have limited experience in valuation or in a related financial field, he/she has received no formal valuation training other than BV 201. This is not a course in advanced cost of capital techniques.

The objective of iiBV 102 is for you to master the fundamental theory and practice underlying the income approach to value. This basic body of valuation knowledge is common to all countries. After understanding the fundamentals of the income approach you should be capable of adapting the theory to the challenges and issues in your specific market.

Format

The course is presented in eleven chapters which consist primarily of the lecture format. Part of the material is drawn from classic finance education, including capital markets theory, while some is based on valuation tools and techniques which comprise current best practices as of 2012. Some material is drawn from common practices in developing economies and is not supported by theoretical research or documented studies.

Each chapter includes problem sets or multiple choice questions which are intended to test the student on material presented in the preceding chapter. These questions will be handled in class, time permitting, or as homework if necessary. It is important that the student understand the solutions/answers to these exercises. These questions mimic the type of questions that the student will see in the exam.

Several readings are included as appendices to certain chapters. The readings will be assigned as homework and will be discussed in class. The readings are intended to help the student understand the material presented in the chapter.

Ask questions if the discussion covers unfamiliar material. It is unlikely that you are the only one who has questions. More than the lecture courses, this course offers you the opportunity to learn from the experience of other practitioners. Students come from different practices and

have varying experiences and viewpoints. It is probably that your viewpoint will enhance the understanding of another student.

Exam

On the fourth day of the course, you will take a three-hour multiple-choice exam, consisting of 100 questions, each worth one point. A passing grade is 75% or above. At the end of class on the third day, the instructors will conduct an exam review session that will highlight important areas of the course materials to understand for the exam. Instructors are also available to answer questions on a one-on-one basis before or after class and at some breaks.

CHAPTER 1 – OVERVIEW OF THE INCOME APPROACH TO VALUE

I. Course Topics

A. The relationship between company and industry risk analyses and a company's cost of equity

B. Equity valuation analysis versus invested capital valuation analysis

C. Historical financial statements and forecasting

D. International economics

E. The capital asset pricing model (CAPM)

   1. Risk-free rate

   2. Beta

   3. Equity risk premium

   4. Size and specific risk

F. Applying the CAPM during periods of high volatility

G. Country risk and its quantification in the CAPM

H. Cost of debt and the weighted average cost of capital (WACC)

I. Cost of debt in a multi-country environment

J. Single period capitalisation and discounted models

K. Valuation adjustments and the income approach

L. Correlating the market, cost and income approaches into a final opinion of value

II. Overview of Income Approach

A. Income Approach – Defined in the International Glossary of Business Valuation Terms ("International Glossary") as:

"A general way of determining a value indication of a business, business ownership interest, security, or intangible assets using one or more methods that convert anticipated economic benefits into a present single amount."

B. The income approach is based on the financial concept that the value of an asset is equal to the present value of the asset's future benefits. Hence, the income approach is used to value not just business equity, but also real estate, tangible equipment, and intangible assets.

1. Components of the income approach

a. Time period

(1) Future benefits can last for a finite period or into perpetuity.

(2) An intangible asset, such as a patent, may have a defined life. The cash flows that the patent generates would be projected over the finite life and discounted to present value.

(3) Most businesses project cash flows into perpetuity. Both a single period and multi-period discount model can accommodate projections into perpetuity.

b. Growth rate

(1) Growth is measured in percentage terms on the base year.

(2) The growth rate can be a constant percentage into perpetuity or it can change each time period.

c. Risk factor

(1) Represents the risk that projected cash flows will be actualized

(2) Measured as a percentage rate, alternatively referred to as the required rate of return, discount rate, cost of equity, cost of capital, or weighted average cost of capital.

(a) These rates are not all synonymous. The rate used depends on the nature of the cash flow stream being discounted.

(3) The higher the perceived risk of actualizing the projected cash flows, the higher the rate of return and the lower the present value

III. Capitalization of Benefits

A. The income approach to value includes two methods, the capitalization methodology and the discounted earnings methodology. The capitalization method is a single calculation, as discussed below.

1. Definitions (from the International Glossary)

a. Capitalization

"A conversion of a single period of economic benefits into value"

b. Capitalization Factor

"Any multiple or divisor used to convert anticipated economic benefits of a single period into value."

c. Capitalization Rate

"Any divisor (usually expressed as a percentage) used to convert anticipated economic benefits of a single period into value."

$$\text{Fair Value} = \frac{\text{Economic Benefit}}{\text{Capitalisation Rate}}$$

B. The capitalization of benefits method is based on the formula for calculating the value of an anticipated economic benefit of a single period growing at a constant rate in perpetuity as follows:

$$\text{Value} = \frac{\text{Income}_1}{k - g}$$

Where:

$Income_1$	=	Representative anticipated economic benefit in the year after the valuation date
k	=	Discount rate that reflects the risk of the specific anticipated economic benefit
g	=	Constant growth rate for the economic benefit into perpetuity

1. The $income_1$ variable represents the first year of a forecast. It is calculated by taking the latest year's historical earnings and multiplying by one plus the growth rate.

2. This model, also known as the Gordon Growth Model, is a shortened version of the discounted future benefits formula discussed in the next section of this chapter.

    a. The difference between a capitalisation model and a discounted future benefits model is that the discounted future benefits model has a certain number of years of specifically forecasted earnings prior to the calculation of capitalised earnings.

3. The capitalisation rate equals the denominator (k – g), and is therefore a discount rate less perpetual growth.

C. Example

1. Acme, PLC is a small hospital supply company that has generated steady cash flows over the past 15 years.

    a. The Company's after-tax equity cash flows have grown at a consistent rate of 4.0% over the past decade.

    b. Management predicts, and all industry data supports, that cash flows will continue to grow at 4.0% in the long term future.

    c. The valuation date is December 31, 2011, and normalized equity cash flow for the fiscal year 2012 is projected to be £250,000.

    d. The valuation analyst assessed a discount rate equal to 19.0%.

2. The fair value of the company at the end of 2011 is calculated as follows:

$$\text{Value} = \frac{£\ 250{,}000}{(19.0\% - 4.0\%)}$$

$$\text{Value} = £\ 1{,}666{,}667$$

D. Components of the Capitalisation Method

1. Economic benefits to be capitalised

   a. The capitalised economic benefits should be based on stabilized operations, which, when coupled with a steady growth rate, represents future economic benefits.

   b. Anticipated growth is a function of management input and verification through independent company, industry, and economic analysis.

      (1) For a steadily increasing business, as was exemplified above, the relevant growth rate will likely be represented by recent history.

      (2) If the business is cyclical, then a longer historical analysis is necessary and an average growth rate over an entire cycle may be appropriate, or a discounted earnings model which specifically forecasts the near-term years can be used.

      (3) For a declining business, it may be more appropriate to look at a cost approach using liquidation values if there is no expectation of turning operations around.

      (4) If the company has no clear earnings trend, then the factors which cause the volatility should be determined. It is unlikely that a capitalisation model would be appropriate unless a reasoning can be developed to support an average rate of growth.

2. The capitalisation rate

   a. Capitalisation rates can be developed on an equity or invested capital basis. (Invested capital concepts are discussed in Chapter 2.)

      (1) Equity capitalisation rates start with a discount rate developed using the capital asset pricing model or the build-up model.

(a) The equity discount rate reflects the risk of the equity investor cash flows.

(b) The equity capitalisation rate equals the equity discount rate less growth.

(2) Invested capital capitalisation rates are derived from the weighted average cost of capital (WACC), which is a blend of the cost of equity and the cost of debt. The WACC, less growth, yields the invested capital capitalisation rate.

b. Analysts can derive capitalisation rates from sources other than the CAPM or build-up model.

(1) Public Stock market – Assuming a robust set of guideline public companies that are truly similar to the subject company, the cap rate can be derived from a representative market multiple from this group.

(a) At the very least the analyst should compare the capitalisation rates used in the income approach to the implied rates from the market approach.

(2) Transaction Method – The market multiples derived from a transaction analysis have the same theoretical standing as the multiples from a guideline company analysis. However, as was discussed in IIBV 101, there are several limitations of the Transaction Method.

(a) The price paid may not represent fair value since synergistic value may have been included.

(b) If it was an asset deal (i.e. price paid for invested capital), there is an implicit assumption about capital structure.

(c) With very small companies, there may be accounting irregularities that are not reflective of the IFRS assumptions made in the valuation.

(d) If the company is in an industry that is experiencing a "roll-up" or a consolidation trend, the price terms may not transfer well between the transaction date and the valuation date in the analyst's report.

3. The Discount Rate

a. Factors affecting discount rates are discussed in Chapters 3,5 and 6.

b. External factors such as national and local economic conditions, local industry risks, cost and availability of capital, competition, etc. all affect the rate chosen.

c. Internal factors include the subject company's business risk (quality of management, customer relationships) and financial condition (margin levels, financial ratios, leverage).

4. Long- term Growth

a. Although the time horizon for any investment cannot be known with certainty, the assumption in business valuation is that fair value is a present value of benefits that extend into perpetuity.

(1) An exception may be if a company is known to have a finite time horizon at which point it will be dissolved.

(2) Other assignments, such as a capital budgeting analysis, may have a defined limited life and therefore require alternate assumptions.

b. Most businesses are subject to life cycles from early stage to maturation and decline. The subject company's position in its life cycle should be considered.

(1) Also, research shows that investors with controlling interests have holding periods that average in the 10-15 year range. While this factor may not affect overall company value, it may affect the value of non-control interests.

c. The analysts should be careful not to assume long term growth that exceeds inflation plus population growth. The implication of this is that the company will be a dominant player in the economy in the long term future.

E. Correlating the Income Approach – Capitalisation Method with the Market Approach

1. The capitalisation rate is the inverse of the market multiple in the Market Approach.

a. The price/earnings multiple is the inverse of the earnings cap rate.

(1) P/E multiple = 8.0x

(a) Capitalisation rate therefore equals 1/8, or a capitalisation rate of 12.5%.

(b) Embedded in the cap rate of 12.5% are the discount rate and the perpetual growth rate.

b. The same is true for other measures of economic benefits. For example, if the Price/equity cash flow multiple equals 9.0x, and the estimated long-term growth rate is 4.0%, what is the implied discount rate?

(1) P/CF multiple = 9.0x

(a) Capitalisation rate therefore equals 1/9, or a cap rate of 11.1%.

(b) Given a constant growth rate of 4.0%, the discount rate would have to be 15.1% since the capitalisation rate equals (k – g), or 15.1% - 4.0% = 11.1%.

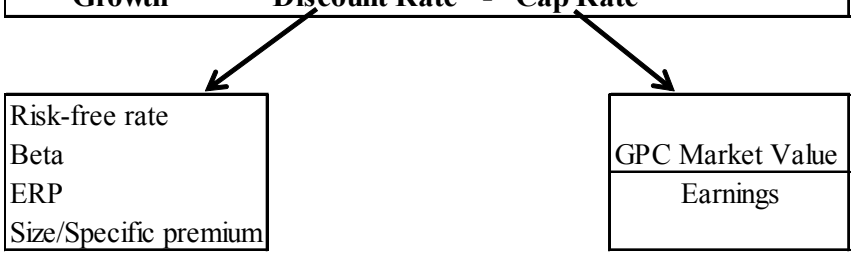
2. Therefore, in the market approach, growth is embedded in the multiple. In the income approach growth is quantified in the capitalisation formula.

a. Since the guideline public company has information available, the embedded growth rate can be derived and compared to the subject.

Cap Rate = Discount Rate - Growth

Solve for growth:

Growth = Discount Rate - Cap Rate



b. The discount rate, or the WACC in an invested capital analysis, can be calculated for the guideline company. The components of the CAPM are market driven. Depending on the GPC's market, the size premium or specific risk premium, if existent, may be subjective, but reasonably estimated.

c. The market value of the guideline public company (GPC) is known and its earnings are known. Therefore, the analyst can calculate the GPC's cap rate.

d. By deriving the discount rate and cap rate, the growth rate that the market has built into the company's price can be derived.

Example - Deriving Growth Rate from Market Multiple	
Guideline Company EBITDA =	€ 260,000
Guideline Company depreciation =	60,000
Guideline Company earnings before interest & tax (EBIT) =	200,000
Tax Rate =	25.0%
Taxes =	50,000
Net operating profit after-tax (NOPAT) =	150,000
Total Company MVIC (share price * shares + debt) =	€ 1,900,000
NOPAT Multiple (1,900,000/150,000) =	12.7
Implied market capitalisation rate (1/12.7) =	7.9%
Weighted Cost of Capital (derived based on information)*	12.5%
Implied Market Growth Rate (WACC - capitalisation rate) =	***4.6%***
* The WACC is derived from available data (risk-free rate, guideline company beta, equity risk premium, guideline company capital structure, value of debt and equity)	

3. The analyst should derive the embedded growth rates for all GPCs, especially if the group constitutes a collection of 'pure plays'.

   a. The subject company's long term growth rate does not need to equal the GPC's growth, but variations should be explainable.

F. Capitalisation Rates for Other Measures of Income

1. Capitalisation rates differ for varying levels of anticipated economic benefits.

   a. The higher up the level of economic benefit is on the income statement (e.g. net income is higher than net cash flow; EBIT is higher than net income, etc.) the larger the capitalisation rate.

2. The derivation of the discount rate from the CAPM or build-up model as discussed above is applicable to net after-tax equity cash flow.

3. If the analyst is working with a small company and wants to derive a capitalisation rate for net income or pre-tax earnings, then an adjustment is necessary.

   a. It is appropriate to use net income in a valuation calculation only if it is a valid proxy for cash flow. Assuming that net income is a valid proxy, and assuming that the relationship between net income will remain constant into perpetuity (which are two very large assumptions), then the following conversion can be completed:

$$CR_{\text{net income}} = NI/NCF * CR_{\text{net cash flow}}$$

Where:

CR =	Capitalization rate
NI =	Net income
NCF =	Equity net cash flow

   b. For example, if normalized net income is expected to be 125% of normalized net cash flow, an 18.0% net cash flow capitalisation rate translates into a 22.5% net income capitalisation rate.

      (1) 1.25 * 18.0% = 22.5%

4. Converting a net income capitalisation rate to a pre-tax income capitalisation rate:

   a. Divide the net income capitalisation rate by one minus the tax rate.

$$CR_{\text{pretax income}} = CR_{\text{net income}} / (1 - \text{tax rate})$$

   b. Assuming an 18.0% net income capitalisation rate and a 25.0% tax rate, this would be:

= 18.0%/ (1 - 25.0%)
= 18.0%/ 75.0%
= 24.0%

5. It should be remembered that the legitimacy of using alternate economic benefits such as net income or pre-tax income should be explained. Investors base investments on equity or invested capital cash flow.

IV. Discounted Future Earnings Method

A. The discounted future earnings method is defined as:

"A method within the income approach whereby the present value of future expected economic benefits is calculated using a discount rate."(International Glossary)

1. The discounted future benefits method allows for greater flexibility and precision in reflecting known variations in the future anticipated economic benefits of a business.

   a. Equity net after-tax cash flow, or invested capital after-tax cash flow are usually used in a discounting model. This section will assume cash flow benefits.

B. The discounted future benefits method involves the following steps.

1. Forecast specific cash flows for a specific number of years (known as the discrete projection period.)

2. Discount each year's cash flow to present value at the appropriate discount rate.

3. Add the present values of the specifically forecasted periods.

4. Determine the value of the business at the end of the discrete projection period, which is usually referred to as the terminal value, continuing value, or residual value.

   a. The terminal value is the capitalisation model calculated after the last individually projected year. The terminal value captures the value of the company after the discrete projection period.

5. Add the terminal value to the sum of the present values in the discrete projections.

C. Discounting Formulas

1. The full equation for discounted future benefits:

$$\text{Value} = \frac{NCF_1}{(1+k)^1} + \frac{NCF_2}{(1+k)^2} + \frac{NCF_3}{(1+k)^3} + \frac{NCF_4}{(1+k)^4} + \ldots + \frac{NCF_\infty}{(1+k)^\infty}$$

Where:

NCF = Net cash flow
k = Net cash flow discount rate

2. This equation can be shortened to:

$$\text{Value} = \sum_{n=1}^{n=\infty} \frac{NCF_n}{(1+k)^n}$$

Where:

NCF = Net cash flow
k = Net cash flow discount rate
n = Time period

3. The equation can be further modified where n is a finite period of time ending with period t, and all future value beyond t is included as a terminal value:

$$\text{Value} = \sum_{n=1}^{n=t} \frac{NCF_n}{(1+k)^n} + \frac{TV_t}{(1+k)^t}$$

Where:

NCF = Net cash flow
k = Net cash flow discount rate
n = Time period
TV = Terminal value
t = Years in discrete projection period

4. The components of this model must each be analyzed.

   a. The length of the discrete projection period

   b. The forecasted cash flow

c. Discounting conventions

d. Calculating terminal value

D. Length of Discrete Projection Period

1. Specific annual forecasts should be made out to a point in the future where operations are normalized.

   a. If a company is experiencing losses, the discrete period should last until operations are not only turned around, but profits can be forecasted at a stable growth rate.

   b. If the company is undergoing an expansion, either due to a major capital investment or acquisition of another entity, extraordinary cash flow items are specifically forecasted until normalization.

   c. In the case of a start-up or early stage business, alternate valuation models might be considered. If a discounted cash flow model is used however, the discrete projection might be lengthy until normalization is reached.

2. Many practitioners use a 5-year discrete projection period, although this may be the case since in-house models are set up that way. There is no inherent relationship between a 5-year period and a normalization cycle. Each company is different and discrete projections could last 1-2 years up to 20 years.

   a. It should be remembered that the further out the specific forecast is, the less certainty the analyst has (i.e. most business owners would be highly skeptical of a discrete projection that lasts 20 or more years).

E. Forecasting Net Cash Flow

1. Many firms rely on management forecasts for liability reasons. However, management's projections may have ulterior motives.

   a. Projections made for banking purposes or impairment studies may be overly optimistic.

   b. If the analyst accepts management's forecasts as part of the valuation, he is accepting the reasonableness of the forecast.

(1) The ultimate opinion of value is owned by the valuation analyst, not management.

c. Therefore, the forecast should be made in the context of extensive industry and economic analysis, as well as internal financial analysis.

d. Any pro forma set of projections provided by management needs to be verified through independent research and testing.

e. If the analyst prepares his or her own projections, management should be consulted and asked to sign off.

F. Discounting Conventions

1. There are generally two options, end-of-year discounting and mid-year discounting.

a. End-of-year discounting assumes that all cash flows are received on the last day of the year. Although this convention is used in many small entities, it is unrealistic except for certain types of companies, such as seasonal businesses.

(1) The denominator for end-of-year discounting is:

$$\frac{1}{(1+k)^t}$$

Where:

t = Year from which cash flow is received

b. Mid-year discounting assumes that cash flows are received evenly throughout the fiscal year. Cash flows are discounted from the mid-point in the year.

(1) The denominator for mid-year discounting is:

$$\frac{1}{(1+k)^{t-.05}}$$

Where:

t = Year from which cash flow is received

2. A present value based on end-of-year discounting (PV_e) can be converted to a present value based on mid-year discounting (PV_m) by growing the PV_e for one-half period using the discount rate as follows:

$$PV_m = PV_e * (1 + k)^{.5}$$

G. Calculating Terminal Value

1. The terminal value captures the value from the end of the discrete period into perpetuity. It is a single-period capitalisation model calculated at the end of the last year of the discrete forecast.

   a. The terminal value calculated as a perpetuity is reasonable only if the subject business is expected to continue indefinitely.

   b. If the company is a liquidation candidate it may be reasonable to insert the liquidation value in the terminal year, less taxes and transactions costs.

   c. Some practitioners apply a market multiple to an earnings measure such as EBITDA to calculate the terminal value. This is often made under the assumption that the Company will be sold in a matter of years.

      (1) While it is reasonable to expect a sale, especially in a private equity investor scenario, it is difficult to assume that any specific market multiple will be applicable years in the future.

2. Formula for calculating the terminal value formula using the single period Gordon Model:

$$\frac{NCF_t * (1 + g)}{k - g}$$

Where:

t = Length of discrete period
NCFt = Net Cash Flow in last year
k = discount rate
g = long-term growth rate

   a. This model grows the cash flow from the last year of the discrete projection period at the long-term growth rate.

   b. Care should be taken to ensure that the cash flow adjustments in the last year of the discrete projection can be validly forecast at the long-term growth rate.

3. The terminal value is then discounted to present value at the valuation date, as follows:

$$PV = \frac{\frac{NCF_t * (1 + g)}{k - g}}{(1 + k)^t}$$

4. If the assumption is that cash flows will be received periodically in the future, then the mid-year discounting assumption should be used. This can be handled by discounting the future value by (t-.05) as shown below.

$$PV = \frac{\frac{NCF_t * (1 + g)}{k - g}}{(1 + k)^{t-.05}}$$

Or

$$PV = \frac{\frac{NCF_t * (1 + g)}{k - g} * (1 + k)^{\wedge .5}}{(1 + k)^t}$$

5. Perpetuity growth will be discussed in the forecasting module in Chapter 4. It would be difficult to support growth that exceeds the 5.0% - 6.0% range.

6. If a business is expected to grow into perpetuity, it is likely that capital expenditures will exceed depreciation since capital investment precedes depreciation.

   a. Some analysts make the argument that capital investment and depreciation should equal each other in a residual model since everything that is purchased gets depreciated. However, in a constant growth environment, it is the timing of each that is important.

7. It is wise to conduct a sensitivity analysis on the terminal value, first calculating the percentage of overall value comprised by the terminal calculation.

V. Chapter Exercises

1. Capitalisation Model - Calculate the value of equity for a client company as of 12/31/2010 given the following variables:

   - 2010 net income after tax = £1,250,000
   - 2010 net after-tax invested capital cash flow = £1,400,000
   - 2010 net equity after-tax cash flow = £925,000
   - Market value of debt = £1,500,000
   - Cost of equity = 18%
   - Cost of debt = 6%
   - Perpetual revenue growth rate = 6.0%
   - Perpetual cash flow growth rate = 4.0%

2. Discounted Earnings Model – Calculate the net present value of this subject company based on the following information. Assume the company receives its cash flow periodically during the year.

   - Valuation date = December 31, 2010
   - Discount rate = 17.0%
   - Cash flow, year 0 = €1,775,000
   - Growth, 2011-13 = 8%
   - Growth, 2014-15 = 6%
   - Growth after 2015 = 4%

3. XYZ Company has been valued at £114,000,000. What is the long term constant growth rate? Additional information:

   - Value = £114 m.
   - Cash Flow, year zero = £14,250,000
   - Cost of equity = 17.0%

CHAPTER 2 – FINANCIAL ANALYSIS AND FORECASTING

I. Introduction

A. BV 201 dealt with company, economic, and industry analyses which address the qualitative risk factors that affect the subject business. This chapter focuses on the quantitative risk factors that arise from a financial statement analysis.

B. A review of financial ratio analysis, trend analysis, and common size analysis is contained in the Appendix of this Chapter. It is advisable that the student review this material especially if some time has elapsed since completion of BV 201.

C. Topics covered in this chapter include:

1. Financial statement analysis case study

2. Financial forecasting

II. Financial Statement Analysis Case Study

A. The historical balance sheets, income statements and financial ratios are shown below for Atlantic Beverages GmbH for the years 2007 through 2010. Atlantic is a relatively small manufacturer of soft drinks located in Germany. Although there is information lacking (no notes to financial statement, no statement of cash flows, no breakdown of cost of sales or selling, general & administrative expense), you have been assigned the task of providing a preliminary financial analysis on the company.

   Financial ratios are based on historical financial statements. The last column of data contains averages from an industry survey of European beverage manufacturers.

B. Review the financial statements below and answer the questions that follow.

Atlantic Beverage GmbH
Historical Balance Sheets

					Percent of Total Assets			
ASSETS	**2007**	**2008**	**2009**	**2010**	**2007**	**2008**	**2009**	**2010**
Current Assets								
Cash	€ 46,352	€ 1,239	€ 18,825	€ 10,179	*2.4%*	*0.1%*	*1.4%*	*1.0%*
Accounts receivable	375,698	285,656	328,006	168,865	*19.4%*	*20.2%*	*23.9%*	*17.1%*
Inventories	420,332	363,682	480,027	441,088	*21.7%*	*25.7%*	*35.0%*	*44.8%*
Other current assets	456	-	61,420	64,000	*0.0%*	*0.0%*	*4.5%*	*6.5%*
Total Current Assets	842,838	650,577	888,278	684,132	*43.5%*	*45.9%*	*64.8%*	*69.4%*
Gross Fixed Assets	2,147,974	2,432,169	2,553,340	2,634,345	*110.8%*	*171.7%*	*186.1%*	*267.4%*
Less: accumulated depreciation	(1,187,259)	(1,666,196)	(2,080,212)	(2,335,543)	*-61.3%*	*-117.6%*	*-151.6%*	*-237.0%*
Property and Equipment, net	960,715	765,973	473,128	298,802	*49.6%*	*54.1%*	*34.5%*	*30.3%*
Other Assets	134,264	-	10,330	2,384	*6.9%*	*0.0%*	*0.8%*	*0.2%*
TOTAL ASSETS	€ 1,937,817	€ 1,416,550	€ 1,371,736	€ 985,318	*100.0%*	*100.0%*	*100.0%*	*100.0%*
LIABILITIES & EQUITY								
Current Liabilities								
Current portion of LTD	€ 795,361	€ 828,540	€ 565,018	€ 100,000	*41.0%*	*58.5%*	*41.2%*	*10.1%*
Accounts payable	138,442	129,427	262,138	199,076	*7.1%*	*9.1%*	*19.1%*	*20.2%*
Other current liabilities	36,969	45,215	92,535	71,650	*1.9%*	*3.2%*	*6.7%*	*7.3%*
Total Current Liabilities	970,772	1,003,182	919,691	370,726	*50.1%*	*70.8%*	*67.0%*	*37.6%*
Long Term Debt					*0.0%*	*0.0%*	*0.0%*	*0.0%*
Other liabilities	-	4	3	-	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Long-term debt, net	469,383	-	-	316,667	*24.2%*	*0.0%*	*0.0%*	*32.1%*
Total Long-term liabilities	469,383	4	3	316,667	*24.2%*	*0.0%*	*0.0%*	*32.1%*
Total Liabilities	1,440,155	1,003,186	919,694	687,393	*74.3%*	*70.8%*	*67.0%*	*69.8%*
					0.0%	*0.0%*	*0.0%*	*0.0%*
Total Capital	497,662	413,364	452,042	297,925	*25.7%*	*29.2%*	*33.0%*	*30.2%*
Total Liabilities and Capital	€ 1,937,817	€ 1,416,550	€ 1,371,736	€ 985,318	*100.0%*	*100.0%*	*100.0%*	*100.0%*

Atlantic Beverage GmbH
Historical Income Statements

					Percent of Sales			
	2007	**2008**	**2009**	**2010**	**2007**	**2008**	**2009**	**2010**
Revenue	€ 3,890,801	€ 2,985,252	€ 3,717,785	€ 2,748,148	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Total Cost of Revenues	2,148,711	1,631,744	2,129,580	1,485,962	*55.2%*	*54.7%*	*57.3%*	*54.1%*
Gross Profit	1,742,090	1,353,508	1,588,205	1,262,186	*44.8%*	*45.3%*	*42.7%*	*45.9%*
Total General and Administrative Expenses	1,182,367	959,421	976,823	841,387	*30.4%*	*32.1%*	*26.3%*	*30.6%*
EBITDA	559,723	394,087	611,382	420,799	*14.4%*	*13.2%*	*16.4%*	*15.3%*
Depreciation	291,706	420,345	291,805	276,332	*7.5%*	*14.1%*	*7.8%*	*10.1%*
Operating income	268,017	(26,258)	319,577	144,467	*6.9%*	*-0.9%*	*8.6%*	*5.3%*
Interest	(23,435)	(8,602)	(32,209)	(7,707)	*-0.6%*	*-0.3%*	*-0.9%*	*-0.3%*
EBT	€ 244,582	(€ 34,860)	€ 287,368	€ 136,760	*6.3%*	*-1.2%*	*7.7%*	*5.0%*

Atlantic Beverage GmbH
Financial Ratios

	2007	2008	2009	2010	4-Year Avg.	Industry Norm
Revenue	€ 3,890,801	€ 2,985,252	€ 3,717,785	€ 2,748,148	n/m	n/a
Revenue Growth		*-23.3%*	*24.5%*	*-26.1%*		
Profitability Ratios						
Gross profit margin	44.8%	45.3%	42.7%	45.9%	44.7%	34.6%
EBT margin	6.3%	-1.2%	7.7%	5.0%	4.5%	4.9%
EBIT margin	6.9%	-0.9%	8.6%	5.3%	5.0%	5.5%
EBITDA margin	14.4%	13.2%	16.4%	15.3%	14.8%	n/a
ROE (EBT/Equity)	49.1%	-8.4%	63.6%	45.9%	37.5%	9.0%
ROA (EBIT/Assets)	13.8%	-1.9%	23.3%	14.7%	12.5%	4.4%
ROIC (EBIT/Equity & Debt)	15.2%	-2.1%	31.4%	20.2%	16.2%	n/a
Liquidity Ratios						
Current ratio	0.9	0.6	1.0	1.8	1.1	2.0
Quick ratio	0.4	0.3	0.4	0.7	0.5	1.1
Coverage Ratios						
Times interest earned	11.4	(3.1)	9.9	18.7	9.3	1.8
Asset Management Ratios						
Total asset turnover	2.0	2.1	2.7	2.8	2.4	2.3
Accounts Receivable turnover	10.4	10.5	11.3	16.3	12.1	13.6
Days of receivables	35.2	34.9	32.2	22.4	31.2	26.8
Inventory turnover	5.1	4.5	4.4	3.4	4.4	13.9
Days of inventory	71.4	81.4	82.3	108.3	85.8	26.3
Accounts payable turnover	15.5	12.6	8.1	7.5	10.9	19.2
Days payables	23.5	29.0	44.9	48.9	36.6	19.0
Cash cyle	83.1	87.3	69.5	81.9	80.5	34.1
Sales/Net fixed assets	4.0	3.9	7.9	9.2	6.3	5.5
Oper. Working capital/sales	17.2%	15.9%	14.4%	15.0%	15.6%	n/a
Leverage Ratios						
Total debt/ equity	2.89	2.43	2.03	2.31	2.4	1.20
Long term debt/total assets	0.65	0.58	0.41	0.42	0.52	0.21
Interest bearing debt/ equity	2.54	2.00	1.25	1.40	1.8	n/a
Assets/ equity	3.89	3.43	3.03	3.31	3.4	2.2

n/a = not available
n/m = not meaningful

C. Case Study Questions

1. Calculate the change in operating working capital in 2009 and 2010. For the calculation of operating working capital include all current assets, but exclude interest bearing debt from liabilities.

2. As of 2010, what is the average life and the average age of fixed assets?

3. Provide 3 or 4 fundamental observations from the balance sheet that should be asked of management.

4. Provide 3 or 4 fundamental observations from the income statement that should be asked of management.

5. Atlantic's average gross profit margin is about 10% higher than the industry norm, but its average operating margin is similar. What is one possible explanation?

6. Assess the condition of Atlantic's liquidity and working capital management relative to the industry norm.

7. What are possible reasons for the difference in Days of Inventory between Atlantic and the industry norm?

8. Why is Atlantic's sales/net fixed assets so much higher than the norm?

9. If sales/net fixed assets is so different, why is total asset turnover so similar?

10. What is Atlantic's capital structure relative to the industry and is this factor an indication of financial risk?

III. Forecasting

A. Introduction

1. As was discussed in Chapter 1, valuation analysis is the process of quantifying a company's growth and risk. If either of these analyses is done incorrectly or without adequate support, the valuation result will be inaccurate.

2. The forecast of operating cash flow represents the analyst's quantification of growth. For this reason, considerable time and effort should be exerted to develop a well-documented set of operating projections that are grounded in all known and knowable facts about the company.

3. Some analysts accept management's projections without question or further analysis. This is inappropriate since management's projections could be skewed to achieve a desired result.

    a. A projection developed for an impairment analysis or for banking purposes may be overly aggressive.

    b. A projection developed for the purpose of buying out a departing partner may be overly pessimistic.

4. The best forecast is usually done through a combined effort between management and the valuation analyst. The analyst will often begin with management's projections and then adjust elements of the forecast if adequate support is found.

    a. If the analyst develops a forecast completely on his own, management should be asked to sign off on the projections prior to completing the job.

B. The Sales Forecast

1. The sales forecast is the most common way to project a company's operations. The steps in the sales forecast process are as follows:

    a. Complete the financial ratio analysis and understand the relationships between all income statement and balance sheet accounts.

    b. Select the number of years that operations can be specifically forecast with specificity. Sometimes a forecast can be made for only 2 to 3 years since operations beyond that point are an unknown. Other times a forecast can be made for an entire economic cycle which may span 5 to 10 years.

        (1) The rule is that the assumptions behind each year of the specific (or discrete) forecast must be documented.

2. Project the income statement

    a. Forecast sales growth throughout the discrete period.

        (1) Each year's growth assumption should be supported by an industry factor or internal company factor.

(2) If the subject is a manufacturer, it is most useful to project unit sales and then include an inflation factor to reach the currency sales.

b. Project cost of goods sold as a variable expense based on research into raw material prices and the company's past gross profit margin.

c. Project selling, general and administrative expense

(1) Variable overhead – variable expenses can be projected as a percentage of each year's sales.

(2) Fixed overhead – fixed costs should be projected independently of sales. Examples:

(a) Rent – rent or lease expense is based on the terms of the property lease.

(b) Interest – based on the amount of debt projected to fund operations. This factor may be iterative in that the acquired debt may not be known until profitability is known.

(c) Utilities & taxes – based on management's input, subject to confirmation

(3) Semi-fixed expense – semi-fixed expenses are fixed costs that are applicable only within a given range of sales. Once sales grow out of the given range, the fixed costs will grow into a higher range with sales. Examples:

(a) Depreciation – depreciation should be projected as part of a fixed asset schedule which takes historical gross fixed assets, adds the capital expenditures that must be made each year to support sales, deletes the fixed assets that are retired, and takes the straight-line depreciation on the gross assets.

(b) Salaries – compensation for labor is not directly variable with sales. As sales pass through a relevant range the company can be expected to need more staff to support the larger operation.

(c) The same can be said for physical plant. Hence, rent, utilities, real estate tax, etc. may be considered semi-fixed in certain companies.

d. Project items included in other income or expense as needed.

(1) These items could include items deemed "non-recurring" as long as there is a legitimate expectation that they will occur. These items should not be included in a permanent forecast.

3. Project the balance sheet

a. Balance sheet accounts can be forecast individually by applying the appropriate financial ratio to the relevant income statement account.

(1) A macro can be written in excel to project the balance sheet using the same relationships. This function will iterate levels of financing needed given assumptions put into the model.

(2) A manual example is shown below for a forecast of accounts receivable

	Actual	**Projected Operations**			
	2010	2011	2012	2013	2014
Revenue (mill)	€ 28,000	€ 30,800	€ 33,264	€ 35,260	€ 36,670
growth		10.0%	8.0%	6.0%	4.0%
Accounts receivable	€ 7,300	€ 8,030	€ 8,672	€ 9,193	€ 9,560
A/R Turnover	3.836				

(a) In this example, the A/R turnover in 2010 was 3.836 based on actual results. The analyst expects that this relationship will continue unchanged in the future. Since sales was projected based on the growth rates that are given, the accounts receivable balances can easily be calculated as Sales/3.84.

(b) Therefore projected accounts receivable in 2011 =

- €30,800/3.836 = €8,030

(3) This same process can be completed for each asset account on the balance sheet and for the current liabilities. The objective here is for the analyst to know how much is needed in working capital, fixed assets, and other assets to fund the increase in the income statement.

(4) Third party debt and/or equity should finally be projected based on assumptions about the future capital structure of the business. Assumptions should not be made about future financing needs without consulting management.

(a) The financing forecast is iterative since changes in debt assumptions will change interest expense on the income statement which will change profitability, retained earnings, and possibly the need for external financing.

b. Project Cash Flow

(1) The equity valuation is based on discounted future net after tax equity cash flow. That cash flow is calculated as:

Pre-tax earnings
(taxes)
Net Income
+ depreciation, amort.
+/- changes in working capital
- capital investment
+/- changes in debt principal
Net Equity Cash Flow

C. Common Errors in Forecasting

1. There are two common errors in forecasting:

   a. Shortcuts are made since the analyst does not have the time or sufficient date to perform a fully documented projection.

   b. Accounts are projected without appropriate support

2. Assume an analyst relies on the financial statements provided earlier for Atlantic Beverage GmbH and decides to complete a "quick and dirty" sales forecast based on preliminary discussions with management.

3. A common mistake that analysts make is to forecast the income statement and cash flows without consideration of the effect that growth will have on the balance sheet. Since changes in balance sheet accounts affect cash flow, there is the potential that the valuation will be incorrect since the cash flows will be projected incorrectly.

   a. In this case, management informed the analyst that sales would grow at a declining rate of 20% in 2011 down to 5.0% in 2015, and then grow at 5.0% into perpetuity. The analyst applied those rates to sales, calculated profit margins

based on historical norms, added back non-cash expenses, and discounted future earnings to a present value of 5.53 million euros.

Atlantic Beverage GmbH
Projected Income Statements

		Fiscal Year Ended December 31,					
		2011	**2012**	**2013**	**2014**	**2015**	
Revenue		€ 3,297,778	€ 3,957,333	€ 4,550,933	€ 5,233,573	€ 5,756,930	
Cost of Revenues		1,780,800	2,136,960	2,457,504	2,826,129	3,108,742	
Gross Profit		1,516,978	1,820,373	2,093,429	2,407,444	2,648,188	
General & Administrative		923,378	1,108,053	1,274,261	1,465,400	1,611,940	
EBITDA		593,600	712,320	819,168	942,044	1,036,248	
Depreciation & Amortization		333,076	399,691	459,644	528,591	581,450	
EBIT		260,524	312,629	359,524	413,453	454,798	
Interest expense		(82,444)	(82,444)	(82,444)	(82,444)	(82,444)	
EBT		178,080	230,185	277,080	331,009	372,354	
Income Tax Rate		35.0%	35.0%	35.0%	35.0%	35.0%	
Income Taxes		62,328	80,565	96,978	115,853	130,324	
Net income		115,752	149,620	180,102	215,156	242,030	
Add: non-cash expense		333,076	399,691	459,644	528,591	581,450	**Residual**
Gross cash flow		€ 448,828	€ 549,311	€ 639,746	€ 743,747	€ 823,480	7,274,074
Discount rate	18.0%	413,180	428,544	422,963	416,714	391,007	3,453,892
					Fair Value =		**€ 5,526,299**

4. What are some of the implications of this analysis? Where does the analyst's forecast break down?

5. By default, the analyst has projected the balance sheet shown below.

Atlantic Beverage GmbH
Projected Balance Sheets

ASSETS	2011	2012	2013	2014	2015
Current Assets					
Cash	€ 10,179	€ 10,179	€ 10,179	€ 10,179	€ 10,179
Accounts receivable	168,865	168,865	168,865	168,865	168,865
Inventories	441,088	441,088	441,088	441,088	441,088
Other current assets	64,000	64,000	64,000	64,000	64,000
Total Current Assets	684,132	684,132	684,132	684,132	684,132
Gross Fixed Assets	2,634,345	2,634,345	2,634,345	2,634,345	2,634,345
Less: accumulated depreciation	(2,610,543)	(2,885,543)	(3,160,543)	(3,435,543)	(3,710,543)
Property and Equipment, net	23,802	(251,198)	(526,198)	(801,198)	(1,076,198)
Other Assets	2,384	2,384	2,384	2,384	2,384
TOTAL ASSETS	€ 710,318	€ 435,318	€ 160,318	(€ 114,682)	(€ 389,682)
LIABILITIES & EQUITY					
Current Liabilities					
Current portion of LTD	€ 100,000	€ 100,000	€ 100,000	€ 100,000	€ 100,000
Accounts payable	199,076	199,076	199,076	199,076	199,076
Other current liabilities	71,650	71,650	71,650	71,650	71,650
Total Current Liabilities	370,726	370,726	370,726	370,726	370,726
Long Term Debt					
Other liabilities	-	-	-	-	-
Long-term debt, net	316,667	316,667	316,667	316,667	316,667
Total Long-term liabilities	316,667	316,667	316,667	316,667	316,667
Total Liabilities	687,393	687,393	687,393	687,393	687,393
Total Partners' Capital	22,925	(252,075)	(527,075)	(802,075)	(1,077,075)
Total Liabilities and Partners' Capital	€ 710,318	€ 435,318	€ 160,318	(€ 114,682)	(€ 389,682)

a. Other than accumulated depreciation (which grows since depreciation is reflected in the projection), there is no change projected in any accounts because an implicit assumption behind the income statement cash flows is that no investment is needed in the operations.

   (1) Total asset and equity become negative as fixed assets are depreciated down below zero.

b. Given the income statement and balance sheet projections, note the changes to the projected financial ratios shown below.

Atlantic Beverage GmbH
Financial Ratios

	2011	2012	2013	2014	2015
Revenue	€ 3,297,778	€ 3,957,333	€ 4,550,933	€ 5,233,573	€ 5,756,930
Revenue Growth		*20.0%*	*15.0%*	*15.0%*	*26.5%*
Profitability Ratios					
Gross profit margin	46.0%	46.0%	46.0%	46.0%	46.0%
EBT margin	5.4%	5.8%	6.1%	6.3%	6.5%
EBIT margin	7.9%	7.9%	7.9%	7.9%	7.9%
EBITDA margin	18.0%	18.0%	18.0%	18.0%	18.0%
ROE (EBT/Equity)	776.8%	-91.3%	-52.6%	-41.3%	-34.6%
ROA (EBIT/Assets)	36.7%	71.8%	224.3%	-360.5%	-116.7%
ROIC (EBIT/Equity & Debt)	62.5%	75.0%	86.3%	99.2%	109.2%
Liquidity Ratios					
Current ratio	1.8	1.8	1.8	1.8	1.8
Quick ratio	0.7	0.7	0.7	0.7	0.7
Coverage Ratios					
Times interest earned	3.2	3.8	4.4	5.0	5.5
Asset Management Ratios					
Total asset turnover	4.6	9.1	28.4	-45.6	-14.8
Days of receivables	18.7	15.6	13.5	11.8	10.7
Days of inventory	90.4	75.3	65.5	57.0	51.8
Days payables	40.8	34.0	29.6	25.7	23.4
Sales/Net fixed assets	138.6	(15.8)	(8.6)	(6.5)	(5.3)
Oper. Working capital/sales	12.5%	10.4%	9.1%	7.9%	7.2%
Leverage Ratios					
Total debt/ equity	29.98	-2.73	-1.30	-0.86	-0.64
Interest bearing debt/ equity	18.18	-1.65	-0.79	-0.52	-0.39
Assets/ equity	30.98	-1.73	-0.30	0.14	0.36

n/a = not available
n/m = not meaningful

Profit margins remain the same since the analyst considered all future costs to be variable.

Return ratios make no sense since no consideration was given to balance sheet investment needed to support sales.

Accumulated depreciation was allowed to build without capital investment, making fixed and total assets negative.

Days ratios decline since the balance sheet remains unchanged while the income statement grows.

Capital structure ratios are meaningless since equity declined with a negative asset base.

c. The forecasting errors are reflected in the financial ratios, several of which stray into nonsensical levels by 2014.

(1) The return ratios increase well above believable ranges since the analyst assumed no investment was needed to support sales growth (if he had assumed investment, the cash flow forecast would have been reduced by working capital investment and capital expenditures.)

(2) Turnover ratios increase sharply for similar reasons.

IV. Chapter Exercise

The student disk provided contains the spreadsheets for Atlantic Beverage. This exercise is a continuation of the example shown at the end of Chapter 2 for this company. The first two tabs in the spreadsheet contain the historical balance sheets

("HBS") and the historical income statement ("HIS") for Atlantic Beverage for the years 2007-2010, as shown in Chapter 2 above. The third tab contains the historical financial ratios ("His Ratios") that are derived from the historical income statements and balance sheets.

Based on your critique of the "quick and dirty" income approach conducted for Atlantic which arrived at a value of €5.53 million, identify the changes that should be made to the forecast and the valuation. Based on your observations, enter appropriate variables in the green shaded cells at the top of the "Proj. B.S." tab in the excel file.

Additional information:

- Projected income statements for the company have been provided by management and are shown in the tab "Proj I.S.". Certain information is missing from the income statements since various decisions must be made about balance sheet accounts that affect the income statement.

- In the management interview, the CFO indicated that above average capital investment is needed in 2011 and 2012 to replace aging assets. The Company needs to invest €500,000 in 2011 and €350,000 in 2012. After 2012, annual capital investment should return to normal.

- The Tab "Proj B.S." contains input cells (shaded in green) which, when filled, will flow information through to the rest of the spreads. Inputs are required for the following:

    - ✓ Accounts receivable turnover ratio
    - ✓ Inventory turnover ratio
    - ✓ Accounts payable turnover ratio
    - ✓ Capital expenditures for the year 2011-2015
    - ✓ Additional debt funding, if any, from 2011-2015

- The ratios should be based on an historical analysis of the first three tabs.

- Given the funding needs, you must decide how much of the required investment will be funded by debt. Whatever is not funded by debt is automatically added to equity funding in the Partners' Capital account on the balance sheet.

- The input decisions can be checked by looking at the projected financial ratios ("Proj. Ratios").

- Net equity cash flows are calculated based on the inputs for the years 2011 through 2015 and flow through to the discounted cash flow analysis tab (DCF#2). Residual growth was set to 5.0% and an equity discount rate of 18.0% was applied in the DCF calculation.

A. Suggested solutions will be provided as Handouts during discussion.

Chapter 2 Appendix

1. Review of Financial Analysis & Ratios

I. Financial Statement Adjustments

A. Adjustments for non-operating items

1. Non-operating items are accounts in the income statement or the balance sheet which are not part of the cash-flow generating function of the business.

2. These items are typically removed prior to the financial and valuation analysis, valued separately if necessary, and then accounted for at the end of the assignment.

    a. Non-operating assets are removed and valued separately since they have a required rate of return that is distinct from the subject company's return.

3. Examples of non-operating balance sheet items

    a. Non-operating cash

    b. Non-operating fixed assets

        (1) Any land, buildings, or equipment that is not used in the business operations is non-operating. At times management may acquire a property that they intend to use in the future. Depending on how realistic the plan is, the practitioner may decide to remove the asset from the balance sheet.

    c. Officer related accounts

        (1) Officer Note Receivable – The officer has borrowed money from the company.

        (2) Officer Note Payable - The officer has loaned money to the company.

    d. Other assets

        (1) Often companies will list non-operating items in the other asset account. All other asset accounts should be scrutinized for their relevance to the business. These may include such assets as the following:

(a) Intangible value that is no longer relevant to the company and has not been measured in an impairment study.

(b) Assets that are perquisites for the business owner but not necessary to generate cash flow, including vacation homes, automobiles, airplanes, etc.

4. Examples of non-operating income statement items

a. Secondary source of income – if a company generates income from separate lines of business, those must be valued separately since the different lines may require different rates of return.

(1) A common example of this is when a business leases extra real estate or equipment to an unrelated party. The asset that is leased and the lease income is considered non-operating to the core operation and removed.

(2) This is often a difficult issue. Many large companies generate revenue in multiple product or service lines. The analyst must decide whether those business lines are close enough to value as one operation, or whether they should be valued separately.

b. Excess officer compensation – If officer compensation is above a fair market level, then the excess amount is considered non-operating and added back to profit.

c. Excess rent – If the business property is leased, especially if it is leased to the business by the owner, the rent should be compared to fair market levels and any difference adjusted.

d. Income statement effects of non-operating assets (discussed above)

e. Other – all income and expense accounts should be reviewed for their relevance to fair value. Any account that is not stated at fair value, for any reason, should be considered for adjustment.

B. Adjustments for Non-Recurring Items

1. At times an expense that may be operating in nature should still be adjusted since it is not expected to recur in future years and its inclusion in the historical financial statements would skew financial ratios and potentially the forecast.

2. Examples of non-recurring items

   a. Discontinued operations

   b. Restructuring expense

   c. Impairment expense

   d. Expenses related to natural disasters

C. Financial Statement adjustments should be applied, adjusted financial statements calculated, and adjusted financial ratios cast. After this first step is completed, a formal financial analysis can commence.

II. Financial Analysis

A. Common Size Analysis

1. Historical income statements are spread as a percentage of sales. Both the income statement accounts and the percentages should be reviewed over the historical period to identify trends.

   a. Sales trends – understand what is causing an upward or downward trend.

      (1) Market penetration – Is the company gaining a larger market share with the same capacity and same product lines?

      (2) Market expansion – Is the company opening up new markets with new products or new geographic areas?

   b. Cost of goods sold

      (1) Are sales expanding at the expense of gross profits? (i.e. is the company "buying" market share?).

      (2) What raw materials does the company purchase and what are the pricing trends?

      (3) What other costs are included in cost of goods sold? Labor? Depreciation?

c. General and administrative costs

(1) Review for trends. Common size statement is especially helpful here.

(2) What is the breakdown of fixed versus variable costs? What costs are fixed in a relevant range of sales?

d. Profit margins (EBITDA, EBIT, EBT, Net Income)

(1) What is the trend with each profit margin?

(2) Many non-recurring items are placed "below" the line, meaning they are listed after operating income. It should be determined if these are non-recurring and/or non-operating.

(3) What is the company's breakeven point? A simple breakeven analysis can be completed after assessing the percentage of fixed costs.

2. Historical balance sheets are spread as a percentage of total assets and analyzed to identify trends.

a. Simple trend observations should be made to determine if the company is growing and whether growth is being financed with debt, equity, or a mixture of the two.

b. Assets

(1) What is the trend in working capital asset accounts? If sales are growing on the income statement, are accounts receivable and inventories growing as well?

(2) Is the company capital intensive? If so, what is the relationship of net to gross fixed assets?

(3) Each account under "Other Assets" must be investigated and understood. There is the potential that these assets might need restatement or removal as non-operating.

c. Liabilities

(1) Current liabilities

(a) How are the working capital accounts (accounts payable, accrued liabilities) moving in relation to sales and current assets? Is the growth in accounts receivable being financed by growth in accounts payable?

(b) Distinguish between short-term working capital loans and the current portion of long term debt.

(c) Are short-term lines of credit being used as long-term financing? Some companies roll over their "short-term" debt each year. This should be considered long-term debt and part of the capital structure.

(2) Long-term liabilities

(a) The terms of each debt instrument should be understood. The analysis here and the related management questions will determine the eventual projection of a long-term capital structure.

(b) If the operations are growing (or management claims that sales and profits will grow) the analyst must understand how much third party debt, if any, will be required.

(3) Equity

(a) The composition of equity securities and the rights of each should be understood.

- If different classes of preferred stock exist, the conversion rights and liquidation priority should be outlined.

- If the company is an early stage entity with a complex capital structure consisting of preferred stock and common stock, it may be necessary to use an option or lattice model to determine the value of the common stock.

(b) Equity as a source of funds relative to debt should be understood.

(c) If treasury stock exists, details of the prior stock buyback should be requested from management.

3. Statement of Cash Flows

a. The accounting cash flow statement converts the accrual net income to the changes in the cash account from the prior year.

B. Growth Analysis

1. Growth analysis can be applied to any financial statement account if the analyst has access to a significant time period. Annual growth rates and compound annual growth rates (CAGR) are both important as a foundation of any financial analysis. Growth is usually measured for at least the following accounts:

2. Annual percentage growth is measured as: (current balance/prior year balance) – 1

3. CAGR is measured as:

$$\left(\left[\frac{\text{Amount in year "n"}}{\text{Amount in year 1}} \right]^{1/(n-1)} -1.0 \right) \text{ x } 100$$

a. CAGR is also easily calculated on a hand calculator:

(1) Value in first year: enter into the "PV" register (usually as a negative)

(2) Value in the final year: enter into the "FV" register

(3) Number of periods: enter into the "N" register

(4) Solve for the "i" or the interest register.

(a) Example:

- 2004 revenue = £38,000,000
- 2010 revenue = £51,000,000
- PV = -38,000,000
- FV = 51,000,000
- N = 6
- CAGR = 5.03%

C. Ratio Analysis

1. Financial ratios reflect information about a company's financial performance. They are most useful when compared to the ratios of industry peers or guideline public

companies. Usually financial ratios are categorized into measurements of profitability, returns, liquidity, asset management, and leverage.

a. Profitability ratios

Profitability Ratios

$$\text{Gross Profit Margin} = \frac{\text{Gross profit}}{\text{Sales}}$$

$$\text{Operating Profit Margin} = \frac{\text{Earning before interest and tax}}{\text{Sales}}$$

$$\text{Pre-tax Profit Margin} = \frac{\text{Earnings before tax}}{\text{Sales}}$$

$$\text{Net Profit Margin} = \frac{\text{Net income after tax}}{\text{Sales}}$$

(1) Profitability ratios are a measurement of management's ability to control costs given varying levels of revenue in the company.

(2) Each margin is presented in descending order (gross margin, EBITDA, EBIT, EBT, net income) so that the relevant category of expense (cost of sales, operating expenses, other expenses, taxes) can be scrutinized.

(3) The analysis of the gross margin and operating expense should consider the following issues:

(a) Expense categorization – the breakout of depreciation and labor between cost of sales and corporate overhead should be understood.

(b) Variable vs. fixed costs – verify with management the breakout of fixed costs (those expenses which do not change in proportion to sales) versus variable expenses (those expenses which do change in proportion to sales).

b. Return ratios

(1) Return ratios measure the relationship between profit on the income statements and the different balance sheet accounts that drive operations such as equity financing, invested capital financing and total assets.

Return Ratios

$$\text{Pre-tax Return on Equity} = \frac{\text{Earnings before tax}}{\text{Total Equity}}$$

$$\text{Pre-tax Return on Assets} = \frac{\text{Earnings before interest and tax}}{\text{Total Assets}}$$

$$\text{Pre-tax Return on Invested Capital} = \frac{\text{Earnings before interest and tax}}{\text{Interest-bearing debt \& equity}}$$

(2) *Return on Equity (ROE)* – Measures the percentage return gained by the equity investors. This ratio can be analyzed on a pre-tax or after tax basis.

(a) Initially this ratio is measured on a book value basis, but the more important measurement considers the fair value of equity which may vary from the book value of equity.

(b) ROE can be further broken down by applying the *Dupont Formula* which separates the ROE into three component ratios:

$$\textbf{ROE} = \overbrace{\left[\frac{\text{Pre-tax income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}}\right]}^{\text{Return on assets ratio}} \times \frac{\text{Assets}}{\text{Equity}}$$

(c) Pre-tax *ROE* is derived as the *pre-tax income margin* multiplied by the *asset turnover ratio* times the *asset to equity ratio*.

- By reviewing the DuPont Formula over a period of years, the analyst can identify changes in ROE as a function of changing profit margins, changing asset turnover, or a changing capital structure.

- The first two components of the Dupont Formula can be combined into the return on asset ratio. By analyzing ROA, the analyst can

identify whether the company's strategy is to rely on a high margin and low asset turnover (e.g. luxury automobile manufacturer) or a low margin and high asset turnover (e.g. mass retailer like Walmart).

(3) *Return on Assets (ROA)* – Measures the interest and income return (EBIT) to all investors in the business against total assets.

(a) Some sources measure return on assets using earnings before tax instead of EBIT (the Dupont Formula above shows ROA in this way). Many analysts use EBIT in the numerator though since the total assets in the denominator includes both equity and debt capital.

- Before comparing ROA to industry surveys or other companies, the analyst should be sure that both ratios are calculated the same.

(4) Return on Invested Capital (ROIC) - This is a comprehensive return ratio which reflects the company's total return on all capital invested. Especially with companies that deploy complex capital structures, this ratio is indispensable in the analysis of operations.

c. Liquidity ratios

Liquidity Ratios

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$\text{Quick ratio} = \frac{\text{(Current assets - inventory)}}{\text{Current liabilites}}$$

(1) Liquidity ratios measure a company's ability to cover its financial obligations over the current accounting cycle, usually one year or less. It is an important area of analysis since an inability to meet short term demands could mean that the company triggers loan provisions which could result in a default.

(2) *Current ratio* – reflects the amount of current assets relative to current liabilities. A ratio of 1.0 or higher suggests the company can cover current obligations with current assets.

(3) *Quick ratio* – This ratio removes inventory from current assets since it is considered the least liquid of current assets. Thus, the quick ratio shows

whether the company can cover current obligations with more liquid current assets.

(a) Some sources calculate the quick ratio (also called the acid test ratio) as (Cash + investments + accounts receivable)/ current liabilities.

d. Asset management ratios

Asset Management Ratios

Total Asset Turnover	=	$\frac{\text{Sales}}{\text{Total assets}}$
Accounts Receivable Turnover	=	$\frac{\text{Sales}}{\text{Accounts Receivable}}$
Average Collection Period	=	$\frac{365}{\text{A/R turnover ratio}}$
Inventory Turnover	=	$\frac{\text{Cost of goods sold}}{\text{Inventory}}$
Days of Inventory	=	$\frac{365}{\text{Inventory turnover ratio}}$
Average Cash Cycle	=	Days Inventory + ACP - Days Payable
Days Payable	=	$\frac{365}{\text{(cost of sales)/accounts payable}}$
Fixed Asset Turnover	=	$\frac{\text{Sales}}{\text{Fixed assets}}$
Working Capital Turnover	=	$\frac{\text{Sales}}{\text{Working capital}}$
Operating Working Capital to Sales	=	$\frac{\text{(Cash + A/R + Inv.)-(A/P + accruals)}}{\text{Sales}}$

(1) Asset management ratios reflect how well management is acquiring and deploying assets to generate sales and cash flow. Similar to the return ratios, the asset management ratios combine an account from the income statement with an account from the balance sheet.

(2) *Total asset turnover* – This ratio reflects how many euros in sales are generated for each euro invested in assets.

(a) Asset turnover is a "summary" ratio, usually followed by an analysis of its component ratios such as receivables turnover, inventory turnover, fixed asset turnover, etc.

(3) *Accounts receivable turnover (A/R Turnover)* – This ratio shows how often the company collects or "turns over" a typical receivables balance in the course of one year or one accounting cycle.

(a) *Average collection period (ACP)* – A more intuitively pleasing form of the accounts receivable turnover ratio is the average collection period, which simply divides the A/R turnover ratio into 365, the number of business days in a year (some analysts use 260 days since it represents the approximate number of working days in a year).

(b) The ACP reflects in days the amount of time it takes the company to collect its receivables. This ratio is especially meaningful when compared to industry norms.

(c) A high ratio here relative to industry norms may indicate that the company has bad receivables that have not been written off or is too lenient in enforcing terms of collection.

(d) Another common form of the *A/R turnover* and *ACP* takes an average measurement of accounts receivable over two years. This is more relevant with a company that is growing (or declining).

(4) *Inventory turnover ratio* – This ratio reflects how quickly the company is able to move its inventory. It is measured as cost of goods sold (not sales) divided by inventory. When compared to industry norms a low ratio may tell the analyst that there is risk in the form of obsolete inventory or an inefficient inventory management system.

(a) *Days of Inventory* – similar to the ACP ratio, the inventory turnover ratio can be viewed in a more intuitively pleasing form by dividing the ratio into 365. This shows the time in days it takes to move a typical inventory holding amount through the company.

(5) *Average Cash Cycle* – this ratio combines the days of inventory ratio, the ACP ratio, and the days payables ratio.

(a) The assumption behind the ratio is that a company is without cash flow for the number of days inventory sits in a warehouse plus the number of days that a receivable is outstanding after inventory is sold. Since companies may finance this time period by extending accounts payable, the days payable ratio is deducted to estimate the approximate number of days the company waits to generate cash.

(b) Similar to other asset management ratios this is a somewhat rudimentary estimation of working capital risk and is only meaningful when compared to industry surveys or other competitors.

(6) Fixed asset turnover (F/A turnover) – Similar to the total asset turnover ratio, this reflects the amount of euros generated for each euro invested in fixed assets. This ratio is most often analyzed separately as *gross fixed asset turnover* and *net fixed asset turnover.*

(a) A key issue in the analysis of fixed asset has to do with the age of the property, plant and equipment. The risk to an investor in this area comes partially from the amount and imminence of required investment in fixed assets. Toward this end, two other ratios are helpful:

- *F/A Average Life Ratio*

$$\frac{\text{Gross Fixed Assets}}{\text{Average Depreciation}}$$

Assuming that the annual depreciation reflects the accurate annual consumption of the asset, then the result of this calculation should provide the time in years that the company expects the fixed asset base should be useful.

- *F/A Average Age Ratio*

$$\frac{\text{Accumulated Depreciation}}{\text{Average Annual Depreciation}}$$

Measured as total accumulated depreciation divided average annual depreciation. This reflects the age of the fixed asset base.

- For example, assume a gross fixed asset base of £100,000,000, annual depreciation of £10,000,000, and accumulated depreciation of £60,000,000. The average life of the fixed assets would be 10 years (100,000,000/10,000,000) and the average age would be 6 years (60,000,000/10,000,000).

- These ratios are more relevant to a capital intensive company. The analyst should be careful how real estate is considered in these ratios since land is not subject to depreciation.

(7) *Working Capital Turnover* – This ratio reflects the amount in sales generated for each euro invested in working capital.

(a) A low ratio here relative to industry norms could mean that one or more of the current asset accounts is relatively high. Hence this ratio should be considered in tandem with A/R turnover, Inventory turnover, etc. It also may indicate that the company is retaining too much cash.

(8) *Operating working capital to sales* - Operating working capital is calculated as operating current assets minus operating current liabilities.

(a) Non operating current assets such as extra cash or investments, shareholder receivables, etc. are excluded.

(b) Third party interest-bearing debt such as the current portion of long-term debt is also excluded.

(c) This ratio is useful for forecasting cash flows since it reflects in percentage of sales the amount that will be needed in receivables and inventory less payables and accruals.

e. Leverage Ratios

Leverage Ratios

$$\text{Debt to Assets} = \frac{\text{Total liabilities}}{\text{Total assets}}$$

$$\text{Debt to Equity} = \frac{\text{Total liabilities}}{\text{Total equity}}$$

$$\text{Interest-bearing Debt to Equity} = \frac{\text{Interest-bearing debt}}{\text{Total equity}}$$

$$\text{Assets to Equity} = \frac{\text{Total assets}}{\text{Total equity}}$$

$$\text{Times Interest Earned} = \frac{\text{Earnings before interest and tax}}{\text{Interest expense}}$$

$$\text{Fixed Charges Coverage} = \frac{\text{EBIT + Fixed expense}}{\text{Interest expense + fixed expense}}$$

(1) Leverage ratios reflect the amount to which debt is deployed in the capital structure and the amount of financial risk that is born by the shareholders.

(2) Debt to Asset Ratio – This is a very general ratio that shows total liabilities (including interest-bearing debt, accruals, and other liabilities) as a percentage of total assets.

(3) Debt to Equity – This similarly shows total liabilities as a percentage of total equity. It should not be confused with, or taken as a proxy for, interest-bearing debt to equity, although it often is.

(a) A higher ratio here above 1.0 may be indicative of excessive financial risk, but should always be considered in relation to industry norms.

(4) *Interest-bearing Debt to Equity Ratio* – This ratio is an indication of the company's capital structure reflecting how much debt financing has been deployed in relation to the amount of equity financing.

(a) It should be remembered that both the debt and equity accounts on the balance sheet do not necessarily reflect fair value. To the extent that fair values are materially different, the book value ratio may not be a relevant measurement of risk.

(b) Most analysts will likely think of capital structure as follows:

$$\frac{\text{Interest-bearing debt}}{\text{(Interest-bearing debt + Equity)}}$$

$$\frac{\text{Equity}}{\text{(Interest-bearing debt + Equity)}}$$

(c) The result of these ratios would be an expression like 30/70, meaning that debt comprised 30% of total financing and equity comprised 70%. This would be directly applied in a weighted average cost of capital analysis.

(5) *Assets to Equity* – This ratio present a book value measurement of capital structure, or the amount of total assets as a function of equity financing.

(6) *Time Interest Earned Ratio (TIE)* – This ratio shows the number of times that earnings can decline before the company defaults on interest payments.

(a) The higher the ratio, the less the risk. However, a ratio that far exceeds industry norms may indicate that the company's capital structure is not at an optimum.

(7) *Fixed Charges Coverage* – This ratio takes the TIE concept and adds fixed expense. Both interest expense and fixed expenses must be paid regardless of the amount of sales generated. Hence this ratio reflects how well the company is covering mandatory payments.

CHAPTER 3 – EQUITY VERSUS INVESTED CAPITAL INCOME STREAMS

I. Equity versus Invested Capital

A. A valuation can be completed using one of two distinct premises:

1. Equity valuation

   a. Equity is defined in the International Glossary of Business Valuation Terms as *"the owner's interest in a property after deduction of all liabilities."*

   b. It is possible to value equity directly by isolating the income stream that is relevant to equity investors and discounting or capitalizing it by a rate which reflects the risks of the equity income stream.

2. Invested capital valuation

   a. Invested capital is defined as *"the sum of equity and debt in a business enterprise. Debt is typically: a) all interest-bearing debt; or b) long term interest bearing debt. When the term is used it should be supplemented by a specific definition in the given valuation context."*

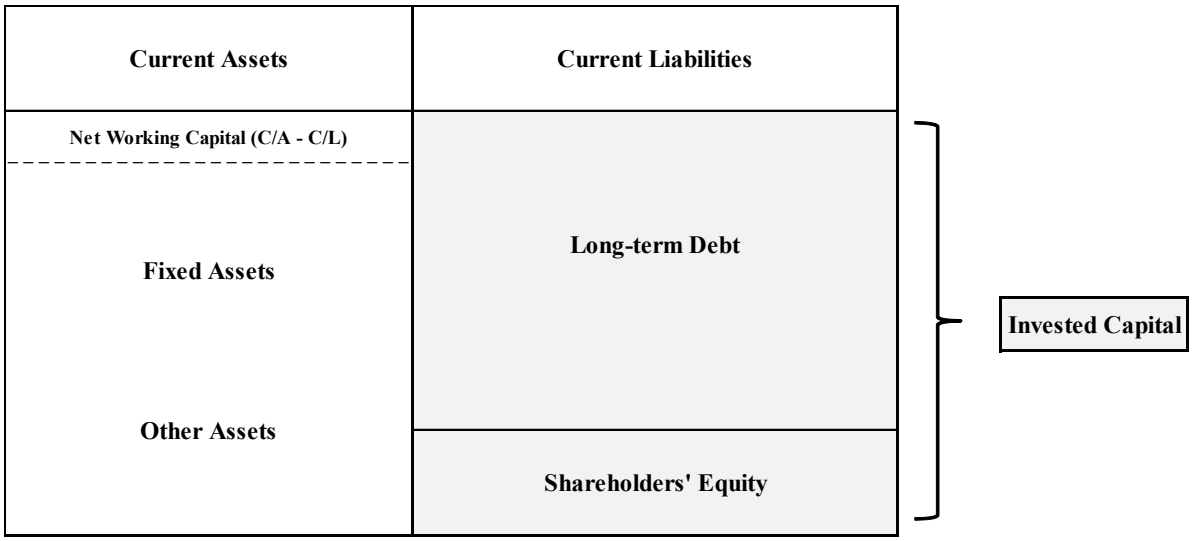
   b. Invested capital can be valued directly by isolating the income stream attributable to the invested capital investors and discounting or capitalizing it by a rate which reflects the risks of the invested capital income stream.

      (1) An invested capital income stream includes both the company's earnings-based cash flows plus interest expense. This income stream represents the amount that would be collected by the company's equity investors and outside creditors.

3. It is common to value larger companies using the invested capital method since this premise gives the analyst more versatility with the company's capital structure. Smaller companies are often valued using an equity methodology.

B. Invested capital includes all investment made by a company's equity shareholders and its creditors. Therefore it includes equity capital and third party debt.

1. A balance sheet presentation of invested capital is shown below.



2. Invested capital includes the equity investment and the long-term interest bearing debt investment. Other forms of interest bearing debt may or may not be included in invested capital as per the discussion above.

   a. Invested capital funding is equated in the graph above to the operating assets of the company, including: 1) net working capital (operating current asset minus operating current liabilities); 2) net fixed assets; and 3) other operating assets.

   b. The balance sheet may include accounts that do not fall neatly in the categories shown in the graph. The analyst must decide whether they are operating or non-operating in nature. Examples:

      (1) Deferred taxes – This may be considered interest-free financing from the government.

      (2) Shareholder loan – As was discussed in IIBV 101, the terms and reason for the loan must be reviewed.

Sample, PLC
Balance Sheet

	2010	2009
Assets		
Non-current assets		
Property, plant & equipment	£298,802	£473,128
Deferred income tax	0	0
Other	2,384	10,330
Total non-current assets	301,186	483,458
Current assets		
Inventories	441,088	480,027
Trade receivables	168,865	328,006
Financial assets	64,000	61,420
Cash	10,179	18,825
Total current assets	684,132	888,278
Total Assets	£985,318	£1,371,736
Equity & Liabilities		
Equity		
Ordinary shares	£1,000	£1,000
Retained earnings	296,925	451,042
Total Equity	297,925	452,042
Liabilities		
Non-current liabilities		
Borrowings	416,667	565,021
Other	0	0
Total non-current liabilities	416,667	565,021
Current Liabilities		
Trade payables	199,076	262,138
Other current liabilities	71,650	92,535
Short-term borrowings	0	0
Total current liabilities	270,726	354,673
Total liabilities	687,393	919,694
Total Equity and Liabilities	£985,318	£1,371,736

C. Financial Statements

1. The Balance Sheet

a. The equity investment in Sample, PLC as of 2009 is £452,042 and is £297,925 as of 2010.

b. The invested capital in Sample, PLC as of 2009 equals £1,017,063 on a book value basis (452,042 + 565,021). As of 2010, invested capital is £714,592.

(1) Many companies will have short term interest-bearing debt (lines of credit, notes receivable, or other debt instruments) that may or may not be included as invested capital debt. This will depend on whether the analyst considers them part of the long term capital structure of the company.

2. Income statement

a. The income stream chosen for the income approach will depend on whether an equity method or invested capital method is chosen.

b. The analyst must derive the appropriate income stream from the accrual income statement, an example of which is shown below.

Sample, PLC
Income Statement

Revenue	£2,748,148
Cost of Sales	(1,485,962)
Gross profit	1,262,186
Distribution costs	(252,100)
General & administrative expense	(865,619)
Operating profit (EBIT)	144,467
Other income	9,321
Finance expense, net	(17,028)
Profit before tax	136,760
Income tax	(43,763)
Net profit from continuing operations	£92,997
Operating profit (EBIT)	£144,467
Income tax	(46,229)
Net operating profit after tax (NOPAT)	£98,238
From accounting notes:	
Depreciation	£276,332
Earnings before interest, tax, depreciation and amorisation (EBITDA)	420,799

c. Income streams include:

(1) Earnings before interest, tax, depreciation and amortization (EBITDA = £420,779)

(a) This income stream may not be shown explicitly on an IFRS income statement but can be derived by adding depreciation (found in the notes) to operating income.

(b) EBITDA is relevant to an invested capital valuation.

(2) Operating profit

(a) Also referred to as earnings before interest and tax (EBIT = £144,467).

(3) EBIT is relevant to an invested capital valuation.

(4) NOPAT is relevant to an invested capital valuation.

(5) Profit before tax

(a) Also referred to as earnings before tax (EBT = £136,760)

(b) EBT is relevant to an equity valuation.

(6) Net profit from continuing operations, or net income (NI = £92,997)

D. Cash Flow Adjustments

1. Accrual based income statements record income when it is earned (not received) and record expenses when incurred (not paid).

a. To the extent that there is a time lapse between earned and received income and a lapse between incurred and paid expenses, then a balance sheet accrual account is created.

(1) For example, if a company sells £100 worth of goods in the last month of the year but is not paid until the following year, then the year-end income statement would include the £100 in sales, and an account receivable would be added to the balance sheet in the amount of £100.

(a) From a cash flow perspective therefore, the income statement overstates cash flow by £100.

(2) If the company orders £75 of goods which are sold in the last month of the year but does not pay for the goods until the following year, then the company adds £75 to cost of sales, and £75 to accounts payable.

(a) From a cash flow perspective, the income statement understates cash flow by £75.

2. Accrual income statements also include non-cash expenses such as depreciation and amortization.

a. When capital assets such as land and equipment are acquired the cost of the assets is not recorded on the income statement since the assets have physical lives longer than one year.

(1) The capital investment is recorded in the statement of cash flows.

(2) A depreciation expense is recorded on the income statement for the pro rata consumption of the asset in the given year.

(a) For example, if equipment that is expected to last 10 years is acquired for £1,500,0000 in 2010, then the entire £1.5 million expense is reflected on the 2010 cash flow statement but only £150,000 (1,500,000/10) is included as depreciation expense on the 2010 income statement.

(b) Hence from a cash flow perspective, the 150,000 is a non-cash item since it represents an economic cost, not a cash investment.

3. Fair value is based on cash flow, not accounting income. Accounting earnings (pre-tax or net income) should only be used if there is no material difference between accounting earnings and cash flow.

4. Since the net income on an income statement represents and economic level of earnings, it must be converted to a cash figure through a series of adjustments.

a. The cash flow adjustments will differ depending on whether *equity cash flow* or *invested capital cash flow* is being calculated.

Calculation of Equity Cash Flow
Earnings before taxes (EBT)
- Tax
Net Income
+ Depreciation & amortization
+/- Change in working capital
+/- Change in other operating assets
- Capital investment
+/- Change in debt principal
Net equity cash flow

(1) As stated above, depreciation and amortization are non-cash expenses that represent the economic consumption of an asset. Since they do not represent actual cash pounds paid, they are added back here.

(2) Changes in working capital are accounted for as well. If, for example, trade receivables increase from one year to the next, that represents a negative cash flow relative to the income statement since more pounds are owed to the company relative to the prior year (but nonetheless were recorded as revenue and are reflected in net income).

(a) Conversely, an increase in trade payables would represent a positive cash flow from one year to the next. This is so since an increase in expenses were recorded on the income statement which have not yet actually been paid. Therefore, net income, from a cash perspective, is too low.

(b) Normally, operating current liabilities (which exclude third party debt) are deducted from operating current assets to arrive at each year's operating working capital.

- To the extent working capital increases in the current year relative to the prior year, a negative cash flow adjustment is made.

- To the extent working capital declines in the current year relative to the prior year, a positive cash flow adjustment is made.

(3) Changes in other assets (and other liabilities), to the extent they are operating assets and liabilities, are handled similar to working capital items.

(4) Capital investment is accounted for in the cash flow adjustments. Capital investment is not recorded on the income statement as discussed above since the asset will last longer than one accounting cycle. The amount of a given year's capital investment is obtained from the cash flow statement.

(5) Third party debt principal is also included as a cash flow adjustment. From the perspective of an equity shareholder, an increase in debt principal from the incursion of a bank loan represents a positive cash flow and should be added.

(a) To the extent debt principal is paid back, this represents a negative cash flow from an equity perspective.

b. Differences between the calculation of invested capital cash flow and equity cash flow.

(1) The difference between equity cash flow and invested capital cash flow is one of perspective. Invested capital investors include everyone who has invested money in the business, including equity investors and creditors who have loaned money.

(2) Therefore, the invested capital income stream must include all equity cash flows (earnings plus adjustments) and interest payments (plus debt principal).

Calculation of Invested Capital Cash Flow

Operating earnings (EBIT)
- Tax

Net operating profit after tax (NOPAT)

+ Depreciation & amortization
+/- Change in working capital
+/- Change in other operating assets
- Capital investment

Net invested capital cash flow

(3) There are two key differences in the invested capital cash flow calculation.

(a) We begin with EBIT instead of EBT since the cash flows must include interest. Taxes are assessed on EBIT and are therefore higher.

(b) All cash flow adjustments are identical to the equity calculation with one exception.

- Debt principal changes are omitted since, from an invested capital perspective, creditors are included as investors. For presentation purposes, both calculations are shown below:

Calculation of Equity Cash Flow	***Calculation of Invested Capital Cash Flow***
Earnings before taxes (EBT)	Operating earnings (EBIT)
- Tax	- Tax
Net Income	Net operating profit after tax (NOPAT)
+ Depreciation & amortization	+ Depreciation & amortization
+/- Change in working capital	+/- Change in working capital
+/- Change in other operating assets	+/- Change in other operating assets
- Capital investment	- Capital investment
+/- Change in debt principal	
Net equity cash flow	**Net invested capital cash flow**

E. Invested Capital and Capital Structure Considerations

1. The invested capital income stream should be correlated with the capital structure assumptions made for the subject company.

2. A company's capital structure includes equity financing and long-term debt necessary to fund future operations.

   a. If the company has multiple lines of business these should be separated and valued apart since they may have different risk profiles and different financing needs.

   b. Long-term capital structure debt may be difficult to analyze.

      (1) Some companies use short-term lines of credit on a perpetual basis to fund operations. If the short-term debt is rolled over every year, the debt may be considered part of the capital structure.

      (2) Some analysts include all interest-bearing debt as long term capital structure debt.

(a) This is theoretically incorrect if the company has short-term seasonal debt which is financing a short-term asset such as inventory and the debt is paid off imminently.

- In this case, the debt is considered an operating liability.
- The interest expense associated with the short-term seasonal item should be excluded from EBIT or EBITDA.

Reported Profits	
EBIT	£144,067
Interest expense	(17,028)
EBT	127,039

Debt Analysis	Principal	Int. rate	Interest
Working capital debt	45,070	4.5%	2,028
Long term debt	250,000	6.0%	15,000

Adjusted Profits	
EBIT	144,067
Working capital interest exp	(2,028)
Adjusted EBIT	***£142,039***
Interest expense (long term)	(15,000)
EBT	127,039

- In the example above, reported EBIT is £144,067. This figure though does not correlate with capital structure debt since the interest on the working capital debt should not be deducted. Assuming the analyst will consider only the £250,000 as part of the long term capital structure, then the interest on the working capital debt must be deducted from the reported EBIT. The correct EBIT income stream is therefore £142,039.

II. Financial Statement Adjustments

A. Financial statement adjustments were covered in IIBV 101 and are summarized in the Appendix to Chapter 1.

B. Two commonly overlooked financial statement adjustments are revisited here.

1. A non-operating asset is any asset that is not used in the generation of operating cash flows. Many companies have ancillary operations or other assets that are extraneous to the main operations.

    a. Dockside Company is an actual U.S. business (name is changed) that operates in a resort area on the east coast. The Company owns a fleet of fishing vessels and acquires the catch of several other fleets which it distributes to processors on the east coast. The Company also runs a large seafood restaurant at the dock where the fleet comes to port and it runs a retail store for take-out fresh seafood. The company's income statement is shown below.

Dockside Company, Inc.
Income Statements
FYE December 31,

	2011
Revenues	
Fishing & distribution	1,756,125
Restaurant operations	1,260,450
Retail store	850,690
Total revenue	3,867,265
Cost of sales	
Boat expenses	498,780
Crew expense	365,470
Ice	56,125
Seafood purchases	514,500
Restaurant staff	498,510
Utilities	98,150
Store staff	110,560
Depreciation	162,400
Total cost of sales	2,304,495
Gross profit	1,562,770
Overhead	
Office salary	150,000
Admin staff	65,000
Employee benefits	299,000
Other G&A	789,010
Total Overhead	1,303,010
EBIT	259,760
Interest expense	(22,500)
Other income	14,900
EBT	252,160

(1) How would Dockside's income statement be adjusted?

(2) What difficulties does that present on the income statement?

(3) What other problems would the valuer face after the initial adjustments?

2. Accelerated depreciation

   a. Management should be asked to compare the actual expected life of major asset classes to the depreciable life assumed in the fixed asset register. If there is a difference, then depreciation should be adjusted.

	Cost	Expected Life	Annual Depreciation	Actual Life	Adjusted Depreciation
Machinery	€ 1,000,000	10	€ 100,000	15	€ 66,667

(1) In this example, machinery which was acquired for €1,000,000 is being depreciated over ten years at €100,000 per year. Management indicates during the interview that the machinery is actually expected to last 15 years.

(2) The historical annual depreciation should be reduced to €66,667, with the €33,333 effectively being added to EBT each year.

(3) The adjustment may more easily be addressed in a DCF model in which future depreciation and capital investment are specifically forecast.

III. Chapter Exercise

A. The balance sheet and income statements for Sample, PLC (which were used as examples earlier in this chapter) are shown below.

✓ Other income includes £7,000 in rental proceeds from a vacation flat that is owned by the company.

- ✓ The flat is included in property, plant and equipment. It was purchased for £40,000 in 2005 and is depreciated at £1,000 per year. The 2010 net value was £35,000.
- ✓ The company officers are paid at a total of 5% of sales, recorded in general and administrative expenses. Industry norms are 3% of sales. Assume that corporate social security tax is paid at 12.8% of payroll.
- ✓ No fixed assets were written off the balance sheet during 2010.
- ✓ Cash should be considered a part of operating current assets.
- ✓ Use the effective tax rate for the invested capital calculation

- Calculate the net adjusted equity cash flow for the fiscal year ended 2010.
- Calculate the net adjusted invested capital cash flows for the fiscal year ended 2010.

Sample, PLC
Income Statement

Revenue	£2,748,148
Cost of Sales	(1,485,962)
Gross profit	1,262,186
Distribution costs	(252,100)
General & administrative expense	(865,619)
Operating profit	144,467
Other income	9,321
Finance expense, net	(17,028)
Profit before tax	136,760
Income tax	(43,763)
Net profit from continuing operations	92,997
From accounting notes:	
Depreciation	*276,332*
EBITDA	*420,799*

Sample, PLC
Balance Sheet

	2010	2009
Assets		
Non-current assets		
Property, plant & equipment	£298,802	£473,128
Deferred income tax	0	0
Other	2,384	10,330
Total non-current assets	301,186	483,458
Current assets		
Inventories	441,088	480,027
Trade receivables	168,865	328,006
Financial assets	64,000	61,420
Cash	10,179	18,825
Total current assets	684,132	888,278
Total Assets	£985,318	£1,371,736
Equity & Liabilities		
Equity		
Ordinary shares	£1,000	£1,000
Retained earnings	296,925	451,042
Total Equity	297,925	452,042
Liabilities		
Non-current liabilities		
Borrowings	416,667	565,021
Other	0	0
Total non-current liabilities	416,667	565,021
Current Liabilities		
Trade payables	199,076	262,138
Other current liabilities	71,650	92,535
Short-term borrowings	0	0
Total current liabilities	270,726	354,673
Total liabilities	687,393	919,694
Total Equity and Liabilities	£985,318	£1,371,736

CHAPTER 4 – COST OF CAPITAL THEORY

I. Discount Rates - Introduction

A. Defined in the International Glossary of Business Valuation Terms ("Glossary") as:

"*A rate of return used to convert a future monetary sum into present value"*

B. The discount rate is also thought of as the rate of return that would attract investors to a particular investment.

1. In this regard, the discount rate can be thought of as a type of price tag on capital wherein the price is a function of how the capital will be deployed.

2. Example:

Cash flow =	€ 1,000,000
Discount rate =	18.0%
Value =	€ 5,555,556

a. In the example above, an investment supposedly will generate one million euros annually into perpetuity. The risk of the investment suggests that an 18% discount rate is appropriate to bring those future cash flows to a present value of €5.55 million.

(1) An investor will pay €5.55 million if he believes that the 18% accurately encompasses the risk the he will accept in actualizing the €1.0 million annuity.

(a) That is, the risk of the investment leads the investor to require an 18% annual return.

(2) The question of how the investor arrives at the 18.0% discount rate is the subject of Chapters 4 and 5.

C. The term "discount rate" is a general term which can apply to different concepts:

1. Cost of capital – this is the blended required return on different types of capital used in a business, including common and preferred equity, as well as debt.

2. Cost of equity – this is the discount rate on equity financing.

3. Cost of debt – discount rate on debt financing

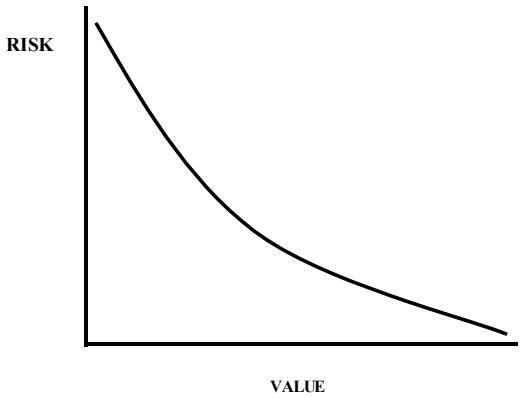
4. Other terminology, such as required rate of return, capitalisation rate, weighted average cost of capital, alternate cost of capital, are all rates that can be used to discount future returns to present value, but have different meanings and will be addressed later in the course.

D. Discount rate characteristics

1. Discount rates capture the risk of actualizing returns on an investment.

   a. Discount rates are positively related to risk.

   b. Discount rates are negatively related to value.



2. Discount rates are *forward looking*, embodying the market's expectations of future conditions that contribute to the risk of cash flows.

   a. This is sometimes confusing to practitioners since discounts rates are often quantified using historical data.

3. Discount rates are based on *market values*.

   a. As will be explained later, the cost of equity and the cost of debt are based on the market value of equity and debt in a company, not the book value.

4. Discounts rates are expressed in *nominal terms*, and therefore capture a real rate of return and inflationary expectations.

5. Discount rates are sometimes viewed as being based on *alternate investments*. Investors judge the riskiness of an investment by comparing it to alternative investment opportunities in the market.

   a. A "risk-free" or risk neutral investor might invest in a developed government's bonds since the bond is backed by the government's ability to pay. This is often seen as baseline risk, or the minimum risk that is accepted in the market.

   b. Investors who invest in corporations require an additional return above the risk-free rate since corporations are riskier than established governments.

   c. Smaller publicly-owned corporations generally require higher returns than larger public corporations.

   d. Closely-held companies generally have higher risk than publicly-owned corporations.

II. Risk Analysis

A. Risk and return

1. The higher the risk of an investment, the higher the expected return.

2. Two assumptions underlying risk analysis:

   a. Risk is associated with uncertainty.

   b. Investors are risk averse.

3. Financial theory distinguishes between the expected return on an investment and the variability or volatility of returns on an investment.

   a. Consider two companies, both with an expected return of 15%.

      (1) Company A sells a product which enjoys a consistent, high demand in the market. Returns are expected to range from a low of 12% if the economy goes into recession and could be 18% if the markets experience higher growth.

(a) Utility companies are a commonly cited example in this category. The demand for water and power are universal and consistent. Consumers may conserve during inflationary periods, but still consume.

(2) Company B sells a product which is discretionary. Returns are expected to range from a low of 0% in a recession to 30% if markets experience higher than expected growth.

(a) The market for luxury goods, such as high-priced automobiles and large screen televisions are examples. These items are entirely discretionary.

(3) Although both companies may have an expected return of 15%, Company A will demand a lower required rate of return since there is less volatility of expected returns. There is less uncertainty in expected outcomes.

(a) Since investors are risk averse, they tend to avoid uncertainty and therefore must be enticed by a higher rate of return to invest in Company B even though its expected return is similar to Company A.

B. Market Rates of Return by Investment

1. Discount rates were discussed earlier in terms of comparisons to alternate investments. Investors tend to measure an investment's riskiness by comparing its risk profile to similar assets in the market and considering the similar asset's historical returns.

2. For example, returns in the U.S. market can be delineated by the risk and return of each class of asset.

Investment Class	Historical Return
Twenty-Year U.S. Treasury Bond	6.1%
Long-term Corporate Bond	6.2%
Large Cap Corporate Stock	11.7%
Mid-Cap Corporate Stock	13.4%
Small-Cap Corporate Stock	17.7%

Source: *Stocks, Bonds, Bills, and Inflation 2009 Yearbook*, Morningstar, Inc.

a. The above exemplifies a ladder of risk. The first two investments are bonds. As debt, they require a lower return since debt has a lower variability of return than equity financing.

(1) The U.S. government bond is seen as safer than the large-cap corporate bond since the government can, after all, print money if it needed to.

b. There is a large jump between the corporate bond and the large-cap stock return to capture the difference in variability between debt and equity risk. This is known as the "equity risk premium."

c. Higher returns are required as the size of the equity market capitalisation declines.

d. These returns represent historical after-tax equity (or debt, on the bonds) cash flow returns. The rates cited in the example above equal an annual average over an 83-year time period. The assumption is that the investor will use these rates as a proxy for the expected return. As will be discussed later, this may not be a safe assumption.

e. The stock returns capture returns on publicly-held stocks which are generally larger and more liquid than closely-held returns.

(1) On average, a typical closely-held company would require an additional risk premium above the small-cap publicly-held investment.

C. Types of Risk – the models used to estimate discount rates in this course will measure each of the following types of risk.

1. Interest rate risk

a. Interest rate risk is the risk that an investment will lose value due to rising interest rates and inflation.

(1) Example: an investor buys a 10-year bond at a 6% interest rate. Suppose interest rates increase to 8% on the same class of bonds in year 3. The value of the 6% bond will decline since the investor is locked in to 6% returns when the rest of the market is enjoying 8% returns.

(2) The same is true for inflation. Inflation will undermine the purchasing power of capital that is tied up in a long term investment.

2. Systematic Risk

   a. Systematic risk is the volatility of one investment's returns measured against the volatility of the overall market's returns. It measures the exposure of a company to factors which would cause a broad shock to the entire market.

      (1) Systematic risk cannot be diversified away by investing in a portfolio of well-diversified stocks since by its nature systematic risk affects the broad market.

      (2) Systematic risk is usually represented by "beta" which is a measurement of a subject's stock variance regressed against the variance of the broad market.

3. Unsystematic Risk

   a. Unsystematic risk includes a myriad of factors that can threaten returns for a single company. These risk factors can mostly be eliminated by investing in a portfolio of well-diversified companies from different industries.

   b. Unsystematic risk factors

      (1) The quality of management or labor

      (2) Obsolete technology

      (3) Lack of capital

      (4) Poor sourcing or distribution system

      (5) Poor quality control

      (6) Low barriers to entry

      (7) High threat of replacement products

4. Liquidity Risk

   a. This is the risk that an investor will not be able to liquidate an investment and access capital when he wants to. Public companies are relatively liquid since they can presumably be traded at any time on the open market.

(1) Closely-held companies may not enjoy the same liquidity since it could take a long period of time to find a buyer.

(2) Within a company's balance sheet, required rates of return increase as the liquidity of an asset increases.

(a) Working capital assets have the lowest required rate of return since they could be converted to cash relatively quickly and easily.

(b) Fixed assets such as real estate or equipment have a higher rate of return since it could take longer to convert them to cash.

(c) Intangible assets have the highest rate of return among all asset classes since these assets may not have value outside the company.

III. The Risk-free Rate

A. The Build-up Model

1. Some practitioners develop an equity discount rate by "building up" the required rate of return. The build-up includes the returns on each class of assets until the cumulative returns equate to the assessed risk of the subject company.

   a. The capital asset pricing model which is more commonly used globally will be introduced in the next chapter.

   b. The build-up model does not include a beta.

2. The build-up model is usually used with smaller companies that tend to have uncomplicated capital structures.

3. An example of the build-up model follows for a small closely-held company in Germany:

Risk-Free rate	3.7%
Equity risk premium	5.4%
Specific risk premium	8.0%
Equity Discount Rate	17.1%

a. In the example above, the risk-free rate is based on the yield to maturity of the twenty-year German government bond.

b. The equity risk premium is taken from the Dimson Marsh Credit Suisse Global Investment Yearbook[1] ("Dimson Marsh Study"). The equity risk premium represents the average premium over bonds in the German market between 1900 and 2009.

(1) Note that this represents an *historical* risk premium measurement.

c. In the build-up model, the specific risk premium captures a host of systematic and unsystematic risk factors including the relative size of the subject company to the large cap stocks included in the Dimson Marsh returns. Since beta is not captured in the model, the systematic risk must be captured at this stage.

d. Each of these components of the discount rate will be discussed throughout the rest of this chapter.

B. The Risk-Free Rate

1. The risk-free rate represents the baseline level return which would appeal to an investor who is highly risk-averse.

a. No investment though is totally free of risk.

2. The government bonds of developed economies are acceptable to use as proxies for a risk-free rate since they are backed by the full faith of the government.

a. Some practitioners question this practice, especially after the sovereign debt crisis and the credit rating reduction of several western economies.

3. Long-term government bond returns are usually used as proxies for the risk-free rate in valuation since valuation is measuring company returns over the long term, not the short term.

4. Long-term government bonds, like any bond, have three potential return components:

a. Income return – coupon payments

[1] Credit Suisse Global Investment Returns Yearbook 2010. (https://emagazine.credit-suisse.com/app/_customtags)

b. Increase in bond value

c. Reinvestment return

(1) It is important to note that only the income return portion of the bond (the coupon return) is technically risk-free since the government bond is considered default-free.

(2) The price return and reinvestment return are subject to deteriorating market conditions and rising interest rates.

(3) Long-term government bonds are riskier than short-term government bonds since the investor is exposed to interest rate risk over a longer period of time.

d. Examples of the yields on 20-year government bonds as of Q1 2011.

Unites States	4.40%
Germany	3.67%
United Kingdom	4.37%
Japan	2.22%
France (10-yr)	3.63%
China (10-yr)	3.98%

(1) Differences between the government bonds' risk-free rates is indicative of varying economic conditions such as expected inflation and interest rates.

e. The risk-free rate on a long term bond contains a return for expected inflation risk.

(1) However, changes in yields on government securities do not necessarily indicate that the market's expectation of future inflation has changed.

f. If a short-term government bond is less risky, why not use that security as the proxy for the risk-free rate?

(1) Analysts match the investment time horizon of the risk-free rate to the subject company investment being valued. Unless the holding period of the investment is known to be shorter, then the subject and the government bond are long-term.

(2) If the shorter term bond were used, there would have to be a separate premium in the built-up discount rate to measure the difference in risk between short-term and long-term bonds.

g. Returns on government bonds were affected by abnormal market conditions during 2008 through 2011, causing extreme rates of returns relative to historical rates.

(1) The issue of volatile market conditions and their effect on returns will be discussed in Chapter 9.

IV. The Equity Risk Premium

A. The equity risk premium ("ERP") is the return above the risk-free rate that is necessary to attract investors to the next level of investment risk. If measured using historical data, it is shown as the delta between the total return on large cap equities and the income-only return on government bonds.

B. Theoretically, the ERP, like the risk-free rate, is a forward looking rate that is based on the market's expectations about future long term returns. As explained by Aswath Damodaran in his research[2], there are several determinants of the ERP, some of which can be quantitatively measured while others are more subjective.

1. Investors' risk aversion

a. An appetite for risk will vary with each individual, but collective risk tolerance tends to decline after an economic downturn.

2. Economic risk

a. Expected risk is lower if the economy enjoys high predictability. Uncertainty breeds risk. Since developed economies have less uncertainty relative to developing economies they tend to have lower ERPs.

3. Consumption patterns

a. Economies with low consumption, high savings rates, and low household debt tend to have lower ERPs.

[2] Aswath Damodaran, "Equity Risk Premiums: Determinants, Estimation, and Implications – 2011 Edition" see http://pages.stern.nyu.edu/~adamodar/

4. Corporate governance

    a. The higher the quality of management and the dependability of earnings information, the lower the ERP.

5. Liquidity

    a. The ability to get into and out of an equity position is very important to investors. If investors need to wait to retrieve cash from an equity investment, they will require a higher return.

6. Catastrophic Events

    a. The threat of an extraordinary, long-term downturn is calculated into investor's expectations. Examples:

        (1) The U.S. depression in 1929 (which did not turn around until after World War II, nearly 20 years later)

        (2) The Japanese recession in the late 1980s, from which Japan has not fully recovered.

7. Irrational economic behavior

    a. Behavioral economists would argue that investors do not always behave in a way that would theoretically earn the highest return. For example, studies suggest that investors judge the risk of a new investment in isolation rather than in conjunction with the existing risk of their portfolio.

C. There are three traditional ways that the ERP is measured:

1. Historical Measurements

    a. Practitioners often measure the ERP by looking at historical returns over the long-term past, based on the assumption that although there will always be short-term aberrations, the market's expectation of future long-term returns is equivalent to an average of past returns.

    b. Past returns are usually measured as the arithmetic average of the annual after-tax equity cash flow returns on large-cap equities.

c. The relevance of using past market returns as a proxy for the market's expectation of future long term returns has been controversial.

d. If historical returns are used to measure future returns, the formula is shown as follows:

$$ERP = E(R_m) - R_{f2}$$

Where:

ERP = equity risk premium

$E(R_m)$ = expected return on large-cap stocks

R_{f2} = income-only return on government bonds (i.e. the arithmetic mean of the historical returns measured over the same period as the expected total return.

(1) R_{f2} is not the same metric as the risk-free rate (R_{f1}). The risk-free rate is the current yield on the government bond. R_{f2} is the historical income return on government bonds.

e. Numerous studies question the validity of using historical measurements of returns to estimate expected returns.

(1) In the U.S. (where the most-cited studies have been completed), the period between 1926 and the present includes non-recurring events that affect the historical returns.[3]

(2) Returns during the past century have not been consistent. Returns in the second half of the twentieth century were larger than the first half due to increased productivity, declining corporate tax rates, declining monitoring costs and other factors.[4]

[3] Robert D. Arnott and peter L. Bernstein, "What Risk Premium is Normal?" *Financial Analysts Journal* (March/April 2002)
[4] Elroy Dimson, Paul Marsh, and Mike Staunton, "Global Evidence on the Equity Premium", *Journal of Applied Corporate Finance* (Summer 2003)

(3) The expected ERP that could have been forecast given the economical factors in 1926 was less than the realized risk premium.[5]

(a) This means that even if an analyst in 1926 was omniscient and *knew* the future, that knowledge of future returns would not be useful in determining the actual expected risk premium in 1926.

(4) Using different historical periods to measure the historical returns will yield different implied equity risk premiums. *Stocks, Bonds, Bills and Inflation*, The most widely used study in the United States, provides an arithmetic average return between 1926 and the present which was between 7.0% and 8.0% when most academics suggested the ERP should be in the 4.0% to 6.0% range.

f. Damodaran's continuing study on worldwide equity risk premiums presents the difficulties with relying on historical measurements to estimate the ERP.

(1) Shorter measurement periods, say 25-30 year periods, will most likely remove many of the non-recurring events that undermine historical studies. However, the shorter time periods yield significant standard errors which make the implied premiums useless.

(2) There is a survivor bias in the longer term data, especially the data used in the United States. That is, if an investor invested money in all of the world's major markets a century ago, he would have lost his investment or seen very low returns in many of those markets.

(a) By just looking at the U.S. market (as many U.S. practitioners do) he is capturing a survivor bias by excluding the down markets.

g. The Dimson Marsh studies measure the equity risk premium for 19 countries based on data from 1900 to 2010. Excerpts from the 2009 study are shown below.

[5] Roger G. Ibbotson and Peng Chen, "Long Run Stock Market Returns: Participating in the Real Economy," *Financial Analysts Journal*, (January/February 2003).

Global ERPs, 1900-2009	
Canada	4.1%
Denmark	2.5%
France	6.1%
Germany	5.8%
Japan	5.9%
United Kingdom	4.2%
United States	5.2%

(1) Damodaran points out that the average arithmetic and geometric risk premiums from many of the 19 countries in the Dimson Marsh studies are lower than the U.S. premium, a fact which underscores the survivor bias in the U.S. data.

2. Prospective Measurements

a. Forward looking studies are more theoretically valid because they utilize economical data available to the market and reflect future expectations of investors.

b. There are two types of prospective measurements

(1) Bottom- up studies

(2) Top-down studies

c. The *bottom-up studies* derive an ERP by calculating an internal rate of return within a market-wide discounted cash flow analysis.

(1) The internal rate of return which equates projected returns with current price is calculated for a critical mass of companies in the market. The IRRs are averaged and the government bond rate is subtracted.

d. Damodaran performs such as study on an annual basis. He measures the projected dividends and stock buybacks on the S&P 500 index and solves for the return on equity which would set these cash flows to equal the Index Value at the beginning of each year.

(1) He deducts the risk-free rate to arrive at an implied expected equity risk premium. His implied ERP for the U.S. market over the past three years is shown[6]:

Date	Implied ERP
January 1, 2008	4.37%
January 1, 2009	6.43%
January 1, 2010	4.36%
January 1, 2011	5.20%
January 1, 2012	6.01%
January 1, 2013	5.78%

(a) The implied ERP as of January 1, 2009 is an aberration caused by the fact that the index lost approximately one-third of its value relative to 2008 and 2010.

e. There are several commercial providers that calculate ERPs using this method, including:

(1) Bloomberg Euro-zone

(2) Reuters

(3) Value Line IBES

(4) Associès en Finance (based on 300 European corporations)

f. The top-down studies use independent predictors including the dividend yield, short-term interest rates, inflation, earnings ratios, default spreads and other variables. This is also called the *supply side ERP*.

g. *SBBI* now includes a supply side ERP, based on projected data in its annual yearbook for the U.S. market. Many practitioners who formerly used *SBBI's* historical arithmetic average ERP now use the supply side premium.

3. Surveys

[6] Damodaran, pages 59-60

a. Since the ERP theoretically represents the collected expectations of the entire market, a survey of industry sources, though seemingly unscientific, is an appropriate way to estimate the ERP.

b. Surveys are often taken of the following groups from the financial professions:

   (1) Academics

   (2) Professional valuation practitioners

   (3) Bankers and CFOs

c. An annual worldwide survey is conducted by Professor Pablo Fernandez of the IESE Business School of the University of Navarro, Spain.[7] See the Appendix of this chapter for his most recent paper detailing the results of his study.

   (1) The 2011 survey asked 19,500 people worldwide for the required MRP that they use in valuation.

   (2) The survey received 6,014 answers, with useable data from 3,874 individuals

      (a) Breakdown:

         - 21.9% academics

         - 37.7% valuation practitioners

         - 40.3% corporate practitioners

[7] Pablo Fernandez, Javier Aguilleamalloa, Luis Corres, "Market Risk Premium Used in 56 Countries in 2011: A Survey, IBES Business School, Working Paper, available at www.papers.ssrn.com

(b) An excerpt from this study is shown below:

2011 Survey of Equity Risk Premiums, Selected Countries

Country	Average ERP	Median ERP	Standard Deviation	Range	# Responses
United States	5.5%	5.0%	1.7	13.5%	1,503
United Kingdom	5.9%	5.5%	1.6	20.5%	112
Germany	5.4%	5.0%	1.4	9.4%	71
Japan	5.0%	3.5%	3.7	14.7%	14
France	6.0%	6.0%	1.5	9.4%	45
Australia	5.8%	5.2%	1.9	11.0%	40
Russia	7.5%	6.5%	3.7	23.7%	37
China	9.4%	7.8%	5.1	26.0%	31
India	8.5%	7.8%	2.8	11.0%	28
Brazil	7.7%	7.0%	4.6	28.5%	35
Portugal	6.5%	6.1%	1.7	9.5%	33
Ireland	6.0%	5.1%	2.2	7.3%	12
Italy	5.5%	5.0%	1.4	18.0%	76
Greece	7.4%	7.2%	2.7	12.0%	34
Spain	5.9%	5.5%	1.6	13.5%	930

Source: "Market Risk Premium Used in 56 Countries in 2011" Pablo Fernandez, Univ. of Navarro

d. As shown, the developed economies at the top of the chart show average ERPs between 5.0% and 6.0%.

e. The rapidly developing economies of China, Brazil, India, and Russia were significantly higher, between 7.5% and 9.5%.

f. The troubled European economies, with the exception of Greece, were in the 5.5% to 6.5% range.

(1) It is possible that practitioners in these countries responded with the ERPs that they use in practice, not the ERPs that they felt were relevant to the country in which they practice. For example, an Irish valuation analyst may perform work for clients in the UK and continental Europe with fewer clients doing business within Ireland.

V. Company Specific Risk

A. The first two components in the cost of equity, the risk-free rate and the equity risk premium, are both objective measurements based on macroeconomic variables. The addition of the risk-free rate and the ERP conclude at a level of risk that would equate to a large publicly-held corporate stock.

B. If the assignment is to value a small closely-held stock, an additional risk premium is necessary to capture the difference in risk between the large-cap public company and the closely-held subject.

C. Possible risk factors that need to be captured include:

1. Size risk

2. Liquidity risk

3. Other operating and business risks

D. Since some of these categories overlap, there is the potential for double-counting risk factors, especially if the analyst includes a discount for lack of marketability at the end of the assignment (discounts and premiums are discussed in Chapter 10).

E. Size risk is measured objectively, albeit through measuring historical returns on the market.

1. It has long been accepted in the financial and valuation communities that smaller size equates to a higher risk profile and a higher required return.

   a. Some taxing authorities dispute the notion that small companies are, *a priori,* riskier. The United States Internal Revenue Service argues that small companies are not risky because they are small. Rather, some companies (but not all small companies) become small because they are risky.

   b. These arguments are largely ignored due to the overwhelming and consistent market evidence that smaller companies demand higher rates of return.

2. Size premium studies are available on the United States markets, but are not yet available in other countries.

a. Although some practitioners outside the U.S. use the U.S.-based size studies, it should be noted that the premium data does not transfer to other markets.

3. The Duff & Phelps, LLC Risk Premium Reports ("DP Study") are highly detailed studies on specific risk. The most widely used application of this study is to measure specific risk in relation to company size. The DP Study includes two distinct analyses:

   a. The DP Size Study

   b. The DP Risk Study

F. Duff & Phelps *Risk Premium Report*

1. The DP Size Study measures size using eight different criteria:

   a. Market value of equity

   b. Book value of equity

   c. 5-year average net income

   d. Market value of invested capital

   e. Total assets

   f. Five-year average EBITDA

   g. Sales

   h. Number of employees

2. Each of the eight size criteria studies breaks the U.S. public market down into 25 size portfolios.

3. There are two separate sets of size studies, one for application to the build-up method of deriving the cost of equity and another for application to the capital asset pricing model.

a. The example shown below assumes the analyst is using the CAPM.

4. Steps for the application of the DP Size Study

   a. Obtain a preliminary assessment of the value and operating metrics of the subject company.

   b. Select which of the eight size criteria are relevant in the subject assignment.

   c. Given the relevant size metric in the subject company (market value of equity, sales level, average EBITDA, etc.), locate the appropriate portfolio in the associated DP size study.

   d. Find the size premium in the "Smoothed Premium over CAPM" column to the right.

      (1) If the subject company lies between two portfolios, the analyst can use regression or extrapolation to arrive at the size premium.

   e. After measuring the size premia from the different criteria studies, select the appropriate size premium for inclusion in the capital asset pricing model as part of specific (unsystematic) risk.

5. Assume in the following example that the analyst is using only one size criteria, market value of invested capital. The estimated MVIC value is $450 million.

Companies Ranked by Market Value of Invested Capital **Premium over CAPM** **Exhibit B-4**

Historical Equity Risk Premium: Average Since 1963
Data for Year Ending December 31, 2009

Portfolio Rank by Size	Average MVIC ($mils.)	Log of Size	Beta (SumBeta) Since '63	Arithmetic Average Return	Arithmetic Average Risk Premium	Indicated CAPM Premium	Premium over CAPM	Smoothed Premium over CAPM
1	132,709	5.12	0.81	11.85%	4.89%	3.44%	1.45%	-0.34%
2	39,200	4.59	0.86	10.63%	3.67%	3.66%	0.00%	0.73%
3	24,024	4.38	0.87	11.20%	4.24%	3.70%	0.54%	1.15%
4	17,557	4.24	0.94	12.89%	5.93%	3.98%	1.95%	1.43%
5	12,991	4.11	0.98	12.80%	5.84%	4.16%	1.67%	1.69%
6	9,654	3.98	0.99	12.54%	5.58%	4.19%	1.39%	1.95%
7	7,641	3.88	1.01	13.46%	6.50%	4.30%	2.20%	2.15%
8	6,299	3.80	1.05	14.40%	7.44%	4.47%	2.98%	2.32%
9	5,215	3.72	1.09	13.13%	6.17%	4.63%	1.54%	2.49%
10	4,403	3.64	1.09	14.96%	8.00%	4.63%	3.37%	2.63%
11	3,731	3.57	1.07	16.61%	9.65%	4.56%	5.09%	2.78%
12	3,295	3.52	1.07	13.55%	6.59%	4.56%	2.03%	2.89%
13	2,875	3.46	1.13	13.13%	6.17%	4.79%	1.38%	3.00%
14	2,535	3.40	1.14	14.31%	7.35%	4.85%	2.50%	3.11%
15	2,204	3.34	1.15	16.34%	9.38%	4.90%	4.49%	3.24%
16	1,906	3.28	1.20	15.38%	8.42%	5.09%	3.32%	3.36%
17	1,620	3.21	1.23	15.18%	8.22%	5.21%	3.02%	3.50%
18	1,372	3.14	1.21	14.63%	7.67%	5.13%	2.54%	3.65%
19	1,147	3.06	1.20	14.89%	7.93%	5.12%	2.82%	3.81%
20	946	2.98	1.20	15.87%	8.91%	5.11%	3.81%	3.97%
21	781	2.89	1.28	16.45%	9.49%	5.42%	4.07%	4.14%
22	602	2.78	1.23	15.51%	8.55%	5.24%	3.31%	4.37%
23	447	2.65	1.26	16.40%	9.44%	5.34%	4.10%	4.63%
24	299	2.48	1.25	18.27%	11.31%	5.29%	6.01%	4.98%
25	95	1.98	1.27	20.38%	13.42%	5.38%	8.04%	5.97%

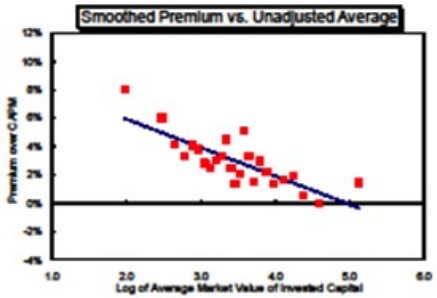
Large Stocks (Ibbotson SBBI data)	11.21%	4.25%
Small Stocks (Ibbotson SBBI data)	16.22%	9.26%
Long-Term Treasury Income (Ibbotson SBBI data)	6.96%	

Equity Risk Premium Study: Data through December 31, 2009
Data Smoothing with Regression Analysis
Dependent Variable: Premium over CAPM
Independent Variable: Log of Average MVIC

Regression Output:

Constant	9.949%
Std Err of Y Est	1.073%
R Squared	64%
No. of Observations	25
Degrees of Freedom	23
X Coefficient(s)	-2.008%
Std Err of Coef.	0.312%
t-Statistic	-6.43

*Smoothed Premium = 9.949% - 2.008% * Log(MVIC)*



a. On the prior page, the analyst would place the subject company in Portfolio 23, which has an average MVIC of $447 million. The smoothed size premium for portfolio 23 is 4.63%.

6. Use of the DP Study can be problematic since the analyst needs to know the answer to the problem as an input to solving the problem. That is, he must estimate the MVIC or MVE to develop the cost of equity to arrive at the MVIC or MVE.

   a. To address this, an iterative approach may be required whereas if the MVE which results from applying the size premium in the CAPM differs from the estimated MVC in the study, a revised estimate should be used and the process repeated.

7. As mentioned before, these studies cannot be immediately applied to markets outside the United States without informed judgment and adjustment.

   (1) There are no comprehensive size premium studies outside the U.S. market.

G. Duff & Phelps *Risk Study*

1. D&P provides a separate analysis in its annual Risk Premium Report that measures the total effect of market risk, size premium, and company specific risk.

   a. The risk premium developed in this Study is added to the risk-free rate since it encompasses the ERP, size premium, and other specific risk.

   b. This Study is only useable if using the build-up model. The build-up model is therefore reconstructed as:

$$K_e = R_f + RP_{m+s+u}$$

Where:

K_e = Cost of equity

R_f = Risk-free rate

$RP_{m,s,u}$ = Risk premium for market risk, size risk and other unsystematic risk

(1) As shown, the equity risk premium is included in the RP variable, along with size risk and other company specific risk.

c. Again, this analysis cannot be used as part of the CAPM.

2. The Risk Study uses three measurements of risk:

a. Operating margin

(1) D&P measures this as earnings before interest, tax, depreciation and amortization (EBITDA). A five year average is assessed.

b. Coefficient of variation of operating margin

(1) Calculated as the standard deviation of EBITDA over the prior five years divided by the mean EBITDA margin over the prior five years.

c. Coefficient of variation of return on book value of equity

(1) Calculated as the standard deviation of return on book equity for the prior five years divided by the mean return on book equity. Return is defined as net income before extraordinary items minus preferred dividends.

3. Application of the DP Risk Study

a. The Risk Study is similar to the Size Study except that there are only three measures of risk as opposed to eight measures of size.

b. Each of the three measurements is broken down into 25 portfolios, similar to the Size Study.

c. The analyst calculates the relevant variables for the subject company and locates the appropriate portfolio given the subject's metric.

d. After calculating the appropriate smoothed risk premium, it is added to the risk-free rate as of the valuation date.

(1) It should be noted that the DP Risk Studies assume an ERP based on the period 1963 to current time frame. If the analyst is assuming an ERP from another source, then the difference should be added or subtracted.

ABC Company

	2006	2007	2008	2009	2010
Sales	£1,010	£990	£1,150	£1,240	£1,310
EBITDA	175	165	210	275	240
EBITDA %	17.3%	16.7%	18.3%	22.2%	18.3%
Net income	125	115	160	225	190
Book Value	550	560	590	630	670
Average EBITDA %	18.6%				
ST DEV EBITDA %	2.1%				
Coefficient of Variation	11.5%				
ROE	22.7%	20.5%	27.1%	35.7%	28.4%
Average ROE	26.9%				
Standard Deviation ROI	5.9%				
Coefficient of Variation	21.8%				

	ABC Metric	DP Study Portfolio	Smoothed Avg Premium
Avg Operating Margin	18.6%	6	7.5%
C.V. Operating Margin	11.5%	17	8.6%
C.v. ROE	21.8%	18	8.6%
		Average	8.2%
		Median	8.6%

$K_e = R_f + RP_{m+s+u}$

$K_e =$ 4.2% + 8.6%

$K_e =$ 12.8%*

* subject to ERP adjustment

ERP from DP Study = 4.25%
Applicable ERP = 6.0%

$K_e =$ 12.8% + 1.75%

14.55%

(2) In the example above, the analyst is using an ERP of 6.0%. Since the assumed ERP in the DP Risk Study is 4.25%, then the delta of 1.75% is added to the formula.

H. Although there are other studies which purport to measure industry risk and subject company risk in an objective way, those studies do not enjoy wide acceptance and often yield inconsistent results.

I. It is common to apply a risk premium above the combined risk of the risk-free rate, ERP, and size risk, to capture operating risks of the subject, especially if the subject company is small.

   1. If the company is located in a developing economy, it is common to add a risk premium for the riskiness of the country. Country risk will be discussed in Chapter 7.

J. It is easy to make errors in the specific risk analysis, especially in regard to double counting the same risk factor.

   1. A size risk premium may include several areas of risk that an analyst may erroneously bundle into an additional specific risk premium such as lack of management depth, lack of access to capital markets, limits on geographic diversity, etc.

   2. As was mentioned earlier, a large specific risk premium, coupled with a large discount for lack of marketability may capture the same specific risk factors twice.

VI. Summary

A. This chapter introduced the discount rate as a metric which discounts projected cash flows to present value.

B. This course will consider two discount rates:

   1. The Cost of Equity, calculated using either:

      a. The build-up model

      b. The capital asset price model

   2. The weighted average cost of capital (WACC)

C. The principle components of the cost of equity are:

   1. The risk-free rate

   2. The equity risk premium (ERP)

3. Size premium

4. Additional specific risk premium

VII. Chapter Exercise

Page 85 contains excerpts from the 2009 DP Study. Assume that an appropriate size premium for the subject company is based on a simple average of the relevant size criteria. You are valuing a subject business in the United States which has an estimated market value of invested capital equal to **$445 million**.

Develop a cost of equity for the subject company as of December 31, 2009. Company owners indicated that they plan to hold their interest for the indefinite future. Additional market information is shown below. Use both a build-up model and the capital asset pricing model (CAPM) to develop a cost of equity. The CAPM is shown below:

1. CAPM:

   Cost of equity = Risk-free rate + beta(ERP) + size risk + specific risk

2. Additional information:

Yield on 10-year U.S. government bonds	3.85%
Yield on 20-year U.S. government bonds	4.58%
Levered beta from industry source	1.10
Total return on large cap stocks	11.91%
Income-only return on government bonds	4.70%
Damodaran implied ERP	4.36%
Premium for additional risk over size	1.0%

Chapter 4 Appendix

1. Article: "How to Price the Risk of Equity: Global Evidence from New Markets" (reprinted with permission)

2. Pablo Fernandez, et al, "Market Risk Premium used in 56 Countries in 2011" (reprinted with permission)

DUFF & PHELPS

How to Price the Risk of Equity: Global Evidence from *New* Markets

On October 21, 2011, Duff & Phelps organised a special conference at the Rotterdam School of Management at Erasmus University entitled *"How to Price the Risk of Equity: Global Evidence from New Markets"*.

The conference brought together a distinguished group of experts and academics for a comprehensive technical discussion about methodologies and approaches for estimating various components of the cost of capital in today's unsettled economic environment. While the primary focus of the conference was the equity risk premium (i.e., "ERP", "market risk premium") through the lens of historical data, current capital market expectations and expert opinions, speakers also presented new evidence of a size premium effect in Europe, as well as a discussion on risk free rates and whether there may be periods during which "normalisation" (averaging) of rates becomes necessary.

Henk Oosterhout, Managing Director, Duff & Phelps

Conference Overview

Standard methods of estimating cost of capital that worked in periods of stability fell apart in late 2008 and early 2009. Even today, markets continue to experience heightened turbulence and uncertainty. Therefore, it is crucial for finance professionals and valuation practitioners to continually monitor and reassess their estimates of the building blocks of cost of capital (i.e. "discount rate", "expected return", or "required return").

The ERP is a forward-looking concept and represents the additional return that investors demand to compensate them for investing in a diversified portfolio of large common stocks rather than investing in risk-free securities. The ERP is used as a building block when estimating the cost of capital, and is an essential ingredient in any business valuation, project evaluation, and the overall pricing of risk.

Because the ERP can have a larger impact on the concluded discount rate than other components, such as beta, estimating the ERP is one of the most important decisions an analyst must make when developing a discount rate.

Professor Elroy Dimson, emeritus finance professor at the London Business School, opened the conference by presenting his long-term analyses of the ERP for 19 countries and 3 regions (based on a data set that spans 110 years). His research suggests that investors have historically realized a long-term annual ERP of approximately 4.5% to 5.0% on a global basis. In addition, professor Dimson indicated that his results are not significantly affected by the choice of currency, and that most of the equity risk premium can be attributed to dividend income.

The next speaker was Roger Grabowski, Managing Director of Duff & Phelps, who contended that the equity risk premium is not constant over time and should be reviewed regularly, based on global economic and financial conditions. Grabowski also emphasised that there is no single universally accepted methodology for estimating the ERP, and for this reason, Duff & Phelps employs a two-dimensional process that takes into account multiple ERP estimation methodologies to first establish a reasonable range of ERP that can be expected over an entire business cycle, and then examines a broad range of economic information to establish where within the range the ERP falls. Grabowski, using the U.S. as an example to illustrate the two-step process, said that after taking into consideration the academic and financial literature and multiple empirical studies, Duff & Phelps has concluded that a reasonable long-term estimate of ERP for the U.S. is in the range of 3.5% to 6.0%. He went on to state that based upon the current financial market conditions and the overall economic environment, Duff & Phelps raised its

recommended U.S. ERP to the top of this range to 6.0% (from 5.5%) as of September 30, 2011.

Pablo Fernández, corporate finance professor at the IESE Business School, University of Navarra was the third speaker of the day. Professor Fernández is known for his annual survey of academics, analysts, and companies regarding the ERP they use in their respective countries when estimating the cost of capital. In his latest survey he received over 6,000 responses to this question. Not surprisingly, the results of the survey reveal a significant dispersion of ERP estimates. However, for most developed countries, including U.S. and Europe, experts expect an average ERP between 5.0% and 6.0%. Professor Fernández believes that there is no single (true) "equity risk premium", as different investors may use different equity premia. As the last speaker of the day, Professor Erik Peek of the Rotterdam School of Management, Erasmus University,

Left to right: Erik Peek, Pablo Fernández, Roger Grabowski, Elroy Dimson, Henk Oosterhout

Netherlands presented preliminary results of his study which investigates the existence of a size premium in European equity markets. Early findings suggest that there is indeed a size effect observed in European equity returns, particularly for very small firms (with market cap below EUR 14 million). Moreover, this size effect appears to follow a non-linear relationship. In other words, as the company size declines, the associated cost of equity (and size premium) rises more than proportionally. Professor Peek's preliminary results may suggest that the size effect in European equity markets mirror the size effect in U.S. equity markets, in that it seems to occur across the full size spectrum, but it is concentrated in the smallest of companies.

Summary

- Historically, equities beat inflation and bonds and bills…everywhere.
- One should review ERP assessment regularly, based on global economic and financial conditions, and based on multiple models.
- Surveys reveal a significant dispersion in the equity premium used by different investors for the same country and across countries.
- Similar to the U.S., it appears that there is a size effect in European equity markets.

To learn more about cost of capital issues in today's turbulent economic environment, visit: www.duffandphelps.com/costofcapital

Market Risk Premium used in 56 countries in 2011: a survey with 6,014 answers

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ABSTRACT

This paper contains the statistics of the Equity Premium or Market Risk Premium (MRP) used in 2011 for **56 countries**. We got answers for 85 countries, but we only report the results for 56 countries with more than 6 answers.

Most previous surveys have been interested in the Expected MRP, but this survey asks about the Required MRP. The paper also contains the references used to justify the MRP, comments from persons that do not use MRP, and comments from persons that do use MRP.

JEL Classification: G12, G31, M21

Keywords: equity premium; required equity premium; expected equity premium; historical equity premium

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1. Market Risk Premium (MRP) used in 2011 in 56 countries

We sent a short email (see exhibit 1) on March and April 2011 to about 19,500 email addresses of finance and economic professors, analysts and managers of companies obtained from previous correspondence, papers and webs of companies and universities. We asked about the Market Risk Premium (**MRP**) **used *"to calculate the required return to equity in different countries"***. We also asked about "*Books or articles that I use to support this number*".

By April 24, 2011, 3,998 of the answers provided a specific MRP used in 2011. [1] Other 2,016 persons answered that they do not use MRP for different reasons (see table 1). We would like to sincerely thank everyone who took the time to answer us.

Table 1. MRP used in 2011: 6,014 answers

	Professors	Analyst	Companies	Total
Answers reported (MRP figures)	**850**	**1,462**	**1,562**	**3,874**
Outliers	41	12	71	**124**
Answers that do not provide a figure	731	310	975	**2,016**
Total	**1,622**	**1,784**	**2,608**	**6,014**

Answers that do not provide a figure:

"I think about premia for particular stocks"	137	5	*39*	181
"MRP is a concept that we do not use"			*390*	390
"I use whatever MRP is specified in the textbook"	31			31
"The CAPM is not very useful nor is the concept of MRP"	145		76	221
"I did not have to use an estimate of the MRP in 2011"	38			38
"I am an academic, not a practitioner"	17			17
"I teach derivatives: I did not have to use a MRP"	39			39
"The MRP changes every day", "weekly" or "monthly"	34	102		136
"It is confidential"		16	83	99
Use a Required Return to Equity	71	38	22	131
Use a minimum IRR	36		*242*	278
Use multiples	41	127	*89*	257
Other reasons	142	22	34	198
SUM	731	310	975	2,016

Table 2 contains the statistics of the MRP used in 2011 **for 56 countries**. We got answers for 85 countries, but we only report the results for 56 countries with more than 6 answers[2]. Fernandez et al (2011a)[3] is an analysis of the answers for the USA; it also shows the evolution of the Market Risk Premium used for the USA in 2011, 2010, 2009 and 2008 according to previous surveys (Fernandez et al, 2009, 2010a and 2010b). Fernandez et al (2011b)[4] is an analysis of the answers for Spain.

Figures 1 and 2 are graphic representations of the MRPs reported in table 2.

[1] We considered 124 of them as outliers because they provided a very small MRP (for example, -23% and 0 for the USA) or a very high MRP (for example, 30% for the USA).

[2] We got 5 answers for Bahrain (6,0), Ecuador (7,7), Lebanon (8,0), Morocco (4,5), Oman (5,0), Qatar (8,0) and Senegal (5,5). The average MRP is in parenthesis. We got 4 answers for Romania (7,2) and Vietnam (8,8). We got 3 answers for Croatia (7,0), Slovakia (5,3) and Slovenia (4,9). We got 2 answers for Bulgaria (8,6), Costa Rica (6,9), Trinidad&Tobago (14,5) and Venezuela (11,0). We got 1 answer for Albania, Bolivia, Cyprus, Ghana, Guatemala, Honduras, Lituania, Malta, Panama, Puerto Rico, Tunisia and Uruguay.

[3] Fernandez, P., J. Aguirreamalloa and L. Corres (2011a), "US Market Risk Premium Used in 2011 by Professors, Analysts and Companies: A Survey...", downloadable in **http://ssrn.com/abstract=1805852**

[4] Fernandez, P., J. Aguirreamalloa and L. Corres (2011b), "The Equity Premium in Spain: Survey 2011 (in Spanish)", downloadable in **http://ssrn.com/abstract=1822422**

Table 2. Market Risk Premium used for 56 countries in 2011

	Average	Median	St.Dev.	Q1	Q3	P10%	P90%	MAX	min	Number of answers
United States	5.5	5.0	1.7	4.5	6.0	4.0	7.0	15.0	1.5	1,503
Spain	5.9	5.5	1.6	5.0	6.0	4.5	8.0	15.0	1.5	930
United Kingdom	5.3	5.0	2.2	4.0	6.0	4.0	7.2	22.0	1.5	112
Italy	5.5	5.0	1.4	4.6	6.1	4.0	7.2	10.0	2.0	76
Germany	5.4	5.0	1.4	4.5	6.1	4.0	7.2	12.4	3.0	71
Mexico	7.3	6.4	2.7	5.9	9.1	5.0	10.2	16.0	1.4	56
Netherlands	5.5	5.0	1.9	4.4	6.2	3.9	7.2	12.5	2.5	48
France	6.0	6.0	1.5	5.0	7.0	4.8	7.2	11.4	2.0	45
Switzerland	5.7	5.5	1.3	5.0	6.6	4.0	7.2	9.6	3.8	44
Australia	5.8	5.2	1.9	5.0	6.0	4.0	7.1	14.0	3.0	40
Colombia	7.5	7.0	4.3	5.5	8.0	2.0	14.6	20.5	2.0	38
Sweden	5.9	5.5	1.4	5.0	7.2	4.8	7.2	10.6	3.9	38
Russia	7.5	6.5	3.7	5.5	8.0	5.0	11.0	25.0	1.3	37
Canada	5.9	5.0	2.1	5.0	6.0	4.0	8.0	14.5	3.5	36
Brazil	7.7	7.0	4.6	5.3	8.0	4.3	10.5	30.0	1.5	35
Greece	7.4	7.2	2.7	5.0	8.3	5.0	11.7	15.0	3.0	34
South Africa	6.3	6.0	1.5	5.6	6.5	5.0	7.0	11.8	4.5	34
Argentina	9.9	9.0	3.4	8.0	11.0	7.2	14.6	20.0	5.0	33
Portugal	6.5	6.1	1.7	5.0	7.2	5.0	7.2	14.0	4.5	33
Austria	6.0	5.7	1.8	5.0	7.2	4.6	7.2	14.3	3.5	32
Belgium	6.1	6.1	1.0	5.0	7.2	5.0	7.2	8.0	5.0	31
Chile	5.7	5.3	2.1	5.0	6.0	5.0	6.5	15.0	1.3	31
China	9.4	7.8	5.1	6.5	10.7	6.0	14.5	30.0	4.0	31
Norway	5.5	5.0	1.6	4.5	6.0	4.0	7.0	11.7	3.5	30
India	8.5	7.8	2.8	6.8	9.3	6.0	13.1	16.0	5.0	28
Poland	6.2	6.0	1.1	5.2	7.5	4.9	7.5	8.0	4.5	28
Turkey	8.1	8.2	3.0	5.5	10.0	5.0	11.2	15.0	2.5	25
Luxembourg	6.1	6.1	1.3	5.0	7.2	4.5	7.2	8.7	4.5	21
Czech Republic	6.1	6.0	0.9	5.5	6.5	5.0	7.3	8.0	5.0	19
Peru	7.8	7.5	2.8	6.6	7.7	5.4	10.0	15.0	3.5	19
Finland	5.4	4.7	2.0	4.5	5.0	4.5	7.4	12.0	3.5	18
Israel	5.6	5.0	1.7	4.5	6.0	4.3	7.4	10.0	3.0	17
New Zealand	6.0	6.0	1.0	5.0	6.8	5.0	7.2	7.5	5.0	17
Taiwan	8.9	8.0	3.8	6.0	10.0	6.0	13.4	20.0	5.8	17
Indonesia	7.3	7.5	2.3	5.6	7.5	5.0	10.8	12.0	4.5	14
Japan	5.0	3.5	3.7	3.5	5.0	3.2	7.1	16.7	2.0	14
Korea (South)	6.4	6.5	2.5	6.5	7.0	2.6	8.8	11.1	2.0	13
Denmark	5.4	4.5	3.3	4.4	4.5	3.1	9.3	14.0	2.0	12
Egypt	7.6	7.0	2.3	7.0	7.6	6.6	10.4	13.0	3.5	12
Ireland	6.0	5.1	2.2	5.0	5.6	5.0	7.8	12.3	5.0	12
Singapore	5.7	5.0	1.5	5.0	5.8	5.0	7.3	9.6	4.5	11
Hong Kong	6.4	5.0	2.6	5.0	6.0	5.0	10.4	11.9	5.0	9
Hungary	8.0	8.0	2.4	6.0	8.0	6.0	9.2	13.8	6.0	9
Malaysia	4.5	3.5	2.2	3.5	6.0	3.1	6.8	8.8	1.5	9
Thailand	7.9	6.5	2.8	6.5	7.5	6.5	10.2	15.1	6.5	9
Saudi Arabia	6.3	6.0	0.4	6.0	6.6	6.0	6.8	7.0	6.0	8
Nigeria	6.9	6.0	1.6	6.0	7.1	6.0	8.9	10.0	6.0	7
Pakistan	6.3	7.5	2.3	6.3	7.5	3.6	7.5	7.5	1.5	7
Iran	22.9	19.5	17.8	12.0	24.0	8.5	40.8	56.5	7.0	6
Kazakhstan	7.5	7.5	0.1	7.5	7.5	7.5	7.6	7.6	7.5	6
Kenya	6.2	5.0	2.9	5.0	5.0	5.0	8.5	12.0	5.0	6
Kuwait	6.6	6.5	0.2	6.5	6.5	6.5	6.8	7.0	6.5	6
Philippines	5.6	5.5	0.2	5.5	5.5	5.5	5.8	6.0	5.5	6
UAE	9.7	10.0	0.8	10.0	10.0	9.0	10.0	10.0	8.0	6
Zambia	6.6	6.0	1.6	6.0	6.0	6.0	7.9	9.8	6.0	6
Zimbabwe	6.5	5.5	2.4	5.5	5.5	5.5	8.5	11.4	5.5	6

Figure 1. Market Risk Premium used in 2011 for some countries (plot of answers)

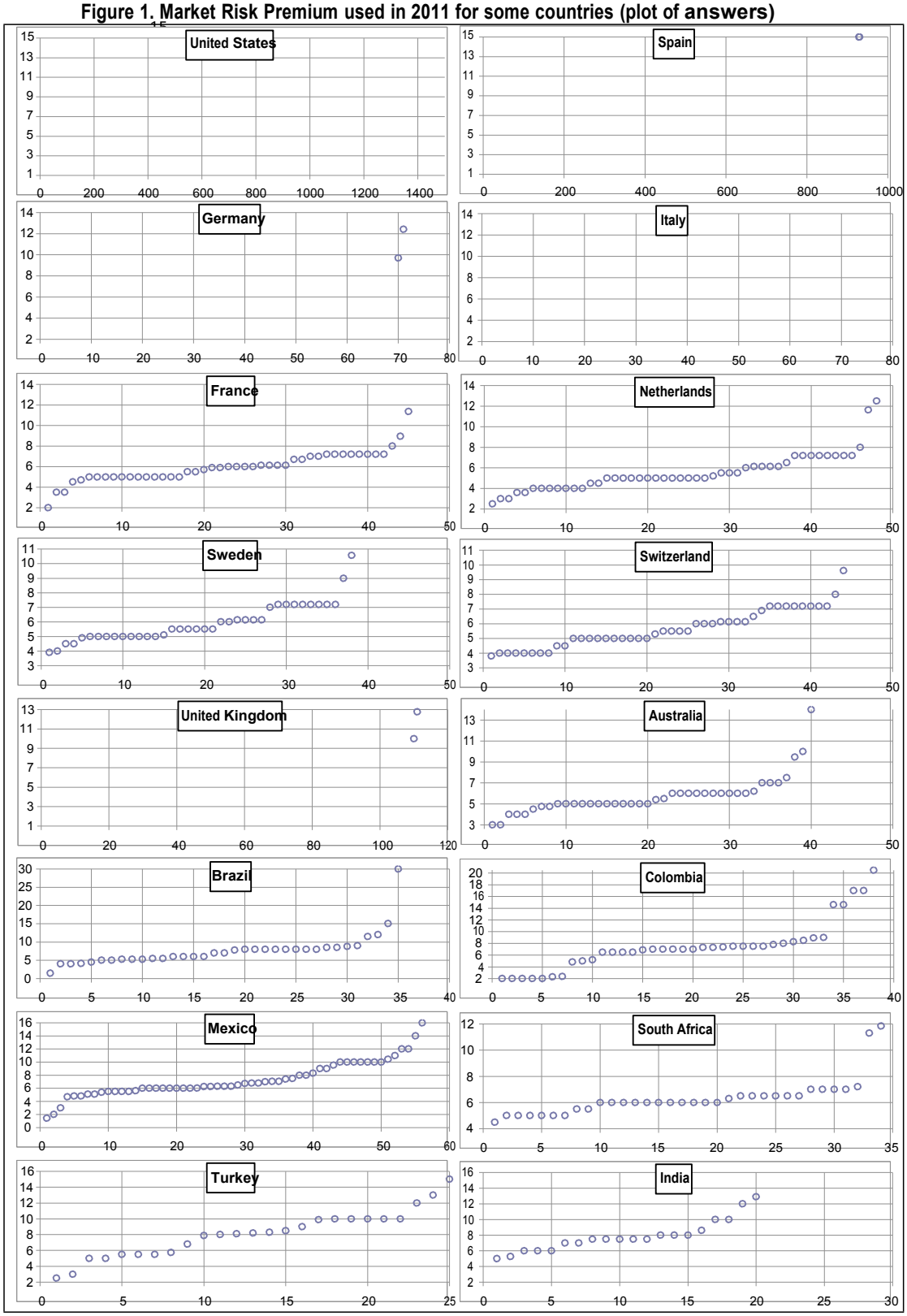
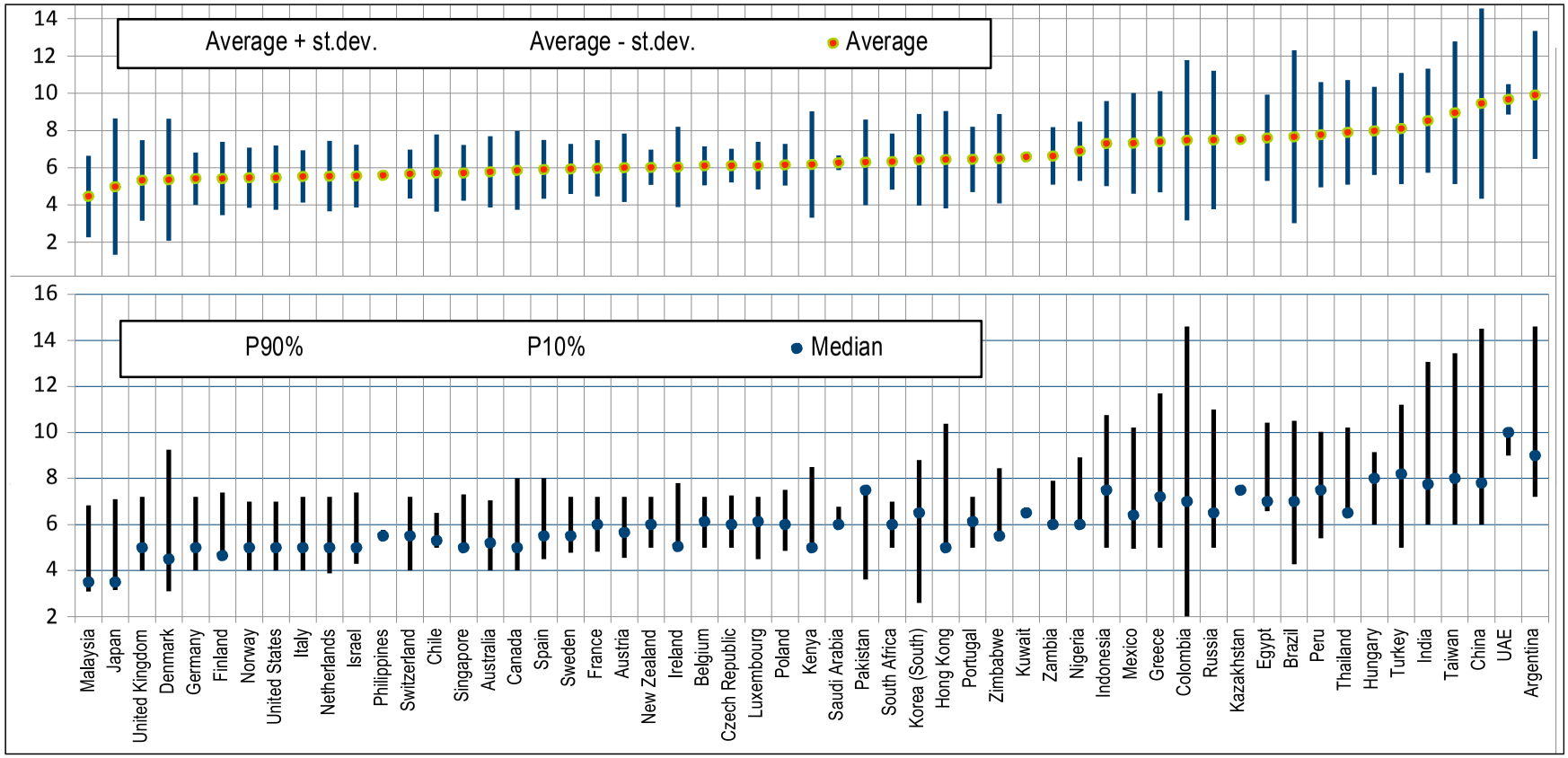


Figure 2. Market Risk Premium used in 2011. Average, median and dispersion of the answers by country
P90%: percentile 90%. P 10%: percentile 10%

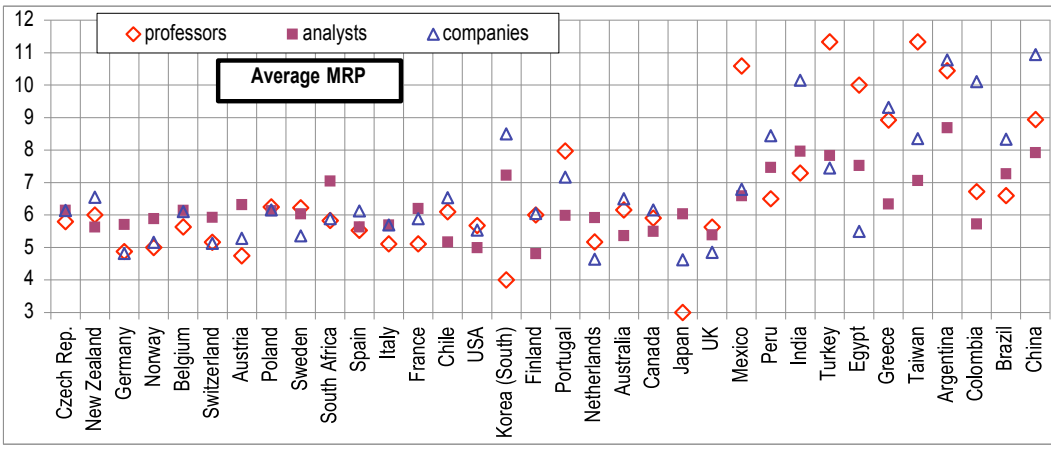


2. Differences among professors, analysts and managers of companies

Table 3 shows the differences for the 34 countries that had at least 2 answers for each category (professors, analysts and managers of **companies**).

Table 3. Market Risk Premium used for 34 countries in 2011 by professors, analysts and managers of companies

	Average			Median			Number of answers			Standard deviation		
	prof.	anal.	comp.	prof.	anal.	comp.	prof.	anal.	comp.	prof.	anal.	comp.
United States	5.7	5.0	5.5	5.5	5.0	5.2	522	330	651	1.6	1.1	2.0
Spain	5.5	5.6	6.1	5.5	5.0	5.5	92	305	533	1.0	1.3	1.8
United Kingdom	5.6	5.4	4.9	5.0	5.0	5.0	20	68	24	4.0	1.6	1.1
Italy	5.1	5.7	5.7	5.0	5.0	5.0	21	40	15	1.3	1.4	1.4
Germany	4.9	5.7	4.8	5.0	5.0	5.0	8	47	16	0.8	1.6	0.6
Mexico	10.6	6.6	6.8	10.0	6.0	6.3	9	25	22	2.7	1.6	2.9
Netherlands	5.2	5.9	4.6	4.5	5.5	4.0	12	29	7	2.5	1.6	1.7
France	5.1	6.2	5.9	5.5	6.1	5.7	6	26	13	1.7	1.7	1.0
Switzerland	5.2	5.9	5.1	5.0	6.0	5.0	8	29	7	1.0	1.4	0.9
Australia	6.2	5.4	6.5	6.0	5.0	6.0	15	21	4	2.5	1.1	2.5
Colombia	6.7	5.7	10.1	7.4	7.0	8.2	5	19	14	2.6	2.4	5.5
Sweden	6.2	6.0	5.4	6.0	5.8	5.0	5	26	7	1.6	1.4	0.7
Canada	5.9	5.5	6.2	5.3	5.0	5.1	12	12	12	1.8	1.7	2.8
Brazil	6.6	7.3	8.3	6.0	8.0	7.0	5	14	16	1.3	3.3	6.1
Greece	8.9	6.3	9.3	8.6	6.1	9.5	7	21	6	3.9	1.5	3.2
South Africa	5.8	7.0	5.9	5.5	6.5	6.0	3	13	18	1.0	2.1	0.7
Argentina	10.4	8.7	10.8	9.5	8.3	9.0	10	12	11	4.1	1.7	4.1
Portugal	8.0	6.0	7.2	6.9	6.1	6.5	6	24	3	3.2	1.0	1.2
Austria	4.8	6.3	5.3	4.8	6.1	5.5	2	23	7	0.4	2.0	0.9
Belgium	5.6	6.1	6.1	5.6	6.1	6.0	2	22	7	0.9	1.0	1.2
Chile	6.1	5.2	6.5	6.0	5.3	5.5	5	17	9	0.2	0.4	3.8
China	8.9	7.9	10.9	9.0	6.5	8.0	8	10	13	3.6	2.5	7.0
Norway	5.0	5.9	5.2	5.0	5.8	5.0	2	13	15	0.0	2.3	0.8
India	7.3	8.0	10.1	7.0	7.5	9.0	9	9	10	1.5	2.3	3.5
Poland	6.2	6.1	6.2	5.5	6.0	6.1	3	13	12	1.5	1.3	0.9
Turkey	11.3	7.8	7.5	12.0	8.4	8.1	3	12	10	2.1	2.3	3.5
Czech Republic	5.8	6.2	6.1	5.8	6.5	5.8	2	10	7	0.3	0.9	1.1
Peru	6.5	7.5	8.4	6.5	7.5	7.2	2	9	8	2.1	0.7	4.3
Finland	6.0	4.8	6.1	6.0	4.5	5.0	3	9	6	1.0	1.4	2.9
New Zealand	6.0	5.6	6.6	5.5	5.0	6.7	3	8	6	1.3	0.9	0.7
Taiwan	11.3	7.1	8.4	9.3	6.0	8.0	6	6	5	5.1	2.6	1.8
Japan	3.0	6.0	4.6	3.0	3.5	5.0	3	7	4	1.0	5.0	0.8
Korea (South)	4.0	7.2	8.5	3.5	6.5	8.5	4	7	2	2.4	1.7	0.7
Egypt	10.0	7.5	5.5	10.0	7.0	5.5	2	8	2	4.2	1.3	2.8



3. References used to justify the MRP figure

1,173 respondents indicated which books, papers… they use as a reference to justify the MRP that they use (375 of them provided more than a reference). **Table 4** contains the most cited references.

Table 4. References used to justify the Market Risk Premium

References	Professors	Analysts	Companies	Total
Ibbotson / Morningstar	53	31	172	256
Damodaran	72	34	114	220
Internal (own) estimate	15	84	67	166
Analysts / Inv. Banks	16	25	80	121
Experience, subjective, own judgement	57	23	28	108
Bloomberg	7	44	47	98
Historic data	45	15	33	93
Fernandez	26	6	31	63
Duff&Phelps	2	0	34	36
Surveys, conversations,…	12	3	18	33
DMS	13	3	15	31
Grabowski / Pratt's and Grabowski	1	5	24	30
Brealy & Myers	14	4	8	26
Mckinsey, Copeland	5	4	15	24
Internet	2	2	16	20
CFA books	2	9	6	17
Reuters	0	6	10	16
Ross/Westerfield	13	0	1	14
Fama and French	10	0	3	13
Siegel	5	0	5	10
Others*	142	47	135	324
I do not justify the number / do not answer	173	151	185	509
SUM	685	496	1.047	2.228

* Amomg them: CDS, Internet, Reuters, Siegel, Bodie, Kane, Marcus, Implied MRP, Economic Press, Datastream, Malkiel, Sharpe, Brigham, Consensus, IMF, RWJ, Shapiro, Kaplan, Shiller, Welch.

4. Comparison with previous surveys

Table 4 of Fernandez et al (2011a) shows the evolution of the Market Risk Premium used for the USA in 2011, 2010, 2009 and 2008 according to previous surveys (Fernandez et al, 2009, 2010a and 2010b).

Table 5. Comparison of previous surveys

	Surveys of Ivo Welch					Fernandez et al (2009, 2010)			
	Oct 97–Feb 98*	Jan-May 99+	Sep 2001**	Dec. 2007#	January 2009++	US 2008	Europe 2008	US 2009	Europe 2009
Number of answers	226	112	510	360	143	487	224	462	194
Average	**7.2**	**6.8**	**4.7**	**5.96**	**6.2**	**6.3**	**5.3**	**6.0**	**5.3**
Std. Deviation	***2.0***	***2.0***	***2.2***	***1.7***	***1.7***	***2.2***	***1.5***	***1.7***	***1.7***
Max	15	15	20	20		19.0	10.0	12.0	12.0
Q3	8.4	8	6	7.0	7	7.2	6.0	7.0	6.0
Median	7	7	4.5	6.0	6	6.0	5.0	6.0	5.0
Q1	6	5	3	5.0	5	5.0	4.1	5.0	5.3
Min	1.5	1.5	0	2		0.8	1.0	2.0	2.0

* 30-Year Forecast. Welch (2000) First survey + 30-Year Forecast. Welch (2000) Second survey

** 30 year Equity Premium Forecast (Geometric). "The Equity Premium Consensus Forecast Revisited" (2001)

30-Year Geo Eq Prem Used in class. Welch, I. (2008), "The Consensus Estimate for the Equity Premium by Academic Financial Economists in December 2007". http://ssrn.com/abstract=1084918

++ In your classes, what is the main number you are recommending for long-term CAPM purposes? "Short Academic Equity Premium Survey for January 2009". http://welch.econ.brown.edu/academics/equpdate-results2009.html

Welch (2000) performed two surveys with finance professors in 1997 and 1998, asking them what they thought the Expected MRP would be over the next 30 years. He obtained 226 replies, ranging from 1% to 15%, with an average arithmetic EEP of 7% above T-Bonds.[5] Welch (2001) presented the results of a survey of 510 finance and economics professors performed in August 2001 and the consensus for the 30-year arithmetic EEP was 5.5%, much lower than just 3 years earlier. In an update published in 2008 Welch reports that the MRP "used in class" in December 2007 by about 400 finance professors was on average 5.89%, and 90% of the professors used equity premiums between 4% and 8.5%.

Johnson et al (2007) report the results of a survey of 116 finance professors in North America done in March 2007: 90% of the professors believed the Expected MRP during the next 30 years to range from 3% to 7%.

Graham and Harvey (2007) indicate that U.S. CFOs reduced their average EEP from 4.65% in September 2000 to 2.93% by September 2006 (st. dev. of the 465 responses = 2.47%). In the 2008 survey, they report an average EEP of 3.80%, ranging from 3.1% to 11.5% at the tenth percentile at each end of the spectrum. They show that average EEP changes through time. Goldman Sachs (O'Neill, Wilson and Masih 2002) conducted a survey of its global clients in July 2002 and the average long-run EEP was 3.9%, with most responses between 3.5% and 4.5%.

Table 6. Estimates of the EEP (Expected Equity Premium) according to other surveys

Authors	Conclusion about EEP	Respondents
Pensions and Investments (1998)	3%	Institutional investors
Graham and Harvey (2007)	Sep. 2000. Mean: 4.65%. Std. Dev. = 2.7%	CFOs
Graham and Harvey (2007)	Sep. 2006. Mean: 2.93%. Std. Dev. = 2.47%	CFOs
Welch update	December 2007. Mean: 5.69%. Range 2% to 12%	Finance professors
O'Neill, Wilson and Masih (2002)	3.9%	Global clients Goldman

Ilmanen (2003) argues that surveys tend to be optimistic: *"survey-based expected returns may tell us more about hoped-for returns than about required returns".* Damodaran (2008) points out that *"the risk premiums in academic surveys indicate how far removed most academics are from the real world of valuation and corporate finance and how much of their own thinking is framed by the historical risk premiums... The risk premiums that are presented in classroom settings are not only much higher than the risk premiums in practice but also contradict other academic research".*

The magazine *Pensions and Investments* (12/1/1998) carried out a survey among professionals working for institutional investors: the average EEP was 3%. Shiller[6] publishes and updates an index of investor sentiment since the crash of 1987. While neither survey provides a direct measure of the equity risk premium, they yield a broad measure of where investors or professors expect stock prices to go in the near future. The 2004 survey of the Securities Industry Association (SIA) found that the median EEP of 1500 U.S. investors was about 8.3%. Merrill Lynch surveys more than 300 institutional investors globally in July 2008: the average EEP was 3.5%.

A main difference of this survey with previous ones is that this survey asks about the **Required** MRP, while most surveys are interested in the **Expected** MRP. Exhibits 2 and 3 contain comments from 168 respondents.

5. MRP or EP (Equity Premium): 4 different concepts

As Fernandez (2007, 2009b) claims, the term "equity premium" is used to designate four different concepts:

[5] At that time, the most recent Ibbotson Associates Yearbook reported an arithmetic HEP versus T-bills of

1. **Historical** equity premium (HEP): historical differential return of the stock market over treasuries.
2. **Expected** equity premium (EEP): expected differential return of the stock market over treasuries.
3. **Required** equity premium (REP): incremental return of a diversified portfolio (the market) over the risk-free rate required by an investor. It is used for calculating the required return to equity.
4. **Implied** equity premium (IEP): the required equity premium that arises from assuming that the market price is correct.

The four concepts (HEP, REP, EEP and IEP) designate different realities. The **HEP** is easy to calculate and is equal for all investors, provided they use the same time frame, the same market index, the same risk-free instrument and the same average (arithmetic or geometric). But the **EEP,** the **REP** and the **IEP** may be different for different investors and are not observable.

The **HEP** is the historical average differential return of the market portfolio over the risk-free debt. The most widely cited sources are Ibbotson Associates and Dimson *et al.* (2007).

Numerous papers and books assert or imply that there is a "market" EEP. However, it is obvious that investors and professors do not share "homogeneous expectations" and have different assessments of the **EEP**. As Brealey et al. (2005, page 154) affirm, *"Do not trust anyone who claims to know what returns investors expect".*

The **REP** is the answer to the following question: What incremental return do I require for investing in a diversified portfolio of shares over the risk-free rate? It is a crucial parameter because the REP is the key to determining the company's required return to equity and the WACC. Different companies may use, and in fact do use, different **REPs**.

The **IEP** is the implicit REP used in the valuation of a stock (or market index) that matches the current market price. The most widely used model to calculate the IEP is the dividend discount model: the current price per share (P_0) is the present value of expected dividends discounted at the required rate of return (Ke). If d_1 is the dividend per share expected to be received at time 1, and g the expected long term growth rate in dividends per share,

$$P_0 = d_1 / (Ke - g), \text{ which implies: } IEP = d_1/P_0 + g - R_F \qquad (1)$$

The estimates of the IEP depend on the particular assumption made for the expected growth (g). Even if market prices are correct for all investors, there is not an IEP common for all investors: there are many pairs (IEP, g) that accomplish equation (1). Even if equation (1) holds for every investor, there are many *required* returns (as many as expected growths, g) in the market. Many papers in the financial literature report different estimates of the IEP with great dispersion, as for example, Claus and Thomas (2001, IEP = 3%), Harris and Marston (2001, IEP = 7.14%) and Ritter and Warr (2002, IEP = 12% in 1980 and -2% in 1999). There is no a common **IEP** for all investors.

For a particular investor, the **EEP** is not necessary equal to the REP (unless he considers that the market price is equal to the value of the shares). Obviously, an investor will hold a diversified portfolio of shares if his EEP is higher (or equal) than his REP and will not hold it otherwise.

We can find out the REP and the EEP of an investor by asking him, although for many investors the REP is not an explicit parameter but, rather, it is implicit in the price they are prepared to pay for the shares. However, it is not possible to determine the REP for the market as a whole, because it does not exist: even if we knew the REPs of all the investors in the market, it would be meaningless to talk of a REP for the market as a whole. There is a distribution of REPs and we can only say that some percentage of investors have REPs contained in a range. The average of that distribution cannot be interpreted as the REP of the market nor as the REP of a representative investor.

Much confusion arises from not distinguishing among the four concepts that the phrase *equity premium* designates: Historical equity premium, Expected equity premium, Required equity premium and Implied equity premium. 129 of the books reviewed by Fernandez (2009b)

identify Expected and Required equity premium and 82 books identify Expected and Historical equity premium.

Finance textbooks should clarify the MRP by incorporating distinguishing definitions of the four different concepts and conveying a clearer message about their sensible magnitudes.

6. Conclusion

Most surveys have been interested in the Expected MRP, but this survey asks about the Required MRP.

We provide the statistics of the Equity Premium or Market Risk Premium (MRP) used in 2011 for **56 countries**. We got answers for 85 countries, but we only report the results for 56 countries with more than 6 answers.

Most previous surveys have been interested in the Expected MRP, but this survey asks about the Required MRP. The paper also contains the references used to justify the MRP, comments from 12 persons that do not use MRP, and comments from 33 that do use MRP. Fernandez et al. (2011a)[7] has additional comments (58 do not use MRP, and 110 use it). The comments illustrate the various interpretations of the required MRP and its usefulness.

This survey links with the *Equity Premium Puzzle*: Fernandez et al (2009), argue that the equity premium puzzle may be explained by the fact that many market participants (equity investors, investment banks, analysts, companies…) do not use standard theory (such as a standard representative consumer asset pricing model…) for determining their Required Equity Premium, but rather, they use historical data and advice from textbooks and finance professors. Consequently, ex-ante equity premia have been high, market prices have been consistently undervalued, and the ex-post risk premia has been also high. Many investors use historical data and textbook prescriptions to estimate the required and the expected equity premium, the undervaluation and the high ex-post risk premium are self fulfilling prophecies.

EXHIBIT 1. Mail sent on March and April 2011

We are doing a survey about the Market Risk Premium (MRP) that companies, analysts and professors use to calculate the required return to equity in different countries.
We will be very grateful to you if you kindly reply to the following 3 questions.
Of course, no companies, individuals or universities will be identified, and only aggregate data will be made public.

Best regards and thanks,
Pablo Fernandez
Professor of Finance. IESE Business School. Spain
http://www.iese.edu http://ssrn.com/author=12696

3 questions:

1. The Market Risk Premium that I am using in 2011 for my country _____is: _____%

2. The Market Risk Premium that I am using in 2011 for USA is: _____%

3. Books or articles that I use to support this number:

Comments
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[7] Fernandez, P., J. Aguirreamalloa and L. Corres (2011a), "US Market Risk Premium Used in 2011 by Professors, Analysts and Companies: A Survey...", downloadable in **http://ssrn.com/abstract=1805852**

EXHIBIT 2
COMMENTS OF RESPONDENTS THAT DID NOT PROVIDE THE MRP USED IN 2011

1. 95% of valuations are executed on multiple basis, i.e. we don't properly calculate a wacc per investment case nor market risk premium
2. We focus on emerging markets. We don't use a formulaic approach to specific country risk and return requirements, and believe that it doesn't adequately account for relative risk or reward. Rather, we look at each country and determine whether there is a compelling real estate opportunity from a perspective of fundamental demand (like Brazil) and which meets our overall return requirements (approximately 20%).
3. Analyst. Europe. Changes every week
4. Germany. We do not apply this methodology in venture capital.
5. In Canada we don't use MRP. The majority of our appraisals are on an orderly liquidation basis. For the few fair value appraisals, we use remaining useful life formulas.
6. I am fundamentally critical as regards the concept of a risk premium, it mainly serves as a tool to rationalize/ legitimate claims on income in the struggle between creditors and debitors.
7. European Fund. We only invest in European non-listed, private companies. Our required return is not depended on MRPs, we try to get the maximum out of it for our shareholders. A reference for us is the return you get on a savings account of a bank. For the moment this is about 2.5%. So if we get on top of an extra 10 to 15% per year, you are doing fine.
8. We usually calculate cost of equity in US$ and then translate it through PPP to R$.
9. The survey comes to me during the period of Japanese 9.0 earthquake, which I believe have strong impact in Taiwan. Unfortunately up to now no precise estimates for the damage can be obtained.
10. I have to confess that what I have doing in finance area is for my own pleasure. In other words I have made some theoretical research but almost never did not try to calculate 'numbers'. On the other hand my understanding of the problem related to the questions below is a little bit different than benchmark. In particular each 'The MRP ' implies risk characteristics that cover the set of scenarios for which say 'payer' pays more than implied by scenarios. Actually I think that relevant general information can be drawn from CDS and Interest Rate Parity. The MRP are excessively simplified.
11. I believe that the long run risk dynamics of corporations versus sovereigns has altered to the extent that risk has diminished for the former and increased for the latter. South African cost of capital has also been shifting in the past few years with the cost of debt particularly declining. I think slightly higher Price Earnings ratios will be typical in South Africa going forward than the long run market average of around 14x.In Private Equity EBITDA multiples of 7x are common today whereas a few years back 3 to 5x was the norm for deals.
12. No previous study is known of a comprehensive study of the portuguese domestic market. We (3 professors) are developing a 3-year project that aims to estimate our domestic ERP along with an understanding of the reasons that influenced that premium. At this very moment we are finalizing the construction of a share index that covers the period 1940 to 2010.

EXHIBIT 3
COMMENTS OF RESPONDENTS THAT DID PROVIDE THE MRP USED IN 2011

1. Your survey assumes that folks are using the segmented markets approach. I use an International CAPM approach and the MRP on the world market index, which I assume to be 5% from the perspective US dollars. We base also on information provided by surveys (e.g. from KPMG, Roland Berger, and other, or finance articles).
2. In estimating a cost of equity for a company with operations outside of US, we typically consider a country risk premium reflects subject country credit risk from the International Cost of Capital Report 2010, Ibbotson Associates, Inc.
3. Stock market in Egypt has been closed for almost a month now, but just before that my planned MRP based on estimations for Egypt was 3.5%. I'll probably not lower it too much after the revolution since I expect a lot of domestic investment and rebuilding efforts.
4. In Japan, a big seismic hazard is received, and the real estate dealings market is being confused in Japan now. Therefore, I cannot appropriately answer your question now.
5. Professor, UK. I think you're potentially asking the wrong question in that I think we should measure (E(rm) directly rather than the MRP. That seems particularly important in the context of current markets.
6. Professor, Finland. Predicting the market premium by using the survey method for asking the personally subjective opinion on the future market outlooks is not the scientific way.
7. I am working with/using a Long-term risk-free rate of 3 %, and a premium of 9 %. But note that this is to illustrate cases in teaching and/or Exam assignments! In Sweden the inflation is around 2 %. The central banks target is 2 %
8. I use CAPM Model. The Iranian stock Market has showed 46% gain in 2010 and it seems continuing for 2011.
9. For the Euro zone, I use a country risk premium and the german bund rate as a risk-free rate in euros.
10. Indonesia. We export mainly to US, Europe, and Japan. The crisis on US affect our export, meanwhile our commodities hardly survive the competition with China commodities. But we still have prospect. We are optimist that our economic growth will increase from 5.7% in 2010 to more than 6.5% at the end of 2011

11. The Malaysian government securities yield is 2,77% whereas historical market FBMKLIC return (market index) is 4,24% from Jan 1980 to the end of 2009
12. I dont believe in fixed ERP its a random variable and partially predictable. You can use 10% for my country Cda and US 8%
13. Pakistan is an emerging market, Its interest rate statistics hardly show any correlation with developing world especially western Europe and USA, Despite higher interest rates, it has witnessed inflation in double digits and depreciation in its currency, Therefore, most monetary economics fails to explain the case of Pakistan and in fact for all emerging economies, The country has a very large undocumented sector, very limited tax base and its policies - for the most part - lately are not set independent of international political pressures.
14. In the case of Japan, true premium should be higher, but risk premium computed by stock return - JGB yield is small. Also this number can change due to the real impact of the current Tsunami and Nuclear problems.
15. The U.S. is higher than Germany and before the earthquake, Japan, but still quite low. The biggest risk is inflation which I normally account for separately – not as part of the country risk premium. In the long run, it is at least 1-3% as a component of the discount rate. Brueggeman and Fisher, Real Estate Finance, has some discussion of principals but no estimates of country risk premium
16. I anticipate China stock market to increase by around 10% within 2011 while its one-year deposit interest rate stands at 3.5%. It results in a 6.5% of MRP for China. I also project the US stock market to increase by around 5% while the risk-free rate of US remains close to zero within 2011.
17. Calculating a MRP for Iran is not straightforward because of unforecastable economic situation. The best thing I can do is narrowing the range of possible rates. The reason for considering 18% as MRP for Iran is that the annual interest rate of bank investments and participation bonds are approximately 14% to 16% (average 15%) announced by the central bank these years. Besides, historical return earned by the market, proxied by the Tehran Stock Exchange (TSE) Index, comes more than 30%. Using a CAPM, these two rates with a market beta of one come to 15% (at least) as MRP. Unlike the other countries that are regaining from the economical crises, here it seems that it takes more time for Iran to revive from recession; that is a personal judgment and should push the premium down. Furthermore, Iranian government is now fulfilling and experiencing a new economical plan which involves cutting subsides and paying peoples directly any savings thereof. This might push the premium up as people expecting more inflation. In my opinion, this MRP goes above 15%. That is why I choose 18%.
18. For international markets from a US perspective we calculate the Cost of Capital per Country Credit Rating model based upon the International Cost of Capital Report issued by Morninstar.
19. We use the policy potential index from this report to adjust project valuations for country risk. We find this is more useful and more comprehensive for the mines operated by our companies than a credit rating.
20. Please note that while my WACC's in general are high (11-13%) my growth rates are a bit higher also, anywhere from ½ to ¾ the overall long-run growth rate for the Chinese economy of 7-8%.
21. The equity risk premium we use here is 5.0%, historically we have used Ibbotson as a source for ERP minus the Ibbotson and Chen study adjustment, more recently we have joined KPMG ELLP and a 5.0% ERP is the generally applied level for Equity Risk Premium. We do not calculate a specific MRP for Russia based on historical returns on the equity market as Gazprom and the oil majors dominate the index so the applicability of any number is only really applicable to the natural resources sector rather than the broader market. The risk-free rate in rouble terms is also a problem as there are no reliable long-term rouble bonds traded so we tend to us Russian Government USD denominated bonds as a basis for the risk-free rate and then add a currency risk premium based on the fisher formula, not a perfect solution but it seems to work. We also use Ibbotson for size premium determination.
22. I use 4% for all countries based on the Credit Suisse Global Investment Returns Sourcebook that provide data for 17 countries beginning in 1900
23. Implied equity risk premium from major stock market indexes
24. Please note that if we calculate the real MRP in Italy for the last ten years, the measure is negative. The value is reasonably considered as right only in force of an accepted practice by the main consulting and auditing firms active in Italy. There is no more rational explanation in doing it !
25. This is based on my VC investors' general requirement. Nowadays, US is no longer safer than some Asian emerging markets. Someday, it may even reverse.
26. Financial analyst for belgian institutions. In general I am using a standard WACC of 7,5% to 8%, which is in fact including an average risk premium of 3% to 4,5%. I am using these figures in good and in bad times, in order to get a standard approach. It is obvious that in bad times, risk premiums are high and thus valuations low and in good times low risk premium result in high valuations. I want to go through this phenomenon by using one standard WACC and risk premium.
27. I would say that I think equities are going to outperform bonds by 3% for both US and the Netherlands.
28. Risk premium for US is measured (for me) in £ i.e. is adjusted for expected depreciation in $
29. I tend to like the Dimson Marsh research. Their Triumph of the Optimists is quite a good read as are some of their articles. I tend to agree that Ibbotson tends to overestimate the MRP.

30. We base our total premium at 12%, counting an estimation of 6% inflation for 2011, according to a survey done on our main market, which is environmental services.
31. Comparison of the interest rate that the market establishes for a standard security in the country to the comparable security in the benchmark country,
32. We use a regression on US Dollar denominated sovereign bonds and our in-house risk rating to determine African countries' MRP
33. This figure is adjusted regularly based on current market levels and recent market performance. The Margin Lending borrowing rate also helps determine the MRP. Our current variable Margin Lending Rate is 9.75%

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CHAPTER 5 – CAPITAL ASSET PRICING MODEL

I. Introduction

A. The capital asset pricing model was first introduced by William F. Sharpe, a Nobel prize-winning economist in 1964. The model is part of capital market theory, which includes portfolio theory and how investors behave in capital markets.

B. Capital market theory differentiates between two kinds of risk that investors face, both of which were discussed in Chapter 4:

1. Systematic risk

   a. Systematic risk, also referred to as market risk, reflects the uncertainties of future cash flows resulting from market-wide events that threaten the broad stock market such as wars, recession, inflation, etc.

   b. Systematic risk therefore is measured by comparing movements in a subject company's stock to a broad market index.

   c. Capital market theory explains the behavior of a portfolio of stocks since a prudent and rational investor would diversify risk by buying a portfolio of different investments rather than a single investment.

      (1) Systematic risk cannot be diversified away since it affects the broad market.

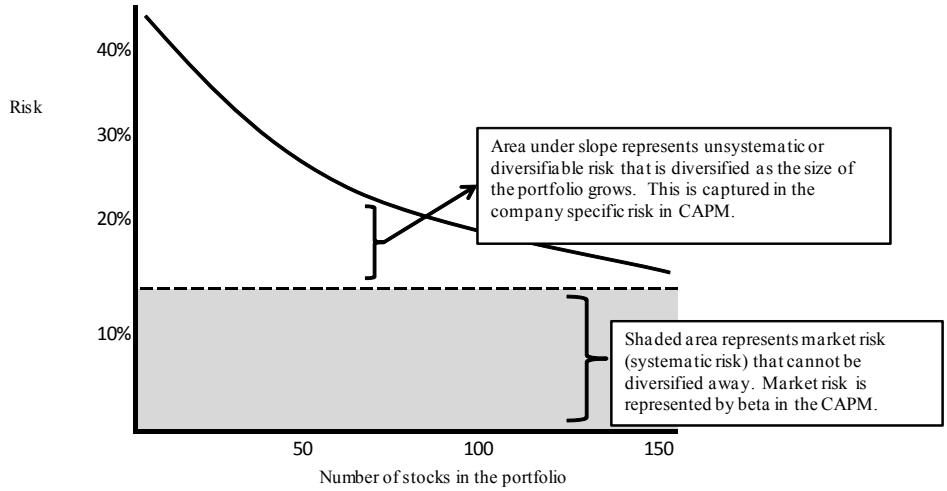
2. Unsystematic risk

   a. Unsystematic risks are the risks that are particular to a certain industry or company within an industry.

      (1) These are the risks that are uncovered in a typical company analysis, such as lack of management depth, obsolete technology, poor quality control, etc.

      (2) Capital market theory assumes that a prudent investor would diversify away this risk by investing in a portfolio of stocks.

3. The relationship between systematic and unsystematic risk is shown in the following graph:



4. Ownership of a single stock exposes the investor to both systematic and unsystematic risk. Ownership of a well-diversified portfolio exposes the investor to just systematic risk, which will be measured by beta.

II. The Security Market Line

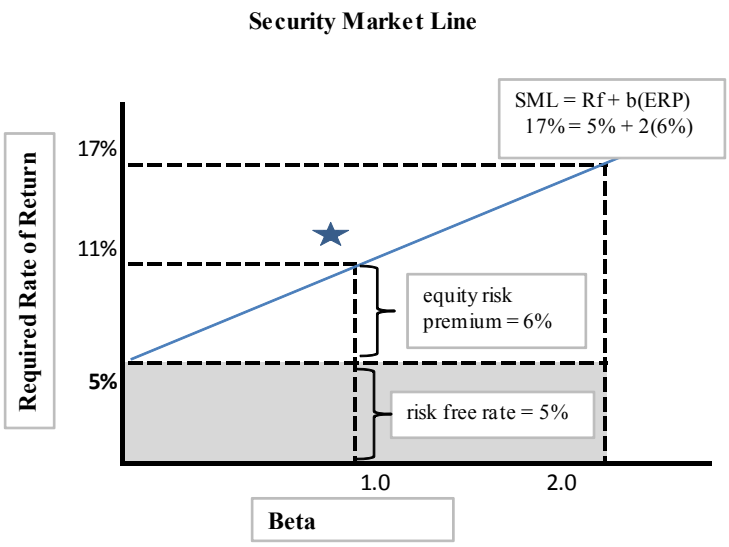
A. Capital market theory allows for efficient markets, which states that a security's price will not part from its justified economic value for an extended period of time.

B. In estimating a required rate of return, it is assumed that the security's risk premium above the risk-free rate is a linear function of the security's beta, as reflected in the Security Market Line (SML) , below.

C. The SML depicts the relationship between risk and return that is derived from the CAPM. Rates of return on diversified portfolios are plotted against risk as measured by the standard deviation of returns, or beta.

D. The risk-free rate is shown on the y-axis and a line is drawn from the risk-free rate to the portfolio with the optimal risk-return relationship or the portfolio with the highest return for a given level of risk. If markets are efficient, this optimal portfolio is theoretically comprised of the entire market. The resulting line is the SML.

   1. The plots on the security market line are risk/return relationships for portfolios of diversified stocks.



E. Suppose the star in the graph represents a portfolio placed above the SML since it is priced too low. The stock has a beta of .90 which should result in an expected return of 10.6% rather than the 12.0% shown. The stock would be underpriced and market demand would drive the price higher given its risk profile.

F. The equity risk premium is a linear function of the stock's beta as shown in the CAPM below:

1. $K_e = R_f + \beta(ERP)$

Where:

K_e = Cost of Equity

R_f = Risk-free rate

β = Beta

ERP = Equity risk premium

III. Beta

A. Beta measures the degree to which an individual stock and the market return move in the same direction.

1. If a stock moves in perfect correlation with the market, it has a beta of 1.0.

2. A company whose returns above the risk-free rate move to a greater degree of magnitude than the excess market returns has a beta above 1.0.

3. A company whose returns above the risk-free move to lesser degree than the market have a beta less than 1.0.

B. Beta is a measure of volatility which is a proxy for risk. If a stock's reaction to market shocks exceeds the market's reaction, it is relatively riskier than the market.

1. Hence, the higher the beta, the greater the risk, and the higher the expected rate of return.

2. The higher the expected rate of return, the lower the value of the stock.

C. The Build-up Model was introduced in Chapter 4. The capital asset pricing model introduces the concept of beta to determine the cost of equity.

D. Measuring beta

1. Beta is measured by regressing the excess returns on a subject company (or a similar guideline public company) against the excess returns on the market over a certain period of time, usually three to five years.

   a. In practice, though, some practitioners and information providers regress total returns against market total returns. There is no significant difference between using total or excess returns.

   b. Other practitioners regress changes in the subject stock price against changes in the market index price, ignoring dividends.

      (1) By excluding dividends it is possible that this alternative way to measure beta is skewed since some companies' returns are primarily dividends.

2. A subject stock should be regressed against a market index which is well-diversified with an array of industries represented. Unfortunately, the public market indices in many developing countries do not meet this criterion.

3. Historical Period – although betas are normally measured with historical price data, the metric is theoretically forward looking. Hence, if historical data is for some reason not indicative of the future, allowances should be made.

a. Most information providers calculate beta on either a three-year or five-year historical period.

(1) Return data can be based on daily, weekly or monthly price data.

(2) If betas are obtained from an information provider, the analyst should know how the beta is calculated since differences in historical period and data frequency can cause a difference in the beta.

(a) ValueLine – five years of weekly returns. Betas are smoothed.

(b) Bloomberg – interactive depending on the analyst's inputs. Betas are smoothed.

(c) Ibbotson – five years of monthly returns

(3) Information providers that "smooth" betas apply a statistical adjustment to historical data to lessen the impact of sudden swings and to provide a beta that is theoretically more indicative of the future.

E. Relevering beta for capital structure

1. Published betas that are based on the daily trading prices of companies are called "levered" betas because the risk reflects both the financial and operating risk in the company. Hence the beta is reflective of the company's capital structure.

2. If the subject's capital structure does not reflect the industry target capital structure or if there are varying capital structures between the subject and the guideline public companies that are used as a proxy for the industry, then two adjustments are necessary before the cost of equity can be applied to future cash flows.

a. Usually, the analyst has obtained betas from guideline public companies ("GPC") since the subject company does not trade on an active market.

b. The GPC betas must be adjusted to reflect the target capital structure used in the analysis.

c. To do this, the GPC betas are unlevered to obtain the unlevered or "asset" beta.

(1) The asset beta represents a company's beta if it had no debt.

d. Each GPC asset beta is then relevered with the target capital structure.

3. The Hamada formula has been a commonly-applied tool to relever betas. The Hamada formula is shown below:

   a. To unlever the levered beta:

$$\beta_U = \frac{\beta_L}{1 + (1 - t)(D/E)}$$

Where:

$\beta_U =$ Unlevered beta

$\beta_L =$ Levered beta

$t =$ tax rate

$D =$ Debt weight in capital structure

$E =$ Equity weight in capital structure

   b. After the beta is unlevered, it must be relevered with the subject company's target capital structure. The Hamada formula for relevering the beta is shown:

$$\beta_L = \beta_U(1 + (1 - t)(D/E))$$

   c. Example:

      (1) The representative guideline company beta is 1.35 and should be relevered to obtain a beta that is relevant to the subject business. Additional information is shown:

Guideline company debt/equity capital structure is 25% and 75%

Guideline company tax rate is 38%

Subject company target capital structure is 15% and 85%

Subject company tax rate is 32%

(a) In the first step, the GPC beta is unlevered using the GPC capital structure and tax rates.

β_u= 1.35/[1 + (1 - .38)(.25/.75)]

= 1.12

(b) In the second step, the unlevered beta is relevered using the subject company's tax rate and target capital structure.

β_L = 1.12 (1 + (1 – .32)(.15/.85)

= 1.25

4. The Hamada formula assumes several market conditions which are questionable, especially during recessionary periods.

   a. The tax shield has the same risk profile as the company's debt.

      (1) These may not be equal especially during volatile markets.

   b. The tax shield on interest expense is realised in the period in which the interest is paid.

      (1) During recessionary periods a company's profits may decline or be erased altogether, eradicating the current applicability of a tax shield on debt.

   c. The value of the tax shield on interest expense is proportional to the market weight of the debt capital.

   d. The amount of debt capital does not change.

      (1) In reality the amount of debt in a capital structure will often change over time.

      (2) Assuming that equity capital will increase over time, debt capital will have to increase in order to maintain the same weight in the capital structure.

5. Two alternatives to the Hamada formulas are presented here to address these assumptions, the Miles-Ezzell formula, and the Practitioners' formula.

a. Miles-Ezzell formulas are shown below:

$$\beta_u = \frac{M_e * \beta_L + M_d * \beta_d[1 - (t * k_{d(pt)})/(1+k_{d(pt)})]}{M_e + M_d[1 - (t * k_{d(pt)}/(1 + k_{d(pt)})]}$$

Where:

β_u = Unlevered or "asset" beta
β_L = Levered beta
M_e = Market value of equity
M_d = Market value of debt
β_d = Beta of debt capital
t = Company tax rate
$k_{d(pt)}$ Cost of debt prior to tax effect

$$\beta_L = \beta_u + D/E(\beta_u - \beta_d)\ [1 - ((t * k_{d(pt)})/(1+ k_{d(pt)}))]$$

Where:
D/E = Market value of debt divided by market value of equity

b. The Miles-Ezzell formula has the following assumptions, relative to the Hamada formula:

(1) The tax shield has the same risk profile as the company's operating cash flows (EBIT) after the first year. From a balance sheet perspective, the tax shield risk is equivalent to the company's invested capital risk, including debt and equity.

(a) Hamada on the other hand assumes the tax shield risk equals debt risk.

(2) Since the formula uses a debt beta, debt principal and interest payments may not be made when owed. Hence, the tax shield on interest payments may not be realized in the same period in which interest payments are made.

(a) Hamada assumes that the tax shield on interest payments occur in the same period the interest paid.

(3) Debt capital remains at a constant percentage of equity. Hence assuming that equity capital increases in a growing company, the debt capital will also increase in proportion.

(a) Hamada assumes that the debt capital amount does not change.

6. Practitioners Method

a. The Practitioners' Method is used in cases where there is the least expectation of taking the tax deduction on interest.

$$\beta_U = \frac{\beta_L}{1 + (D/E)}$$

Where:

$\beta_U =$ Unlevered beta
$\beta_L =$ Levered beta
$D =$ Debt weight in capital structure
$E =$ Equity weight in capital structure

b. To relever the beta, the subsequent formula under the Practitioners' Method is:

$$\beta_L = \beta_U(1 + (D/E))$$

c. The Practitioner's method assumes that the risk of the tax shield is comparable to the risk of the operating cash flows, or EBIT. Hence, the risk of realizing the tax deduction is greater than the risk implied in the Hamada and Miles-Ezzell formulas shown above.

d. Using the example from III.E.3 above, the Practitioners' Method would yield the following relevered beta:

e. Step One

Bu = 1.35/ [1 + (.25/.75)]

= 1.0125

f. Step Two

BL = 1.0125 * [1 + (.15/.85)]

BL = 1.191

g. The Practitioners' Formula results in a lower beta here than the Hamada formula in III.E.3 above since the relevered capital structure has such a low level of debt (15% debt in the capital structure). The opposite result (that is, a much higher relevered beta under the Practitioner's method) would occur if the relevered capital structure is debt heavy. See the Chapter Exercise in Part V below.

IV. Modified Capital Asset Pricing Model

A. The CAPM discussed above assumes that securities are held in a perfectly diversified portfolio.

B. Business valuation has a different set of assumptions. It is assumed that a subject stock is not being valued as part of a portfolio, but rather as a stand-alone entity.

1. Therefore we cannot assume that unsystematic risk is diversified away. It must be measured and accounted for in the CAPM.

2. $K_e = R_f + \beta(ERP) + Alpha$

Where:

K_e = Cost of Equity

R_f = Risk-free rate

β = Beta

ERP = Equity risk premium

Alpha = Unsystematic or specific risk

3. Unsystematic risk includes the specific risk that is associated with industry or company issues such as small size or other factors which cause an uncertainty in future cash flows.

C. Assumptions behind the CAPM and Capital Market Theory

1. Investors are risk averse.

2. Rational investors do not accept unnecessary risk and invest in well-diversified portfolios of stocks.

3. All investors have identical investment horizons (i.e. holding periods).

4. All investors have identical expectations about expected rates of return and how capitalisation factors are generated.

5. There are no investment related taxes or transaction costs.

6. Relative price volatility is a modifier of equity market risk and required return.

7. The rate received from lending money is the same as the cost of borrowing money.

8. The market has perfect divisibility and liquidity.

D. Problems with the assumptions

1. Critics would argue that all investors do not have equivalent knowledge and do not always act rationally.

   a. The widespread frauds that contributed to the severe global recessions in 2008-09 were neither short-term nor insignificant. This is one argument that can be used to counter the premise that markets are educated and rational.

      (1) In the United States, a major contributor to the recession was the collapse of collateralized debt obligations (CDOs), a class of securities which brought profound and uncalculated risk to the balance sheets of most of America's financial institutions.

(a) This was not a short-term phenomenon. The risk of subprime mortgages was bundled into debt instruments for 20 years before the recession. Neither consumers, bankers, investment professionals, nor government regulators understood the risk.

(b) This would argue against Assumption #2 above.

2. There are taxes and transaction costs.

3. It is virtually assured that the cost of lending and borrowing will not be the same.

4. Some academic studies show that volatility (as measured by beta) is not a good proxy for risk.

5. The holding period of investors in publicly-held securities is likely shorter than the holding period of investors in closely-held companies.

6. The CAPM is part of capital market theory and meant to develop rates of return for securities in a well-diversified portfolio. It was not intended as a model for developing the cost of equity of a single private entity.

V. Chapter Exercise

A. The Hamada Model example from Section III of this chapter is revisited below:

The representative guideline company beta is 1.35

Guideline company debt/equity capital structure is 25% and 75%

Guideline company tax rate is 38%

Subject company target capital structure is 15% and 85%

Subject company tax rate is 32%

This resulted in an unlevered beta of 1.12 and after applying the second Hamada formula, a relevered beta of 1.25.

1. Using these input variables calculate the unlevered and relevered betas using the Practitioners' Model.

2. Why is the relevered beta lower than the relevered beta in the Hamada formula?

3. Now calculate the unlevered and relevered beta under both Hamada and the Practitioners method using the set of assumptions below:

Guideline company debt/equity capital structure is 25% and 75%

Guideline company tax rate is 38%

Subject company target capital structure is 60% debt and 40% equity

Subject company tax rate is 32%

CHAPTER 6 – INTERNATIONAL ECONOMICS AND COUNTRY RISK

I. Introduction

A. The prior chapters discussed the components of the CAPM in the context of a developed economy.

1. Risk-free Rate – a common proxy is the constant yield to maturity on a long term U.S. Treasury bond.

2. Beta – assuming that volatility is a good proxy for risk, this is usually measured using publicly-held companies in a developed market regressed against a stock market in a developed economy.

3. Equity risk premium – theoretically this metric should be based on a market's expectation of future returns but traditionally historical returns have been used as a proxy for expectations.

4. Specific risk – this has been separated into a measurable size premium and a subjective assessment of specific company risk. The size premium is usually based on U.S. market returns since no other stock market has similar historical data which allows a study of returns in relation to size.

B. Chapters 6 and 7 deal with the assessment of risk in developing or undeveloped economies where the macroeconomic market information referenced above does not exist.

1. Risk-free rate – if the risk-free rate from Germany or the U.S. is used, how does the analyst account for the difference in long term inflation between the developed market and the subject company's home country?

2. Beta – if the home country does not have a stock market, or has a stock market with a limited history, how can guideline company betas be determined?

3. Equity risk premium – what is the relationship between the equity risk premium in the developed economy and the equity risk premium in the home country?

4. Specific risk – Can a size risk premium based on the U.S. market returns be applied to a similarly sized company in a developing economy?

C. The answer to these questions requires an understanding of basic international economic theory and an understanding of how to assess country risk.

   1. These factors are covered in the following sections.

II. Analyst Perspective

A. To adequately assess country risk and develop a valid projection model in the income approach, the analyst must first be clear on his or her perspective in the assignment.

   1. What currency will the valuation be expressed in?

   2. From what countries does the subject company generate cash flow?

   3. The currency of the cash flows in the projections must correlate with the currency of the discount rate.

B. We will address four common perspectives that analysts take:

   1. An analyst in a developed economy (e.g. UK) valuing a company in that same economy for a UK client.

      a. In this case, the UK analyst prepares projections in GB£ and prepares a discount rate based on UK economic and market variables.

      b. This perspective has already been addressed in prior chapters.

   2. An analyst in a developed economy (UK) valuing a company in a different economy (e.g. Poland) for a UK client.

      a. Assuming the UK client wants the valuation expressed in pounds sterling, the projections will be in pounds and therefore the discount rate must be based on UK economic variables.

      b. However, the analyst must account for country risk in Poland as well as currency and exchange rate risk between the British pound and the Polish zloty.

   3. An analyst in a developing economy (e.g. Poland) valuing a company in that same developing economy

a. The cash flows are prepared in Polish zlotys and the discount rate is based on Polish economic metrics.

b. Since most developing economies do not have ready market data similar to developed economies, the analyst must develop a model which either starts with a developed market's discount rate, or adjusts local economic data directly.

4. An analyst in one country (e.g. United States) valuing a company which generates cash flows from multiple countries (U.S., UK, Poland, China, etc).

a. This is a complicated perspective. Cash flows can he projected individually by country or converted to a single currency in the analyst's country. If the cash flows are kept separate, then separate cash flow models must be completed.

(1) The separate cash flow analyses will still most likely need to be converted to a single currency. That is, a valuation opinion cannot be expressed in multiples currencies.

b. The discount rate must be set for each currency based on that country's economic factors.

C. The perspective and needs of the client will determine the currency of the valuation and the currency of the discount rate.

D. Country and currency risk can be recognized in either the level of cash flows or the size of the discount rate. It is important to note, especially with currency risk, that the analyst should not double count the risk factors by both lowering the level of cash flows projected and at the same time raising the discount rate to account for the same risk.

III. International Economics

A. In order to help understand how risk in international assignments is categorized, it is necessary to have a basic understanding of the economic theories that explain the dynamic relationships between world currencies.

1. At the end of this chapter, the analyst should be able to distinguish between currency risk, exchange rate risk and country risk. While the three are related and overlap, they are distinct concepts.

B. There are five economic relationships that address why currencies fluctuate against each other and why interest rates vary around the world.

1. Interest rate parity

    a. When dealing with a multi-country assignment, the analyst needs to address the fact that countries have different interest rates (i.e. different "risk-free rates").

    b. The difference in interest rates is directly related to expectations about how the two countries' currency exchange rate will vary in the future.

    c. Interest rate parity states that the percentage difference between two countries' risk-free rates will equal the percentage difference between the forward and spot exchange rates of those countries.

        (1) The spot exchange rate between two currencies is the exchange rate on any given day.

        (2) The forward rate is the exchange rate at a designated time in the future.

    d. Interest rate parity says that the relationship between the interest rates should equal the relationship between spot and forward exchange rates so that:

        (1) (Forward rate * FV of base cur.) = (Spot rate * (1 + quote cur. interest rate))

            (a) "FV" = future value, or (currency * (1 + interest rate))

        (2) Algebraically then:

            Forward rate = (Spot * FV of quoted currency)/FV of base currency

    e. Example

        (1) Euro to Indian Rupee exchange rate = 61.742

            (a) That is, €1.00 = 61.742 rupees

        (2) Euro area interest rate = 1.0%

        (3) Indian interest rate = 5.5%

        (4) Forward rate therefore equals:

$$= \frac{(61.7421 * 1.055)}{(1 + 1.0\%)}$$

$$= 64.4930$$

(5) Given the above calculation, the interest rate parity holds since:

1.055//1.01 = 64.493/61.742

=1.0446

f. Interest rate parity, like many financial concepts, is proven by the arbitrage opportunities that would exist were it not true.

(1) Given the fact set above, an investor could borrow €100 euros at a 1.0% interest rate in Europe and exchange the cash for Indian rupees at the exchange rate to get 6,174 rupees.

(2) He would then invest the rupees at the 5.5% interest rate to yield 6,514 rupees after one year.

(3) Simultaneous to the rupee investment, he would have bought a futures contract at the 61.74 exchange rate, which would equal the spot rate since we are assuming interest rate parity does not hold in this example.

(a) He would use the futures contract to convert the rupees back to euros at the end of one year. So the 6,514 rupees would convert back to €105.50 (6,514/61.74).

(b) With the €105.50, he would pay off the loan due of €101.00 and earn a profit of €4.50.

(c) The arbitrage opportunity would cause the spot and forward rates to grow apart or interest rates to change.

g. Problems with interest rate parity

(1) Interest rate parity is more of a short-term concept. Valuation is a long term analysis.

(2) Governments often manipulate short-term interest rates in order to achieve other economic goals. This outside influence can interfere with market forces.

2. Expectations of Future Exchange Rate

   a. This principle is self-evident. It merely states that the forward rate for any given time period reflects what the market expects the spot rate to become over that time period.

      (1) In the example above, given the interest rates in Europe and India, the currencies of the base and quoted rate will become €1.01 and AUD 65.138. Therefore, the spot rate will be 64.493 after one year.

3. The Fisher Effect

   a. The Fisher effect states that the nominal rate of return on a risk-free security has two components:

      (1) A real rate of return

      (2) Inflation

   b. The two components are multiplicative so that if the real risk-free rate is 3.0% and inflation is 1.5%, then the nominal risk-free rate equals:

$$((1.03) * (1.015)) - 1.0 = 4.55\%$$

4. The International Fisher Effect (IFE)

   a. The IFE states that the real rate of interest is determined by the demand and supply of capital in a country.

   b. In an optimal global market that is integrated, there would be a single real rate of interest due to perfectly integrated demand and supply.

   c. If there were a single real rate of interest, then differences in nominal interest rates between countries would have to be the result of different levels of inflation between those countries.

   d. As a result, the value of a currency with a high inflation rate will depreciate over time relative to the currency with a low inflation rate.

(1) Most countries are not part of a globally integrated market.

5. Purchasing Power Parity (PPP)

a. PPP addresses price equality regardless of geographical region. All identical goods will cost the same regardless of where they are sold.

(1) PPP does not account for inflation variances between countries. Hence, the cost of an item may increase faster in a country with a relatively high inflation rate.

(2) If a country has high inflation, PPP states that its exchange rate relative to a country with low inflation will adjust to compensate.

b. Again, PPP is validated by the arbitrage opportunities.

c. PPP is valid in the long term but is subject to short-term distortion.

C. These international economic principles are relevant to valuation analysis since they provide insights into varying inflation rates and the effect inflation has on the future value of currencies. Expected inflation is a key factor in country analysis due to its effect on the value of the local currency.

1. Using the example of the Euro and Indian rupee discussed above, note that the Euro's interest rate is 1.0% and India's rate is 5.50%.

a. IFE states that differences in nominal interest rates must be the result of inflationary differences since the real rate of interest remains the same among countries assuming efficient capital flow.

(1) India's inflation rate is 9.47% compared to 2.50% in Europe.

2. Interest rate parity and purchasing power parity suggest that the exchange rates then between the European Union and India will adjust to reflect this inflationary difference.

a. Interest rate parity states that the relationship between the European Union's and India's interest rate reflects the relationship between the current spot rate and the forward rate.

b. PPP states that the exchange rate (€1.00 equals 61.74 rupees) will move closer due to high Indian inflation. The forward rate is 64.49. This rate will increase as long as the Indian inflation rate is higher.

(1) This makes intuitive sense. If Country A's long-term inflation rate is higher than Country B's rate, Country A's currency should devalue relative to Country B. That is, one unit of Country B's currency should buy higher amounts of Country A's currency over time.

(a) Country A is India and Country B is the European Union.

c. From the perspective of a European analyst valuing an Indian company, there must be an assessment of how the Indian currency will lose value relative to the European euro over time.

(1) This may be addressed in the forecast wherein inflation is considered, but the effect of inflation on the forward rate (i.e. the exchange rate a certain number of years in the future) must also be considered.

3. Example

a. A discounted cash flow analysis for an Indian Company is shown below.

(1) An Indian company is valued in rupees, but the investor is European and wants to know the value of his investment in euros;.

(2) Revenues are forecast to grow at a relatively high rate over a discrete period and at 8.0% in perpetuity;

(3) Cash flow is projected at an 8.0% margin and discounted at 16.0%;

(4) The present value of 31,162,000,000 rupees is converted to €505,000,000 at the 61.74 exchange rate effective as of January 2011.

	2012	2013	2014	2015	2016	Residual
Revenue (rupees, millions)	Rs. 38,500	Rs. 44,275	Rs. 50,916	Rs. 57,026	Rs. 62,729	
Growth rate		*15.0%*	*15.0%*	*12.0%*	*10.0%*	*8.0%*
Net cash flow	3,080	3,542	4,073	4,562	5,018	33,874
Present value	2,860	2,835	2,811	2,714	2,573	17,370
Discount rate	*16.0%*	*16.0%*	*16.0%*	*16.0%*	*16.0%*	*16.0%*

Fair Market Value (rupees, millions)	Rs. 31,162
Fair Market Value in Euros (millions)	€ 505
Exchange rate	*61.74*

b. In this example, has the currency exchange risk been adequately addressed? Given the discussion above, the forward rate (rupees/euros) is 64.49. If that rate were used to convert the rupees, the value would have been €483 million. Which value is correct?

(1) The answer to this question lies in the analyst's assessment of the discount rate. The 16% discount rate, which presumably was derived based on Indian economic metrics must also include the currency risk born by the European investor who must be concerned that the rupee will devalue relative to the euro over time.

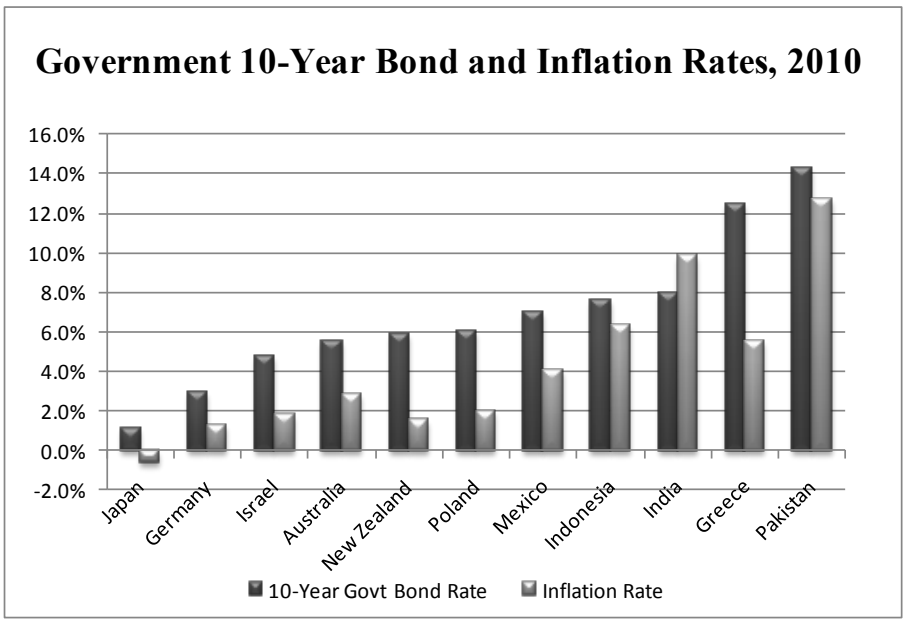
4. We focus on inflationary differences between countries to assess currency risk.

a. However, each country may have risks in addition to inflation that must be analyzed.

(1) The following graph reflects the 10-year government bond rates and the inflation rates for each country.

(2) Although there is a general correlation between inflation and the bond rate, there are exceptions. For example, Greece's bond rate reflects default risk as well.

(3) Does Japan's risk-free rate, which is lower than that of Germany (and the United States) indicate that Japan is a less risky economy? Not necessarily. It is more accurate to say that the Japanese risk-free rate applies to a forecast which should be in Japanese yen, which is expected to contain little to no inflation.



(4) India's bond yield is lower than the country's inflation rate, unlike all other country's shown. This is attributable to the fact that India's GDP growth is 8.9%. Among the country's shown, the next highest GDP growth is Pakistan, at 2.0%.

D. The limitations of the economic theories

1. Valuation involves long-term projections and assumptions. Some of the theories discussed above are more relevant over the short-term, such as interest rate parity.

2. Interest rates in countries are subject to government manipulation. This could undermine these economic assumptions, especially over the short-term.

3. Free and efficient capital flow between countries is a theoretical concept and probably only viable among developed western economies.

4. The forward rates discussed more often refer to the short-term market. It is very difficult to project a forward rate over a ten or twenty-year time frame.

IV. Currency Translation Adjustment

A. Currency Risk

1. Currency risk is comprised of inflation and exchange rate volatility. Any currency can devalue due to inflation. In addition, a currency can lose value in relation to

another currency. The more volatile a currency is in relation to other currencies, the greater the risk.

2. The model below changes the cost of capital developed for a company in a developed economy to the cost of capital as if that company were operating in a foreign country. In other words, it merely matches the cost of capital to the currency of the projected cash flows.

$$K_L = \left\{ [1 + K_{DE}] \left(\frac{(1 + \text{Inflation}_L)}{(1 + \text{Inflation}_{DE})} \right) \right\} - 1$$

Where:

K_L =	Discount rate for local equity capital
K_{DE} =	Discount rate for equity capital in a developed economy
Inflation_L =	Inflation rate in local country
Inflation_{DE} =	Inflation rate in the developed economy

3. Assume the fact set from the Indian company shown above. Let's assume that the analyst arrived at the 16.0% cost of equity based on Euro economic factors and instead of applying them to euro denominated cash flows, he erroneously applied the 16.0% to rupees.

   a. The above equation will merely convert the euro-based cost of equity to the equivalent Indian cost of equity relevant to rupees.

$$K_L = \left\{ [1 + 16\%] \left(\frac{(1 + .095)}{(1 + .025)} \right) \right\} - 1$$

$$= \quad 23.9\%$$

   (1) The result of the valuation which discounts cash flows at 23.9% would be a valuation in rupees for a company with the risk profile of a company operating in Europe, with the Indian inflation factor built in.

   (2) The equation will not account for a series of other risks that the Indian company may be subject to.

(a) Currency risk (also referred to as exchange rate risk) must still be accounted for. This is the risk that the current exchange rate (which is captured above) will change in the future.

- It is unlikely that the interest rate parity conditions embedded above will remain unchanged over time. The spot rate market is short term relative to a long term valuation project.

(b) Country risk

- Political risk
- Economic risk
- Financial risk

V. Country Risk Factors

A. Introduction

1. Country risk and the operating risks of a business operating in the country are not identical. The analyst must decide the degree to which the subject business is exposed to country risk.

2. The ultimate goal is to develop a cost of equity for the subject business, which may entail a risk premium above the country risk, or may reduce the country risk.

3. Country risk factors include political, economic, and financial risk.

B. Country/Political Risk

1. Politically most developed economies (the U.S., Germany, UK, Canada, Japan, France, etc.) are considered relatively stable countries.

2. Some established and emerging markets though are located in more vulnerable and unstable countries such as Israel, Brazil, Russia, etc.

3. Political risk is a subjective measurement that must capture many factors of doing business in a country. Political considerations include:

   a. Quality of government economic management & planning

(1) E.g. Portugal, Ireland, Greece, and Spain are suspect here

b. Frequency of changes in political leadership

c. External conflicts

d. Government corruption

e. Military role in political leadership

(1) E.g. Myanmar

f. Role of organized religion in political leadership

(1) E.g. Iran

g. Tradition of law and order

(1) E.g. Vladimir Putin's ability to interfere in Russian courts

h. Role of political parties in government

i. Existence of middle class

j. Quality of the bureaucracy

k. Expropriation of private investment

4. Like any assessment of a subjective factor, country political risk is relative. The practitioner must assess the country's risk in relation to the most politically risky and the least politically risky countries.

a. The PRS Group, Inc. (www.prsgroup.com) is one data source that provides a framework for such an analysis. PRS ranks countries under multiple criteria, one of which is political risk

(1) PRS ranks 100 countries from high to low, with #1 being the least risky and #100 being the most politically risky.

(2) As of October 2010, PRS ranked the United States #32. Canada was ranked #1, and Myanmar was ranked #100. Other notable rankings were:

- Canada #1
- Slovakia #12
- Chile #15
- Uruguay #23
- United Kingdom and Kuwait, tied for #25
- Poland #28
- United States #32
- China #54
- Russia #81

(3) Given the criteria above, how is it possible that the United States, which is often assumed to be the safest and most stable country in the world, be ranked #32?

(a) If the analyst uses a risk rating source like PRS, he must be comfortable with the criteria used. The rankings are based on political, not economic, factors, and are relative.

(b) In the case of PRS's rating of the United States, the country would rank relatively poorly on involvement in external conflicts and the quality of economic planning.

C. Country/Economic Risk

1. A developed economy like the United States consists of a rich diversity of industries with many companies that have been trading actively for nearly a century.

   a. Conversely, most developing or undeveloped countries either have no trading market or they have markets with one or two dominant industries.

   b. There are few developed markets that have the maturity and diversity to rival the United States.

   c. Size alone does not define maturity and diversity. The economies of China, India, and Brazil, which are growing rapidly and will one day surpass the U.S. for world economic dominance, do not have the maturity to provide useful data for risk assessment and the derivation of a cost of capital.

2. Government bonds of developing countries are generally far riskier, at times incorporating extremely high inflation rates.

a. The U.S. government's Treasury securities are recognized worldwide as the least risky security (although perhaps not for long due to the inability in the U.S. to curb government debt and to enforce securities regulations)

3. Other country/economic risks to consider in developing cost of capital:

   a. Debt service as a percentage of exports of goods and services

   b. Per capita GDP

   c. Real annual GDP growth

   d. Annual inflation rate

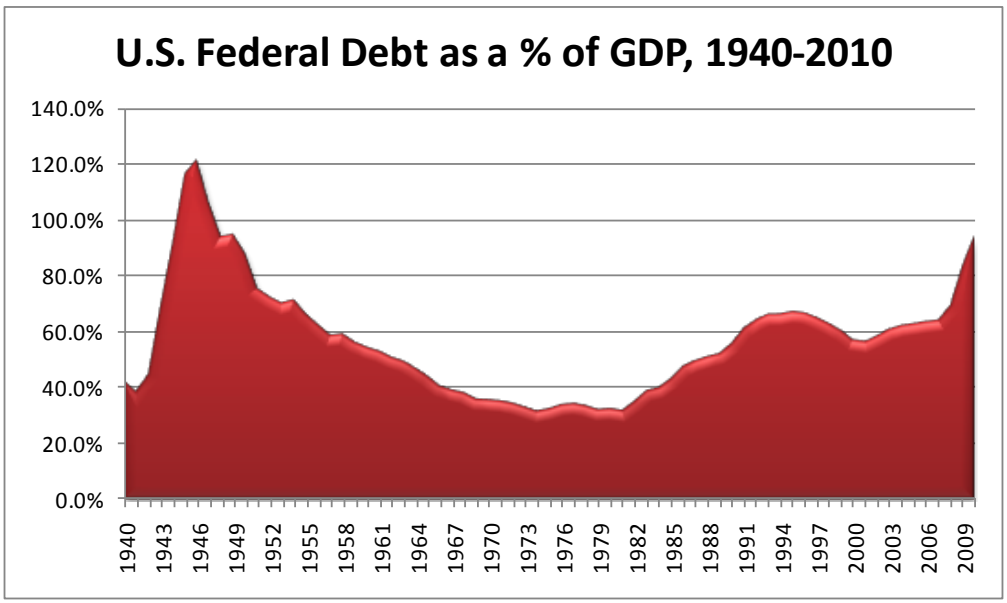
   e. Current account balance as a percentage of goods and services

   f. Parallel foreign exchange rate market indicators

   g. Volatility of local economy

   h. Ratio of government debt to GDP

      (1) Rating agencies are starting to include a country's major bank debt together with the country's government debt in this percentage, especially after the recent recession in which world governments bailed out their major financial institutions.



(2) In 2011, the U.S. Federal debt was over 100% of the country's GDP for the first time since the end of World War II. This places the U.S. among the riskier countries in the world, although not at the extreme position of Greece, Iceland, Ireland, and others.

D. Country/Financial Risk

1. Financial risk factors include the following:

   a. Currency risk

   b. Foreign debt as % of GDP

   c. Foreign debt service as % of goods and services

   d. Current account as a % of goods and services

   e. Delayed payment of supplier's credits

   f. Losses from exchange controls

   g. Loan default

2. The objective of the country risk analysis is to assess a composite risk profile for the country or countries in which the subject operates.

a. Services such as the PRS Group provide this service, although the analyst must be familiar with their criteria and methodology to apply it in a valuation.

b. A standalone analysis will ultimately assess a country's risk which encompasses political, economic, and financial criteria in relation to other countries.

c. This relative risk premium is commonly applied in practice as a premium in the capital asset pricing model as part of the subject company risk premium, or alpha.

3. Data Availability

a. The U.S. capital markets have reliable trading information going back to at least 1926, when the Center for Research in Security Prices (CRISP) was started.

b. No other economy has similar historical information.

VI. Chapter Questions

A. The following questions are multiple choice questions, similar to the type that are contained in the course examination.

1. Interest rate parity tells us that the relationship between two countries' risk-free rates should equal the difference between those countries':

a. Country risk and political risk
b. Forward and spot exchange rates
c. Government bond and inflation rates
d. GDP and GNP rates

2. If an analyst used the currency translation model to develop a cost of equity in a developing economy, he may not have accounted for:

a. Country risk
b. Future unfavorable changes in the country's currency
c. Specific company risk
d. All of the above

3. Information from sources like the PRS Group is useful since:

   a. The data provides a country premium that can be used in the CAPM
   b. The data provides access to government bond data expressed in the U.S. currency
   c. The data is a source that can be used in a regression model with public company returns
   d. The data provides risk ratings for companies inside developing economies

4. The Fisher Effect states that the nominal rate of return on a risk-free security

   a. Reflects the delta between a government's long-term and short-term bond rate.
   b. Consists of a real rate of return and inflation.
   c. Captures the difference between the country's spot rate and forward rate
   d. Can be estimated by using data from the PRS Group

CHAPTER 7 – ADAPTING CAPM FOR COUNTRY RISK

I. Types of Models

A. Several categories of models have been developed which attempt to capture the risk differential of companies operating outside of the world's dominant economies. These models are generally adaptations of the CAPM and rely on one or more the following concepts:

1. Risk can be assessed by deriving a cost of equity based on a developed market (United States, Germany, UK, etc.) and adding a risk premium for the country in question.

2. Country risk can be derived by a country's debt rating on its government bonds.

3. Country risk can be researched through institutions which supply country risk ratings.

4. Country risk can be derived by regressing returns from a country (either a stock market in the country or the country's market returns) against the returns on the market of a developed country such as the U.S. or UK.

II. Local Country CAPM

A. All variables in the CAPM are taken from the local country

$$K_L = R_{fL} + \beta_L(ERP_L)$$

Where:

$K_L =$	Cost of equity in local country
$R_{fL} =$	Risk free rate of local country (local gov't debt)
$\beta_L =$	Country beta (company measured against local securities mkt)
$ERP_L =$	Equity risk premium from local market

1. This model is not applicable unless the country has a robust, diversified securities market.

2. Dimson, Marsh and Staunton publish an annual study on the equity risk premiums for the 19 most developed economies in the world. This study is available in the Credit Suisse Global Yearbook.[8]

3. Excerpts from the 2011 study reflect the following geometric means:

Country	**ERP***
Australia	5.9%
Belgium	2.6%
Canada	3.7%
Denmark	2.0%
Finland	5.6%
France	3.2%
Germany	5.4%
Ireland	2.9%
Italy	3.7%
Japan	5.0%
Netherlands	3.5%
New Zealand	3.8%
Norway	2.5%
South Africa	5.5%
Spain	2.3%
Sweden	3.8%
Switzerland	2.1%
United Kingdom	3.9%
United States	4.4%
World	3.8%

** ERP based on returns 1900-2010, geometric mean %*
Credit Suisse Global Investment Returns Yearbook, 2011

a. Example

(1) German bond yield = 3.7%

(2) Beta for widget manufacturer as per regression of comparable companies against the Frankfurt exchange = 1.10.

[8] The Credit Suisse Global Investment Returns Yearbook, 2010, Credit Suisse Research Institute (available online)

(3) Analyst uses geometric ERP of 5.4% and specific risk premium of 3.0%

(a) $K_L = 3.7\% + 1.1(5.4\%) + 3.0\%$

$K_L = 12.64\%$

B. Problems with this model

1. It cannot be used for developing economies.

2. The resultant cost of equity may not capture all of the company-specific risk.

3. The assumption that each country has equivalent risk may not be valid.

III. International CAPM

A. The risk-free rate must be country-specific based on local government bonds.

B. Beta must be country-specific.

1. Country betas are calculated by regressing the country's market return against the U.S. market (or another developed country's market) over a period of time.

   a. Since most developing markets have shorter reliable time periods, the regression will likely be over a shorter period of time than what is commonly calculated for a company beta. This will likely result in a large standard error.

$$\mathbf{K_L = R_{fL} + \beta_L(ERP_W)}$$

Where:

K_L = Cost of equity in local country

R_{fL} = Risk free rate of local country

β_L = Country beta

$$ERP_w = \frac{ERP_{US}}{\beta_{US}}$$

Where:

ERP_w = World Equity Risk Premium

ERP_{US} = U.S. Equity Risk Premium

β_{US} = Historical U.S. Beta

Note: β_{us} represents the U.S. market returns regressed against world stock returns, 1970 - present

b. The historical U.S. beta (i.e. β_{US}) is calculated by regressing U.S. market returns against a world equities index. The Morgan Stanley Capital International (MSCI) world index measures world returns from 1970 forward.

C. The model has several weaknesses:

1. Many developing countries do not have viable government bonds, making R_{fl} difficult to measure.

2. Many developing countries do not have markets with enough history and diversity to regress against the U.S. or another developing market.

IV. Country Risk Rating Model

A. Data is available on individual country risk ratings from *Institutional Investor* for 170 countries going back to 1979. Since we also have reliable expected returns for developed markets, we can regress an historical country risk rating against an established market return and potentially obtain a predicted country return assuming a correlation.

B. Use a simple regression model with the natural log of the country credit rating as the independent variable and historical equity returns in U.S. dollars as the dependent variable.

C. Data sources for country credit ratings:

1. The Institutional Investor study is proprietary information, for sales on www.iimagazine.com. Each year's study is $299.

2. Standard & Poors Sovereign Credit Ratings

3. Moodys

   a. Example:

Country Risk Rating Model
Regression Analysis

	Y - Dependent Variable	*X - Independent Variable*		
	Exp. Return	**credit rating**	**Predicted Return**	**Residual**
Switzerland	2.0	96.4	1.83	0.17
Norway	2.8	95.0	2.93	(0.13)
Denmark	2.9	94.7	3.17	(0.27)
Germany	4.7	93.0	4.50	0.20
Sweden	5.4	92.4	4.98	0.42
UK	4.9	92.0	5.29	(0.39)
Subject Country		88.0	8.44	

Intercept	77.67	
Coefficient	(0.787)	
R-Squared	0.95	R-Squared is interpreted as the proportion of the variance in MVIC/Sales attributable to the variance in EBIT/Sales

V. Country Spread Model

A. This model develops a cost of equity based on a developed market and adds a spread to that return to capture country risk. The risk is based on the difference in risk between the developed market's government bonds and the local country's government bonds.

$$K_L = R_{fUS} + (R_{fL} - R_{fUS}) + \beta_{US}(ERP_{US})$$

Where:

K_L =	Cost of equity in local country
R_{fUS} =	U.S. Risk Free Rate
R_{fL} =	Risk free rate of local country in U.S. $
β_{US} =	U.S. Beta
ERP_{US} =	U.S. Equity Risk Premium

B. For example, a cost of equity can be developed based on traditional U.S. data and then the spread between dollar-denominated foreign bonds (Brady Bonds) and the U.S. Treasury yield is added as country risk.

1. For example, assume Brazil's Brady Bond minus the U.S. Treasury yield = 1.6%

U.S risk-free rate	=	4.5%
U.S ERP	=	5.0%
U.S. beta	=	1.10

Then: $K_L = 4.5\% + 1.6\% + 1.1(5.0\%)$

$= 11.6\%$

a. Specific risk would still need to be accounted for.

2. Strengths:

a. The approach is simple to do.

b. It provides a good check to other more complex models.

3. Weaknesses:

a. The model provides an ex ante comment on the government of a country, not the equities in a given country. It assumes that the additional country risk factor is the same for each company operating in that country.

b. The model provides a debt premium, not an equity premium.

c. Although the model captures current inflationary differences and some country-specific risks, it does not necessarily capture all country risks.

d. The model inserts a variable in the CAPM that is not theoretically linked to the CAPM.

C. A variation of the country spread model is used by some analysts. Assuming the forward exchange rate between two currencies is known, the spot rate is known, and the developed country risk-free rate is known, the risk-free rate for the subject country can be derived.

$$\text{forward } 10y^{\$}_{local} = \text{spot}^{\$}_{local} * \frac{(1 + \text{rate}_{local})}{(1 + \text{rate}_{US})}$$

Assume:

U.S. risk-free = 4%

Spot rate local currency to dollar = .60

Forward rate local currency to dollar = .6231

$$0.6231 = .60 * \frac{(1 + x)}{(1 + 4\%)}$$

$$1.0385 = \frac{(1 + x)}{(1 + 4\%)}$$

$$x = 8.0\%$$

$$\text{spread} = 4.0\%$$

1. In this example, the analyst uses information that is publicly available to solve for the implied risk-free rate in a country that does not have government bonds. The spot and forward exchange rates between currencies are publicly available, as is the risk-free rate for the developed economy.

   a. Using the interest rate parity formula, the local rate (risk-free rate) can be derived, shown in the example above as 8.0%. The spread between government bonds would be the local rate less the developed country rate, or 8.0% - 4.0%, or 4.0%.

VI. Relative Standard Deviation Model

A. Volatility of a country's stock market, as measured by its standard deviation, is related to the standard deviation of the U.S. market.

$$\mathbf{K_L = R_{fUS} + \sigma_{x,u.s.}(ERP_{US})}$$

$$\sigma_{x,u.s.} = \frac{\sigma_x}{\sigma_{u.s.}}$$

Where:

$\sigma_{x,u.s.}$ =	Standard deviation of Country X returns, relative to U.S.
σ_x =	Standard deviation of Country X returns
$\sigma_{u.s.}$ =	Standard deviation of U.S. returns

B. The relative standard deviation of the local country returns relative to the U.S. returns (instead of U.S. another developed economy can be used) is used as a beta, multiplied by the U.S. equity risk premium to arrive at the country's equity risk premium, which is added to the U.S. risk-free rate to determine the country return.

1. Example: Assume that $\sigma_{x,u.s.}$ equals 1.30. The US risk-free rate equals 4.0%. The U.S. ERP equals 5.0%.

   a. Country return = 4.0% + 1.3(5.0%)

      Country return = 10.5%

2. The cost of equity from this model is an adjusted U.S. return and therefore should be applied to U.S. dollar cash flows.

C. Strengths

1. Easy to apply, assuming the country has observable historical returns.

D. Weaknesses

1. Sometimes produces results that are unreasonable given what is known about relative markets.

2. If the subject company operates in multiple markets, the premium from the local market's standard deviation may not apply.

3. If the market volatility is attributable to one or a few dominant industries, then this model yields industry risk and not country risk.

VII. Duff & Phelps Model

A. This model should be applied to cash flows denominated in U.S. dollars.

1. With the exception of the adjustment for political risk, this model is essentially the same as the Relative Standard Deviation Model.

$$K_e = R_{fUS} + ERP_{US}(\sigma_{subject}/\sigma_{Base}) + PRA$$

Where:

K_e =	Cost of equity for U.S. denominated cash flows
R_{fUS} =	U.S. Risk Free Rate
ERP_{US} =	U.S. Equity Risk Premium
$\sigma_{subject}$ =	Volatility of subject company's market
σ_{base} =	Volatility of highly developed market
PRA =	Political risk adjustment (optional)

2. The political risk adjustment is a subjective measurement

   a. Although the adjustment can be based on independent country risk ratings, remember that country risk studies yield metrics which are relative to other countries. The ratings themselves have no direct relevance to the CAPM and cannot be inserted directly into the CAPM.

VIII. Damodaran Model

A. The models above address the risk of conducting operations in specific countries. Many practitioners assume that country risk is automatically applicable to companies in the country.

1. The Damodaran model addresses situations in which this is not a safe assumption.

B. The Damodaran model is based on CAPM, with an adjustment for country risk derived from the relative volatility of the local country's stocks and bonds.

$$K_L = R_{fUS} + \beta_{US}(ERP_{US}) + \lambda(CRP)$$

Where:

K_L =	Cost of equity in local country
R_{fUS} =	U.S. Risk Free Rate
β_{US} =	U.S. Beta
ERP_{US} =	U.S. Equity Risk Premium
λ =	Company's exposure to local country risk
CRP =	Country Risk Premium
	= Country Default Spread x ($\sigma_{stock}/\sigma_{bond}$)
σ_{Stock} =	standard deviation of local country's stock market
σ_{Bonds} =	standard deviation of local country's bond market

C. The λ variable measures the subject local company's percentage of operation in its country relative to the average local company's percentage of operations in that country.

1. This variable will be difficult to quantify since it would require analysis on a case-by-case basis. There are no generally available studies which provide this data.

2. The country exposure concept is based on research that shows that the country risk factors are more important than global and industry factors in emerging markets relative to developed markets.

D. The country default spread is the difference between the local government bond return and the U.S. return.

1. Damodaran measures country default spreads on a continuous basis. See his site:

   http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html

E. If the country does not have rated debt, the country risk rating can be used.

IX. Practical Application

A. Much of the valuation work being conducted in Europe is by large-firm practitioners performing valuations for large companies in developed economies such as Germany,

the UK, France, etc. Hence, the cost of capital development for typical Euro-based companies is very similar to practice in North America.

1. The cost of capital calculation below was taken from an actual assignment for a France-based corporation.

WACC		Bas	Haut
Risk free rate	*(1)*	**3.2%**	**3.0%**
Equity risk premium	*(2)*	**5.5%**	**6.0%**
Bêta (unlevered)	*(3)*	**0.95**	**0.95**
D / E	*(4)*	**45%**	**45%**
Bêta (relevered)	*(5)*	**1.36**	**1.36**
Specific risk premium	*(6)*	**0.5%**	**0.5%**
Cost of equity	*(7)*	**11.2%**	**11.7%**
Cost of debt	*(8)*	**5.2%**	**5.2%**
Blended tax rate		*32%*	*32%*
Cost of debt after tax		**3.5%**	**3.5%**
D/(D+E)	*(9)*	**31%**	**31%**
E/(D+E)	*(9)*	**69%**	**69%**
WACC		**8.8%**	**9.1%**
		9.0%	

(1) Risk free zone € - 20 y
(2) Equity risk premium - zone Euro
(3) business
(4) Debt to equity ratio
(5) Hamada formula
(6) Specific risk premium
(7) CAPM
(8) Cost of debt / BBB- rating
(9) D: Net Financial Debt; E: Equity; 1-D/(D+E) = E/(D+E); (D+E) = Enterprise Value

2. As is shown, the WACC for a large European corporation operating in a developed market is not, as of 2010, materially different that the U.S. market. This is not to imply that WACCs for large European firms are the same as the WACCs for large U.S. firms.

a. These rates are developed using macroeconomic variables in the Eurozone which as of 2010 are not in this case materially different than in the U.S.

b. For developing economies around the world (and even for some Eurozone countries such as Ireland and Spain), the process of developing a cost of equity and a WACC will likely be materially different than typical North American practice.

X. Chapter Questions

A. A valuer in the UK is appraising a Finnish Company for a UK investor who wants a valuation in pounds sterling. The valuer's best course of action is to:

1. Project cash flows in pounds but discount them at a WACC that is derived using the Finnish risk-free rate and an ERP based on Finland's historical returns.
2. Project cash flows in euros and base the WACC on Finnish economic variables.
3. Project cash flows in pounds and derive a WACC based on the UK markets, but add a country risk premium to capture the added risk of operating in Finland.
4. Project cash flows in U.S. dollars and develop a U.S.-based WACC since the historical studies are U.S.-based.

B. One weakness of the Country Spread Model is that many developing countries do not have government bonds. Some analysts avoid this problem by:

1. Using the interest rate parity formula to solve for a spread between the developed country's risk and developing country's risk.
2. Measuring the spread between the developed economy and another undeveloped economy that is similar to the subject company's country.
3. Looking up the developing country's risk-free rate in *Institutional Investor*.
4. Regressing the local country's stock market against the U.S. market.

C. One weakness of several of the adapted CAPMs used to value stock in developing countries is:

1. The models all rely on a U.S. risk-free rate which no longer is the safest economy in the world.
2. The regression calculations which are used to measure volatility between markets is not a valid tool for such a subjective variable.
3. Volatility is not generally accepted in the profession as a proxy for risk.

4. The models add debt spreads to the CAPM which are not theoretically linked to the other variables in the CAPM.

D. An analyst used the Relative Standard Deviation Model to derive a cost of equity for a Polish subsidiary of a U.S. based company. In his analysis he developed a proxy for beta by dividing the standard deviation of the Warsaw Stock Market by the standard deviation of the New York Stock Exchange, which he multiplied by a U.S. ERP. One weakness of his analysis is:

1. The result of this CAPM is a cost of equity relevant to Poland and he is valuing the Polish company in U.S. dollars.

2. The New York Stock Exchange is not a good proxy for the world market.

3. The Warsaw Stock Market does not have a diverse enough stock market nor does it have enough years of a history to validate the beta.

4. The standard deviation of returns on the Warsaw stock market does not adequately capture the risk of the Polish government's sovereign bonds.

E. One advantage of the Damodaran Model over the other adaptations of the CAPM is that the Damodaran Model:

1. Always expresses a cost of equity that relates to the local currency.

2. Allows the analyst to allocate risk to the different countries in which the subject company operates.

3. Adequately captures the risk-free rate of all countries, even those that do not issue sovereign bonds.

4. Relies on *Institutional Investor* which is a highly regarded source for country risk ratings.

CHAPTER 8 – COST OF DEBT AND WEIGHTED AVERAGE COST OF CAPITAL

I. The WACC and Invested Capital

A. Previous chapters covered the variables and methodologies used to calculate a cost of equity which reflects the risks and subsequent required rate of return on equity capital in a subject company.

1. The cost of equity is applied to net after-tax equity cash flows to determine the value of equity investments.

2. This chapter covers the cost of capital which is the discount rate applied to the invested capital cash flow in a company. The required rate of return reflects the risk of both the debt investment and the equity investment. This discount rate is called the Weighted Average Cost of Capital (WACC).

B. WACC is defined in the International Glossary as:

"*The Cost of Capital (discount rate) determined by the weighted average, at market value, of the cost of all financing sources in the business enterprise's capital structure.*"

C. The WACC captures the cost and weight of each class of investment in the subject company's capital structure:

1. Long-term interest bearing debt

2. Preferred equity

3. Common equity

D. Invested capital is the sum of the market value of debt and equity.

1. Invested capital should not be calculated using book values.

2. The value of equity can be derived from the value of invested capital by simply deducting the value of debt.

E. The WACC formula is as shown below:

WACC = $(K_e * W_e) + (K_p * W_p) + (K_d[1 - t] * W_d)$

Where:

K_e = Cost of common equity

W_e = Weight of common equity FV in capital structure

K_p = Cost of preferred equity

W_p = Weight of preferred equity FV in capital structure

K_d = Cost of debt

t = Company tax rate

W_d = Weight of debt FV in capital structure

1. An example of a WACC calculation follows. Assume a company's fair value of debt capital, preferred stock and common stock equals £340,000, £560,000, and £1,350,000, respectively, and an effective tax rate of 25%.

   a. The rates of return for each class of capital are 6.5%, 10.0%, and 15.0% for debt, preferred, and equity investment, respectively. Given this data, the WACC equals:

	Fair Value (000)	**Weight**	**Discount Rate**	**Weighted Return**
Debt	£340	15.1%	4.9%	0.7%
Preferred Stock	560	24.9%	10.0%	2.5%
Common Stock	1,350	60.0%	15.0%	9.0%
TOTAL L&E =	2,250		**WACC =**	**12.2%**

Debt return = 6.5% * (1 - .25)
= 4.9%

   b. The weighted average cost of capital is 12.2%.

   c. Since interest on debt is tax deductible, the 6.5% pre-tax rate is netted for the 25% tax rate, which equals 4.9%.

F. The WACC is based on the discount rates on invested capital. Since invested capital should equal the total net operating assets, the WACC should equal the weighted returns on each class of a company's assets.

1. Assume the company has fair values as follows: 1) net working capital = £350; 2) property, plant & equipment = £900; 3) Intangible assets = £750; and 4) goodwill of £250.

2. The weighted return on each asset class is commonly called the weighted average return on assets, or WARA. An example using the WACC above is shown:

ASSETS	Fair Value (000)	Weight	Discount Rate	Weighted Return
Net Working Capital	£350	15.6%	5.0%	0.8%
Property, Plant & Equipment	900	40.0%	8.0%	3.2%
Identified Intangible Assets	750	33.3%	18.0%	6.0%
Goodwill	250	11.1%	20.0%	2.2%
TOTAL ASSETS =	2,250		**WARA =**	**12.2%**

LIABILITIES and EQUITY	Fair Value (000)	Weight	Discount Rate	Weighted Return
Debt	£340	15.1%	4.9%	0.7%
Preferred Stock	560	24.9%	10.0%	2.5%
Common Stock	1,350	60.0%	15.0%	9.0%
TOTAL L&E =	2,250		**WACC =**	**12.2%**

3. In the example above, the sum of the rates of return on each class of assets multiplied by the percentage of each class of total assets equals the WACC.

4. Theoretically, the risk profile of each class of assets must approximate the risk profile of each class of capital that funds the assets.

G. The complexity of any WACC calculation is that the fair value of the debt and equity must be known in order to calculate the cost of capital, which in turn is necessary to determine the fair value of debt and equity. This issue will be addressed below.

II. The Optimal Capital Structure

A. It is common practice, especially with larger companies, to assume an optimal or industry capital structure in the WACC calculation instead of the actual capital structure that exists in the company.

1. One assumption is that a buyer would impose an optimal capital structure on the business in an acquisition.

2. Another assumption is that any company with a capital structure that differs from an optimal debt/equity ratio will gradually move toward an optimal capital structure over time.

B. Some analysts do not use an optimal or industry capital structure.

1. If a non-controlling interest is being appraised, an argument can be made that a non-controlling investor cannot influence a change in the existent capital structure.

2. When valuing small companies, a case can be made that they have simpler capital structures that tend to be financed with equity and there is little basis for an imposed structure that differs from the actual capital structure.

   a. Research shows certain types of companies tend to favor debt financing:

      (1) Large capital intensive companies with few growth options

      (2) Companies with high effective corporate tax rates

      (3) Highly profitable companies

      (4) Companies with a high amount of product line diversification

3. Analysts typically obtain an industry capital structure by consulting the following sources:

   a. Guideline company norms

   b. Morningstar Cost of Capital Yearbook

   c. Duff & Phelps Risk Premium Report

   d. International sources

   e. Key considerations in estimating the cost of capital are similar to what a lender might consider when granting a loan:

      (1) Profitability

      (2) Collateral

(3) Industry norms

(4) Risk

4. If the decision is made to impose an industry capital structure on the subject business, consideration should be given to the following:

   a. The ability of the subject to assume the debt capacity that is implied in the capital structure being imposed on the business.

      (1) For example, if the company is financed completely with equity and its operations are risky or compromised, what is the likelihood that it could obtain debt financing?

      (2) Some sources for industry capital structure provide ratios based on book values, not market values. The analyst should know the source and how the capital structure is calculated.

III. Debt

A. Debt Capacity

1. Practitioners sometimes use the book value of debt – often erroneously - in estimating the capital structure. The assumption is that the company's market value of debt will not change significantly from its book value.

   a. Market value of debt could vary from book value as a result of several causes.

      (1) Market rates could increase or decrease given a change in macroeconomic events or a change in company risk.

         (a) If interest rates increase, the market value of debt will decline below book value. If rates decline, the market value will increase above book.

B. Debt Beta

1. The formulas used to lever equity betas (Hamada, Miles-Ezzell, etc.) assume that the relationship of incremental amounts of debt, and the effect that the debt has on the levered beta, are linear in nature.

   a. This is unlikely. The risk of equity at very high levels of debt, as seen during the 2008-2009 recession, is often more than the re-levered betas imply.

b. Basic financial theory tells us that debt provides a tax shield benefit to equity investors and is therefore beneficial. However, as debt is added to a capital structure, a point will be reached where the likelihood and costs of financial distress increase quite rapidly and overwhelm the value of the tax benefit.

(1) This occurs when the present value of future tax savings attributable to additional layers of debt is offset by the present value of the costs of financial distress.

2. Some relevering models require a debt beta, as was discussed in Chapter 5. Debt betas, like equity betas, are measured by regressing returns against the market.

a. Debt risk is a function of several factors;

(1) Existing levels of debt

(2) Variability of operating earnings

(3) Variability of profit margins

(4) Other operating factors

3. Debt betas can be calculated for public companies. For private companies, the riskiness of the debt should be assessed relevant to a class of rated bonds in the market.

a. During the recession of 2009, debt betas in the U.S. ranged from 0.10 for Aaa bonds to 1.60 for Ca-D bonds in the public market.[9]

C. Many WACC models used by practitioners do not consider that the addition of debt will change the cost of equity. Also, higher percentages of debt will increase the cost of debt as well.

1. In the example below, QRS Group is moving its debt/equity from 20/80 to 40/60. The Company added one tranche of debt in 2012 in the amount of €3,000,000 and a second tranche in 2014 in the amount of €1,250,000.

[9] Pratt and Grabowski, *Cost of Capital*, Fourth Edition, page180.

QRS Group
Capital Structure Analysis

	2011	2012	2013	2013	2014
EBITDA	€ 1,500,000	€ 1,650,000	€ 1,825,000	€ 2,000,000	€ 2,150,000
Multiple	7.50	7.50	7.50	7.50	7.50
Market Value of Invested Capital (MVIC)	11,250,000	12,375,000	13,687,500	15,000,000	16,125,000
Preferred Stock	-	-	-		-
Total Debt	2,000,000	2,000,000	5,000,000	5,000,000	6,250,000
Common Equity Value	9,250,000	10,375,000	8,687,500	10,000,000	9,875,000
Interest Rate, Pre-tax	6.0%	6.0%	6.5%	6.5%	6.8%
After-tax cost of debt	4.5%	4.5%	4.9%	4.9%	5.1%
CAPITALIZATION %:					
Debt	17.8%	16.2%	36.5%	33.3%	38.8%
Preferred Equity	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	82.2%	83.8%	63.5%	66.7%	61.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

2. The market value of invested capital is estimated by multiplying projected EBITDA by a market multiple of 7.5x. The multiple is market derived and assumed, at this point, to be accurate.

3. Debt is projected to increase from €2.0 million to €6.25 million.

   a. Cost of debt increases modestly as each tranche is added.

   b. In this example it is assumed that the book value of debt equals the FV.

4. Projected FV of equity equals MVIC less projected debt.

5. The DCF model below takes the asset beta (unlevered beta in the assumptions) and relevers it based on the capital structure implied in the projections above.

QRS Group
Discounted Cash Flow Analysis

Assumptions	
Business Risk Index	1.15
Risk-Free Rate	4.0%
Market Risk Premium	5.5%
Size Risk Premium	5.7%
Specific Risk Premium	0.5%
Perpetuity Growth Rate	5.0%
Tax Rate	25.0%
Unlevered Cost of Equity	16.5%

	2011	2012	2013	2014	2015	Perpetuity
Free Cash Flow	€ 890,000	€ 1,100,000	€ 1,275,000	€ 1,400,000	€ 1,500,000	€ 1,575,000
% Debt Capital	18%	16%	37%	33%	39%	40%
% Common Capital	82%	84%	63%	67%	61%	60%
After-Tax Cost of Debt	4.5%	4.5%	4.9%	4.9%	5.1%	5.1%
Levered Cost of Common	17.5%	17.4%	19.2%	18.9%	19.5%	19.7%
WEIGHTED COST OF CAPITAL	*15.2%*	*15.3%*	*14.0%*	*14.2%*	*13.9%*	*13.8%*
Cash Flow in Period	*100.00%*					
Period to Discount	0.50	1.50	2.50	3.50	4.50	
NPV Factor	0.9317	0.8075	0.7209	0.6282	0.5567	
PV of Free Cash Flow	€ 829,187	€ 888,215	€ 919,197	€ 879,545	€ 835,011	

Perpetuity Value at start of 2015	€ 17,858,155
PV of Perpetuity	9,973,821
FV of Invested Capital	**14,324,977**
less: Debt	2,000,000
FV of Equity	**€ 12,324,977**

6. The projected fair values of debt and equity result in projected capital structures that trend toward 40% debt and 60% equity.

7. The cost of equity is calculated separately for each year with a relevered beta using the Hamada formula and the CAPM, as follows:

   $(((B_u * (1 + ((1 – \text{tax rate})*((\%Debt/\%Equity)))))) * ERP) + R_F + \text{Size Risk} + \text{Specific Risk}$

8. The WACC is calculated each year with the cost of debt, weight of debt, revised cost of equity and the weight of equity as per the WACC formula shown earlier.

9. Note that the cost of capital declines throughout the forecast as the capital structure changes from 20% debt to 40% debt.

10. If the analyst used the simplifying assumption that the 15.2% WACC in 2011 would be a permanent cost of capital, the MVIC would have been 12.4 million and the equity value 10.4 million.

QRS Group
DCF Analysis with Constant WACC

Assumptions	
Business Risk Index	1.15
Risk-Free Rate	4.0%
Market Risk Premium	5.5%
Size Risk Premium	0.0%
Specific Risk Premium	0.5%
Perpetuity Growth Rate	5.0%
Tax Rate	25.0%
Unlevered Cost of Equity	10.8%

	2011	2012	2013	2014	2015	Perpetuity
Free Cash Flow	€ 890,000	€ 1,100,000	€ 1,275,000	€ 1,400,000	€ 1,500,000	€ 1,575,000
WEIGHTED COST OF CAPITAL	*15.2%*	*15.2%*	*15.2%*	*15.2%*	*15.2%*	*15.2%*
Cash Flow in Period	*100.00%*					
Period to Discount	0.50	1.50	2.50	3.50	4.50	
Net Present Value Factor	0.9317	0.8087	0.7020	0.6093	0.5289	
PV of Free Cash Flow	€ 829,187	€ 889,571	€ 895,001	€ 853,034	€ 793,332	

Perpetuity Value at start of 2015	€ 15,432,250
PV of Perpetuity	8,161,933
FV of Invested Capital	**12,422,058**
less: Debt	2,000,000
FV of Equity	**€ 10,422,058**

11. As shown, the assumption that the WACC remains constant when the level of debt changes can cause an inaccurate result.

D. Cost of Debt in Multinational Markets

1. A complication in estimating WACC is how to assess the cost of debt when the subject company operates in multiple countries and could potentially obtain debt in multiple debt markets.

2. For example, suppose an analyst is valuing a Polish Company but expressing the value in UK pounds. Hence, the CAPM variables in deriving a cost of equity are derived from the UK economy, with a premium added for the country risk of operating in Poland versus the UK. Also, assume the following:

   a. The subject company has the ability to raise debt capital in Poland as well as other countries, including the Eurozone or in Swiss Francs.

   b. The subject company's risk profile would warrant varying costs of debt in the various markets.

c. Which cost of debt should be assumed as the market cost in the WACC?

3. There are several options to address this issue that are chosen in practice.

   a. Assume that the Polish company would borrow in the market with the lowest cost of debt and purchase a principal swap to hedge against interest rate fluctuation.

   b. Assess the cost of raising debt in Poland but in pounds sterling. Remember, that if the cash flows are in a certain currency, the discount rate must match that currency.

   c. Assume the cost of debt for a similar company in the UK. Add a debt premium based on a country default spread or another factor to capture the difference in risk.

IV. Fair Value and Iterative Calculations

A. The DCF model for the QRS Group shown above contains an inconsistency that must be remedied before the value can be finalized.

   1. In order to estimate the capital structure which is necessary to calculate a relevered beta, an assumption was made about the value of the subject company's equity.

      a. In the QRS Group example, a multiple of 7.5x EBITDA was used to calculate MVIC, from which the book value of debt was deducted to reach equity. There are two potential problems with this assumption.

         (1) The book value of debt may not equal the FV of debt.

         (2) The 7.5x EBITDA multiple may not provide an accurate MVIC.

   2. To test whether the initial capital structure is accurate, an iterative process is applied which follows these steps:

      a. Compare the FV of equity derived in the DCF model to the assumed equity value in the initial capital structure calculation.

      b. If the two values are different, select a lower (or higher) equity value in the capital structure calculation depending on the delta of the two values.

(1) In the example of QRS Group shown above, the assumed equity fair value at the outset was €9,250,000. The DCF model resulted in an equity value equal to €12,325,000.

(a) This is untenable since if the actual FV of equity is 12.325 million, then the real capital structure at 2011 would be 14/86, not 18/82.

c. The iteration function on excel can be used to address the difference quickly and easily. It is done manually here for illustrative purposes.

d. The model below increases the assumed equity value at the outset by increasing the EBITDA multiple to 9.5x. This results in a beginning equity value of €12,250,000.

ABC Group
Capital Structure Analysis

	2011	2012	2013	2014	2015
EBITDA	€ 1,500,000	€ 1,650,000	€ 1,825,000	€ 2,000,000	€ 2,150,000
Multiple	9.50	9.50	9.50	9.50	9.50
Market Value of Invested Capital (MVIC)	14,250,000	15,675,000	17,337,500	19,000,000	20,425,000
Preferred Stock	-	-	-		-
Total Debt	2,000,000	2,000,000	6,000,000	6,000,000	8,000,000
Common Equity Value	12,250,000	13,675,000	11,337,500	13,000,000	12,425,000
Interest Rate, Pre-tax	6.0%	6.0%	7.0%	7.0%	7.0%
After-tax cost of debt	4.5%	4.5%	5.3%	5.3%	5.3%
CAPITALIZATION %:					
Debt	14.0%	12.8%	34.6%	31.6%	39.2%
Preferred Equity	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	86.0%	87.2%	65.4%	68.4%	60.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

e. The second iteration above also adds debt at a faster pace. With equity at a higher value, a higher amount of debt is taken on to move the capital structure to the 40/60 goal.

f. The revised DCF model below yields a value of €12,195,000 which approximates the equity value going in. If this were not the case, then the analyst would adjust the assumed equity value again and recalculate the DCF until the ending value matches the beginning value.

ABC Group
Discounted Cash Flow Analysis

Assumptions	
Business Risk Index	1.15
Risk-Free Rate	4.0%
Market Risk Premium	5.5%
Size Risk Premium	5.7%
Specific Risk Premium	0.5%
Perpetuity Growth Rate	5.0%
Tax Rate	25.0%
Unlevered Cost of Equity	16.5%

	2011	2012	2013	2014	2015	Perpetuity
Free Cash Flow	€ 890,000	€ 1,100,000	€ 1,275,000	€ 1,400,000	€ 1,500,000	€ 1,575,000
% Debt Capital	14%	13%	35%	32%	39%	40%
% Common Capital	86%	87%	65%	68%	61%	60%
After-Tax Cost of Debt	4.5%	4.5%	5.3%	5.3%	5.3%	5.3%
Levered Cost of Common	17.3%	17.2%	19.0%	18.7%	19.5%	19.7%
WEIGHTED COST OF CAPITAL	*15.5%*	*15.6%*	*14.2%*	*14.4%*	*13.9%*	*13.9%*
Cash Flow in Period	*100.00%*					
Period to Discount	0.50	1.50	2.50	3.50	4.50	
NPV Factor	0.9306	0.8049	0.7168	0.6237	0.5557	
PV of Free Cash Flow	€ 828,212	€ 885,373	€ 913,937	€ 873,131	€ 833,490	

Perpetuity Value at start of 2015	€ 17,707,572
PV of Perpetuity	€ 9,860,448
FV of Invested Capital	**€ 14,194,591**
less: Debt	2,000,000
FV of Equity	**€ 12,194,591**

g. The process can be repeated to bring the equity value even closer.

3. Another possibility is that the fair value of debt differs from the book value. This should be analyzed prior to going through the equity value iterations.

V. Chapter Exercise

A. See Exercise 8-1 on the distributed student excel file. You have been assigned the task of reviewing a valuation that was performed as part of an impairment analysis. The income approach consists of the discounted cash flow model provided below.

1. List any flaws that you see in the report.

2. Assuming that the forecasted cash flows are accurate and the book value of debt provided (€40 million) equals the fair value of debt, what value of equity would be appropriate for this company?

The Software Group, Plc
Discounted Cash Flow Analysis

Assumptions	
Business Risk Index	1.10
Risk-Free Rate	4.0%
Market Risk Premium	6.0%
Size Risk Premium	4.0%
Specific Risk Premium	1.0%
Perpetuity Growth Rate	5.0%
Tax Rate	25.0%
Unlevered Cost of Equity	15.6%

	2011	2012	2013	2014	2015	Perpetuity
Free Cash Flow	£9,700,000	£11,100,000	£11,670,000	£12,180,000	£12,970,000	£13,618,500
% Debt Capital	40%	40%	40%	40%	40%	40%
% Common Capital	60%	60%	60%	60%	60%	60%
After-Tax Cost of Debt	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%
Levered Cost of Common	18.9%	18.9%	18.9%	18.9%	18.9%	18.9%
WEIGHTED COST OF CAPITAL	*13.1%*	*13.1%*	*13.1%*	*13.1%*	*13.1%*	*13.1%*
Cash Flowin Period	*100.00%*					
Period to Discount	0.50	1.50	2.50	3.50	4.50	
PV of Free Cash Flow	€ 9,119,345	€ 9,223,563	€ 8,570,979	€ 7,906,617	€ 7,441,615	

Perpetuity Value at start of 2015	£167,303,440
PV of Perpetuity	95,991,346.89
FV of Invested Capital	**138,253,465.12**
less: Debt	40,000,000.00
FV of Equity	**£98,253,465**

The Software Group, Plc
Capital Structure Analysis

	2011	2012	2013	2014	2015
Assumed Market Value of Invested Capital (	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000
Preferred Stock	-	-	-		-
Total Debt	40,000,000	40,000,000	40,000,000	40,000,000	40,000,000
Assumed FV of Equity	60,000,000	60,000,000	60,000,000	60,000,000	60,000,000
Interest Rate, Pre-tax	6.0%	6.0%	6.0%	6.0%	6.0%
After-tax cost of debt	4.5%	4.5%	4.5%	4.5%	4.5%
CAPITALIZATION %:					
Debt	40.0%	40.0%	40.0%	40.0%	40.0%
Preferred Equity	0.0%	0.0%	0.0%	0.0%	0.0%
Common Equity	60.0%	60.0%	60.0%	60.0%	60.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

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a. The conclusion is in the Handout.

CHAPTER 9 – THE CAPM DURING VOLATILE MARKETS

I. Extreme Market Conditions Affect CAPM variables

A. It should be remembered that the capital asset pricing model, like any theoretical model, is most relevant during normal operating conditions. In the case of the CAPM, considerations should be made when market conditions become extreme.

B. Consider the 2008-09 global recession and its effect on world equities markets.

Country Equity Market	Index 30-Jun-07	Index 31-Dec-08	Percent Change
Germany	8,000	4,800	-40.0%
UK	6,700	4,300	-35.8%
France	6,100	3,300	-45.9%
United States	13,800	8,800	-36.2%
Canada	14,000	9,200	-34.3%
India	14,200	9,000	-36.6%
Brazil	53,000	37,000	-30.2%
China	3,800	2,000	-47.4%

1. No country escaped the decline in equities, not even China, which most believe escaped the 2008-09 recession.

C. The valuation professional must be aware of the how such a trauma in the public market affects the mechanics of the valuation of closely-held companies. Consider the following questions:

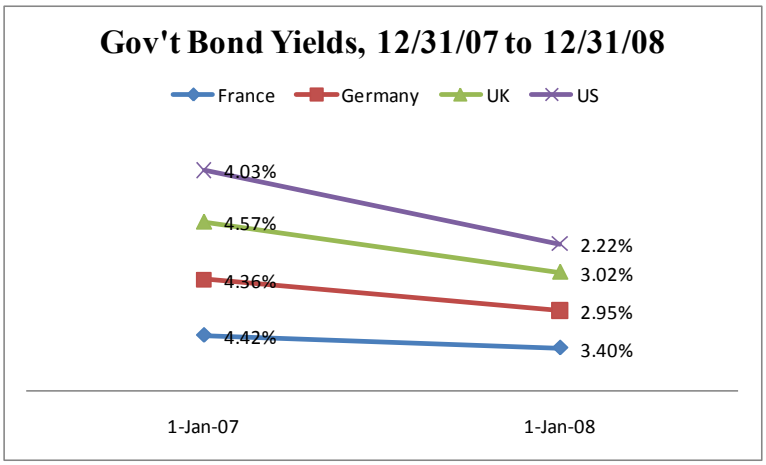
1. What effect do market declines have on a country's risk-free rate?

   a. When equity markets decline, investors usually move assets to the bond markets, which causes a higher demand and affects bond market rates.

   b. Consider the changes shown below in the ten-year bond yields for selected government treasuries around the world.

      (1) If the risk-free rate is a theoretical proxy, do the market forces which caused these yield changes result in rates that can still be used in the CAPM?

Gov't 10-Yr Bonds	Yields 31-Dec-07	Yields 31-Dec-08
Australia	6.34%	4.00%
Austria	4.38%	3.69%
Belgium	4.47%	3.77%
Canada	3.99%	2.69%
Denmark	4.44%	3.40%
France	4.42%	3.40%
Germany	4.36%	2.95%
Hong Kong	3.49%	1.35%
Italy	4.65%	4.38%
Japan	1.50%	1.18%
Netherlands	4.41%	3.55%
Portugal	4.53%	3.96%
Spain	4.41%	3.82%
Sweden	4.36%	2.43%
Switzerland	3.07%	2.23%
UK	4.57%	3.02%
US	4.03%	2.22%



Source: TradingEconomics.com

2. What effect do market declines of 30% to 40% have on beta measurements?

   a. Is it safe to assume that the relationship between the volatility of a stock and the volatility of the market is a constant?

   b. What happens when there is an abnormal increase in market volatility? The equities market performance in the same global markets between 2008 and 2010 are shown below.

Country Equity Market	Index 31-Dec-08	Index 31-Dec-10	Recovery, 2008-2010
Germany	4,800	6,800	41.7%
UK	4,300	5,750	33.7%
France	3,300	3,750	13.6%
United States	8,800	12,400	40.9%
Canada	9,200	12,900	40.2%
India	9,000	19,200	113.3%
Brazil	37,000	69,000	86.5%
China	2,000	2,900	45.0%

c. The market rebound feeds high volatility as much as the market decline. What does the CAPM assume about market volatility?

(1) The assumption is that volatility is an adequate proxy for risk. We measure a stock's volatility (and its systematic risk) by regressing changes in the stock price against changes in the market.

(2) An implicit assumption is that the market volatility is a relatively stable variable. Extreme changes in market volatility, as we saw in 2008-09, could make an individual stock's beta artificially lower.

(3) For example, assume a company's stock price remained relatively volatile between 2004 and 2007 with a beta of 1.50. What would happen to the company's beta during 2008-09 if its daily price swings remained the same during the recession?

(a) The answer is that the company's beta would have declined since, relative to the market which had gone into a period of hyper-volatility, it would appear less volatile, and less risky by comparison.

(b) Does a company become less risky because the market around it has become more volatile?

3. What effect does the market decline have on the measurement of the equity risk premium?

a. If the practitioner measures the ERP as an arithmetic average of historical market returns, the average would have declined in 2008.

D. Practical Example

1. Assume an analyst performs two valuations for a UK client, one in June, 2007 and the second in December, 2008. The analyst consults the following variables as of the two dates.

Variables	**30-Jun-07**	**31-Dec-08**
Net equity cash flow	£15,000,000	£15,000,000
UK 10-year bond yield	4.9%	3.7%
ERP	4.2%	3.4%
Specific Risk	5.0%	5.0%
Equity discount rate	14.1%	12.1%
Long term growth	5.0%	5.0%
Indicated Value	**£173,649,394**	**£221,830,986**
% change		27.7%

2. In the example above, there are no changes in the two valuations other than the risk-free rate and the equity risk premium, both of which were derived from market observations. The analyst calculated value using the single-period Gordon growth Model.

   a. Due solely to two factors, the risk-free and the ERP, value increased by 27.% over the 18-month period even though the company experienced no increase in cash flow or decline in specific risk.

   b. Does it make sense that the company would increase in value by nearly 30 percent during one of the worst global recessions in the last century?

3. If a CAPM is used instead of the build-up model, the results are more extreme since an artificially low beta would also drive up value.

4. These questions are addressed in the following sections which look more closely at the risk-free rate and the equity risk premium.

II. Risk-Free Rate

A. The government bonds that are used as a proxy for the risk-free rate express a constant yield to maturity, or interest rate.

   1. Bond price = Bond coupon/Bond yield

   2. Since most bonds have fixed coupon payments, an increase in bond yield means the bond price declines and vice versa (i.e. a decrease in bond yield results in an increase in the bond price).

3. Typical causes of a decline in bond yields:

   a. Perceived risk of the bond issuer declines relative to alternate investments.

   b. Expectations of lower inflation rates and lower interest rates. If inflation declines then the fixed coupon payment will hold its value, or increase in value, making the bond more attractive, and pricier.

4. Typical causes of an increase in bond yields:

   a. Risk of the bond issuer increases

   b. Inflation is expected to increase which means the fixed returns on the bond will decline in value.

5. Two factors pushed the yields on government bonds lower during the 2008 recession.

   a. There was a flight to quality as investors got out of equities and into bonds; higher demand pushed bond prices up.

   b. Although inflation increased in early 2008 due to oil prices, rates declined rapidly in the third and fourth quarters as expectations for world economic activity declined. Forecasts for short-term lower inflation made the bonds more attractive.

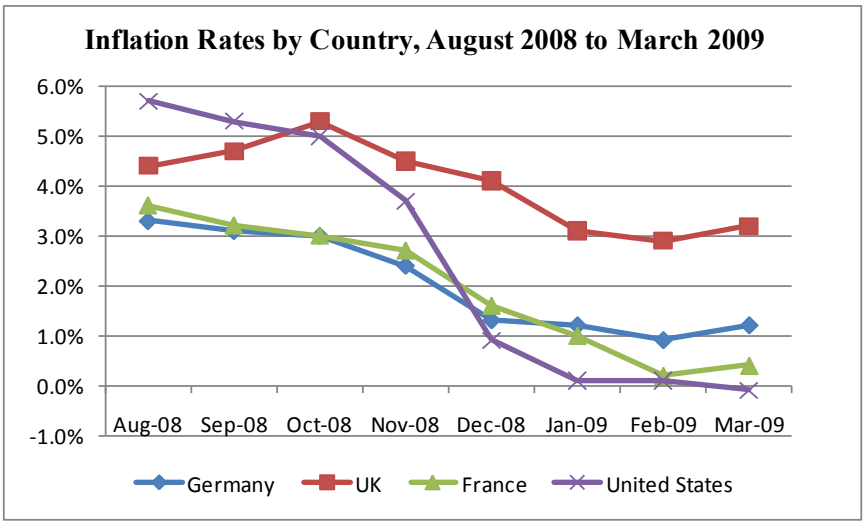
Inflation Rates, August 2008 to March 2009

Country	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09
Germany	3.3%	3.1%	3.0%	2.4%	1.3%	1.2%	0.9%	1.2%
UK	4.4%	4.7%	5.3%	4.5%	4.1%	3.1%	2.9%	3.2%
France	3.6%	3.2%	3.0%	2.7%	1.6%	1.0%	0.2%	0.4%
United States	5.7%	5.3%	5.0%	3.7%	0.9%	0.1%	0.1%	-0.1%
Canada	3.4%	3.5%	3.4%	2.6%	2.0%	1.2%	1.1%	1.4%
India	8.4%	9.0%	9.7%	10.5%	10.5%	9.7%	10.5%	9.6%
Brazil	6.4%	6.2%	6.3%	6.4%	6.4%	5.9%	5.9%	5.9%
China	6.2%	4.9%	4.7%	4.0%	2.6%	1.0%	0.9%	-1.7%

   c. Inflation for most developed and developing economies declined precipitously, with the exception of a few countries such as India and Brazil.

   d. The graph below depicts inflation in the major western economies during the peak months of the recession.

(1) A key consideration is whether the lower inflation rates represent a short term reaction to worldwide economic stagnation or expectations for a longer term trend.



e. Between the flight to quality and the lower inflation rates, bond yields (and risk-free rates) were poised for a decline. Note the Reuters article below from April, 2009 regarding an increase in bond prices.

TREASURIES-Bonds rally as bank fears clobber Wall Street

NEW YORK, April 20 (Reuters) - U.S. Treasury debt prices rallied on Monday as renewed worries about the banking sector hammered Wall Street and spurred the appetite for bonds and other low-risk investments.

The benchmark 10-year yield recovered much of Friday's losses, as traders jumped back into bonds in reaction to news of a spike in credit losses at Bank of America (BAC.N: Quote, Profile, Research), the largest U.S. bank by assets and the recipient of $45 billion in government bailout money.

Adding to the day's positive tone was this week's light supply and the Federal Reserve's planned purchases of longer-dated securities, analysts said.

"The theme contributing to the bid into government securities is the concern over the banking sector," said Eric Lascelles, chief economics and rates strategist with TD Securities in Toronto.

Benchmark 10-year notes <US10YT=RR> were up nearly a point in price at 99-5/32. Their yield, which moves inversely to their price, was 2.85 percent, down from 2.95 percent late on Friday.

6. The risk-free rate is used as part of the cost of equity to discount future cash flows that are expressed in *nominal* terms. Therefore, the risk-free rate includes inflation expectations.

7. A lower risk-free rate is relevant to the cost of capital only if it reflects the market's expectations for lower long-term inflation.

   a. Valuation is a long-term analysis. Hence, the variables that contribute to the analysis must have a similar time orientation.

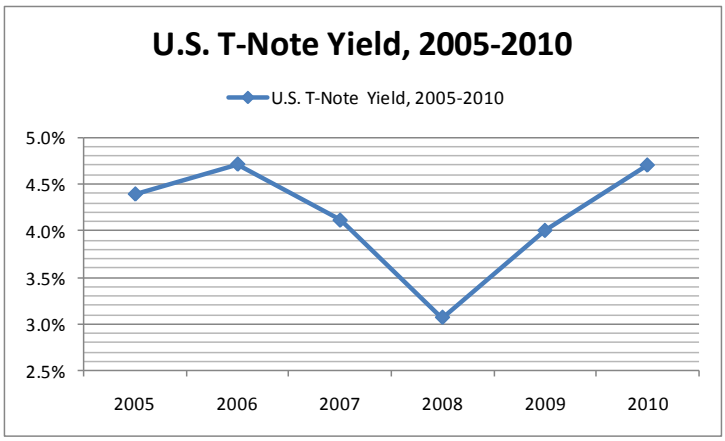
   b. Expectations for long-term inflation during the 2008 recession did not change during the period of declining yields.[10]

   c. At the end of 2008, long term inflation in the United States was actually expected to increase; consequently, yields on long-term government bonds were expected to increase. Expectations were for the yield on the 10-year U.S. Treasury to also increase by 1.63% between 2008 and 2010.

Date	**10-Year T-Note Yield**
December 31, 2005	4.4%
December 31, 2006	4.7%
December 31, 2007	4.1%
December 31, 2008	3.1%
December 31 2009 *	4.0%
December 31, 2010 *	4.7%

* Projected, U.S. Federal Reserve Livingston Survey

[10] Roger Grabowski, "Problems with Cost of Capital Estimation in the Current Environment – Update" *BVR*, Winter 2008, p. 209-220.



d. The analyst must decide in the case of the yields of any government bonds that are considered as a proxy for the risk-free rate whether the fluctuation in the rate is due to the market's expectations for long-term inflation, or due to a short-term flight to quality.

(1) In the case of the U.S. Treasuries shown above, there is little question that the temporary drop in yields is attributable to a flight to quality reacting to the equity market crash.

e. Consequently, it would be inappropriate to use the 10-year yield as of 12/31/08 as a proxy for the risk-free rate since, given expectations for inflation and for increasing rates, the 3.05% rate was an aberration.

8. Therefore, before using a given government bond as a proxy for the risk-free rate, the analyst should take to assure that the following is true:

a. Does the yield reflect the market's expectations for long term inflation?

b. Is the yield skewed due to a short-term economic anomaly (as was true during 2008 and 2009)?

9. If the long term bond rate is not a valid proxy for the risk-free rate, there are options.

a. The analyst can use an average rate over a 3-4 year period. In the example given above for the U.S. 10-year Treasury, it is clear that the 3.07% rate is an aberration. Similar to removing, or smoothing, a non-recurring even on an income statement, an average rate of 4.0% could be applied.

b. Use a forward rate based on options on exchange traded funds on long term government bonds.

III. Equity Risk Premium

A. The equity risk premium (ERP) is defined as follows:

> *"A rate of return added to the risk-free rate to reflect the additional risk of equity instruments over risk-free instruments (a component of the cost of equity capital or equity discount rate)"* International Glossary

1. The ERP represents the market's expectations of future returns. The ERP is not an arithmetic or geometric measurement of historical premiums earned over the risk-free rate. The historical measurements are only a common method used in practice as a proxy for the expected rate.

2. Aswath Damodaran discusses the "implied ERP" which is derived from the internal rate of return which equates a stock market index with expected dividends and stock buybacks on that index.[11]

3. Seen as an internal rate of return, the ERP therefore can be expected to increase when the S&P declines and decrease when the market rebounds.

4. Many valuation practitioners use some type of historical analysis to derive an ERP proxy.

   a. For example, U.S. practitioners typically use *Stocks, Bonds, Bills, and Inflation* (SBBI), a Morningstar publication, which supplies different measurements of the ERP.

      (1) Arithmetic and geometric averages of returns on large cap stocks from 1926 through the publication date are presented. Also, data is available for the practitioner to compute averages using other dates.

      (2) A supply side ERP is also presented.

   b. Other practitioners use the Duff & Phelps arithmetic average which covers the period from 1963-present.

   c. Use of the geometric average has many pitfalls which will be discussed later in this chapter.

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[11] Aswath Damodaran, "Equity Risk Premiums: Determinants, Estimation, and Implications" see Damodaran website www.stern.nyu.edu/adamodar/

B. The Conditional and Unconditional ERP

1. Grabowski distinguishes between the conditional and unconditional ERP.[12]

   a. The unconditional ERP represents the long-term average premium, generally agreed by practitioners to be between 4.0% and 6.0% for a developed market like the United States.

      (1) This range is relevant over an entire business cycle. It would be theoretically incorrect to take the range of the unconditional ERP and assume that a midpoint, say 5.0%, is an appropriate ERP for all points of the business cycle.

   b. The conditional ERP reflects market conditions at a given point in time.

2. Appropriate practice is to gauge where the local economy is in the cycle and assign an ERP from the range accordingly.

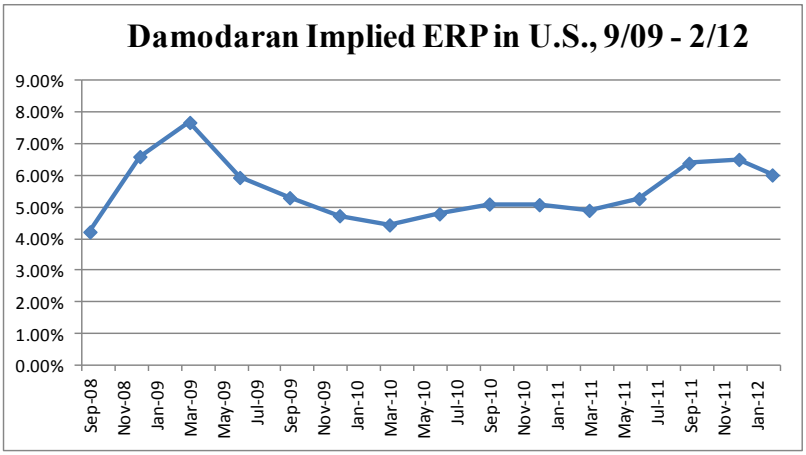
   a. When the market is at a peak, an ERP at the low end of the range (4.0%) is acceptable.

   b. When the market is down (as was the case in 2008-09), the higher end of the range (6.0% in the U.S. market) is more accurate.

3. According to Damodaran's analysis the implied ERP as of March, 2009, the bottom of the U.S. equities market was 7.68%. Damodaran's implied ERPs from his website are shown below:

[12] Grabowski, page 210-211.

DAMODARAN	
Date	**Implied ERP**
Sep-08	4.22%
Dec-08	6.60%
Mar-09	7.68%
Jun-09	5.94%
Sep-09	5.30%
Dec-09	4.73%
Mar-10	4.44%
Jun-10	4.79%
Sep-10	5.10%
Dec-10	5.08%
Mar-11	4.90%
Jun-11	5.27%
Sep-11	6.39%
Dec-11	6.51%
Feb-12	6.02%



a. The cyclicality of the ERP can be seen in the Damodaran analysis above. During the sovereign debt crisis in the Fall of 2011, the implied ERP jumped back up to 6.5%.

4. Constant use of a midpoint unconditional ERP, without considerations of the peaks and valleys of the market will alternately undervalue and overvalue the subject entity.

5. If the changes discussed above for the risk-free rate and the ERP are accounted for in the valuation illustration from I.D.1, note the results:

	Revised	
Variables	**30-Jun-07**	**31-Dec-08**
Net equity cash flow	£15,000,000	£15,000,000
UK 10-year bond yield	4.9%	4.5%
ERP	4.2%	5.5%
Specific Risk	5.0%	5.0%
Equity discount rate	14.1%	15.0%
Long term growth	5.0%	5.0%
Indicated Value	**£173,649,394**	**£157,500,000**
% change		-9.3%

a. Two changes were made to the original valuation. An average bond rate for the pound is applied. Still lower than the June, 2007 rate, it is more reflective of future inflation conditions. Second, a conditional ERP for the UK market is chosen which reflects the market conditions at the time.

(1) The result is a valuation which dropped 9.3% from the June 2007 valuation.

(2) The actual case would likely require an increase in company-specific risk since many companies saw their risk profiles change during this time period.

(3) During 2008-09, it was not uncommon for practitioners to insert unreasonably high specific risk premiums into the CAPM to counter the effect of the unreasonably low risk-free rates and low ERPs. This is not an appropriate way to handle the extreme market conditions of the time.

IV. Beta

A. The capital asset pricing model (CAPM) includes an analysis of systematic risk expressed in the beta; volatility is assumed to be a proxy for risk. For closely-held companies, practitioners may look at the betas of guideline companies since the subject company has no trading history.

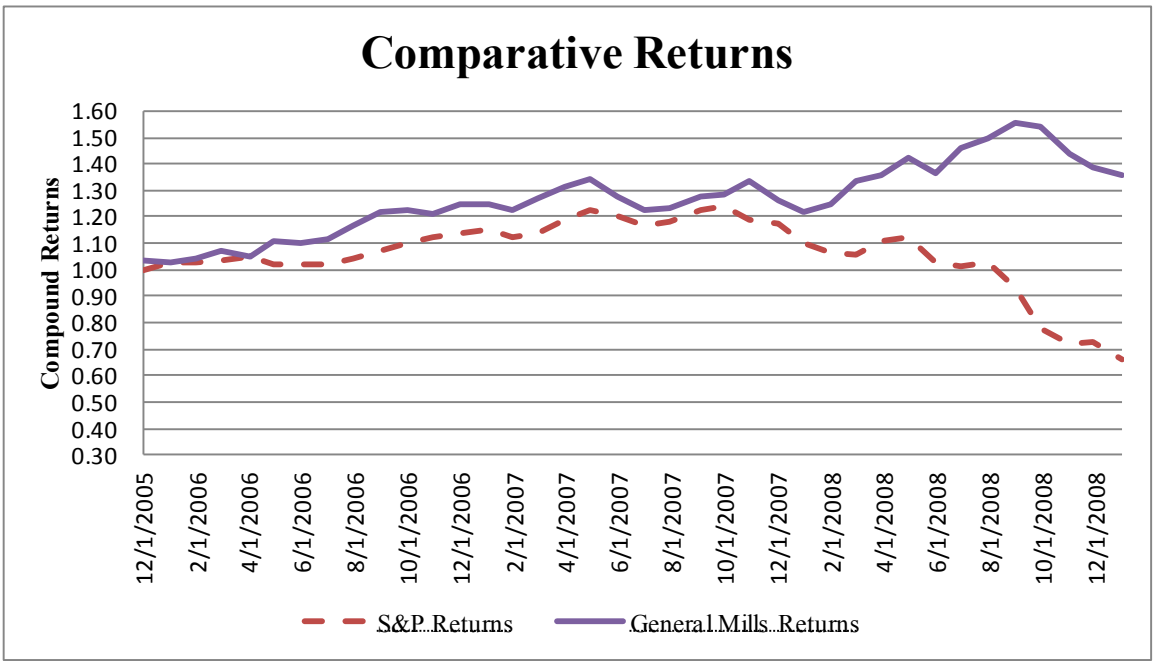
1. The beta is measured through a regression of the company's stock price changes to changes in the market.

a. During periods of hyper-volatility, any single company's beta will likely decline assuming no other changes. Typically, a company's business risk does not decline simply because the market has become more volatile.

b. Similarly, a company's beta may be skewed if measured during a period when the company is undergoing unusual volatility.

c. Optimally, the beta should be measured when the company is in equilibrium with the market.

2. A company's beta can be analyzed by graphing compound returns for the stock market index against the returns for the company. In the graph shown below, the American company General Mills' returns are graphed alongside the S&P between January 2006 and December, 2008.



3. General Mills and the S&P are in equilibrium between mid-2006 and January of 2008. After January, 2008 General Mills does not move in tandem with the market. This occurred since the market moved downward seeking a lower equilibrium price.

4. The beta estimate must reflect the forward looking relationship between the company and the market. Since the company and the market were not in equilibrium for much of 2008, the regression period should include the period from the middle of 2006 to the end of 2007.

5. The valuation of closely-held companies usually involves deriving a beta from a group of guideline companies. Performing this analysis for each guideline company can be time-consuming but is necessary to isolate the market's repricing during 2008.

B. Chapter 5 discussed the Hamada formula and alternate formulas which are used to address some of Hamada's limitations as listed below.

1. All the financial risk in the company is borne by the shareholders.

    a. While this may be a safe assumption with smaller companies with low leverage, it is less true with high-leverage companies as was shown to be true during the 2008-09 recession with bank failures and bank buyouts.

    b. In reality, financial risk is also borne by the creditor. In the case of widespread financial default, collateral can be impaired.

        (1) Many real property markets around the world saw banks fail because of homeowner defaults.

        (2) Even government bond risk increases in cases where the country's major banks get closer to default, under the assumption the government will be pressured to underwrite the bank's losses.

2. Chapter 5 discussed two models which address the various shortfalls in the Hamada formula. The Miles-Ezzell formula and the Practitioners Formula were discussed.

Chapter 9 Appendix

1. Article: "Developing the Cost of Equity Capital: Risk-Free Rate and ERP DuringPeriods of Flight to Quality", by Roger J. Grabowski, ASA, *Business Valuation Review,* Volume 29 No. 4

BVR
Business Valuation Review
Volume 29 • Number 4

Developing the Cost of Equity Capital: Risk-free Rate and ERP during Periods of "Flight to Quality"

Roger J. Grabowski, ASA

Introduction

The rate of interest on the risk-free security, the *risk-free rate*, is one of the building blocks valuation professionals use in developing the cost of equity capital. Selection of the risk-free rate allows one to "scale" the cost of equity capital for the expected inflationary environment. But during late 2008 and early 2009 and again during the summer of 2010 risk-free rates were abnormally low and inconsistent with their theoretical formulation due to a "flight to quality."

Another key building block is the *equity risk premium* (ERP). Choice of the appropriate ERP as of the valuation date is one of the most important decisions the analyst must make in developing a discount rate. Any estimate of the ERP must be made in relation to a risk-free security. That is, the expected return on a fully diversified portfolio of equity securities must be measured in its relationship to the rate of return expected on a risk-free security.

The selection of an appropriate risk-free security with which to base the equity risk premium estimate is a function of the expected holding period for the investment to which the discount rate (rate of return) is to apply. For example, if you were estimating the equity return on a highly liquid investment and the expected holding period were potentially short-term, a U.S. government short-term bond (e.g., a Treasury or T-bill) may be an appropriate instrument to use in benchmarking the ERP estimate.

Alternatively, if you were estimating the equity return on a long-term investment, such as the valuation of a business where the value can be equated to the present value of a series of future cash flows over many years, then the yield on a long-term U.S. government bond is commonly used in benchmarking the ERP estimate. As the thrust of this paper is the development of the cost of equity capital for valuing a business or other long-term investment, this is the approach we will discuss herein.

The Great Recession of 2008–2010 has necessitated we reconsider many methods of analysis we took for granted during periods of stability.[1] The choice of risk-free rate and estimate of ERP are just other examples of the difficulty of pricing risk during these uncertain economic times.

Risk-Free Rate

A *risk-free rate* is the return available on a security that the market generally regards as free of the risk of default. Many of the widely used methods for estimating the cost of equity capital (e.g., the build-up method, the capital asset pricing model, and the Fama-French 3-factor model) are built upon the yield to maturity on U.S. government securities, as of the valuation date.

The risk-free rate reflects three components:

1. *Rental rate.* A real return for lending the funds over the investment period, thus forgoing consumption for which the funds otherwise could be used.
2. *Inflation.* The expected rate of inflation over the term of the risk-free investment.
3. *Maturity risk or investment rate risk.* The risk that the investment's principal market value will rise or fall during the period to maturity as a function of changes in the general level of interest rates.

All three of these economic factors are embedded in the yield to maturity for any given maturity length. However, it is not possible to observe the market consensus about how much of the yield for any given maturity is attributable to these factors (with the exception of expected inflation which can be estimated based on Treasury Inflation Protected Securities or TIPS).

This basic risk-free rate *includes inflation expectations*. Therefore, when this rate is used to estimate a cost of capital to discount expected future net cash flows, those future net cash flows also should reflect the expected effect of inflation. In the economic sense of nominal versus real dollars, we are building a cost of capital in

Note: This paper is an excerpt from and updates discussions that appear in Chapters 7 and 9 of *Cost of Capital: Applications and Examples* 4th ed. by Shannon P. Pratt and Roger J. Grabowski (John Wi ey & Sons, Inc., 2010). Reprinted with permission of John Wi ey & Sons, Inc.

[1]The recession technically began in December 2007 and lasted 18 months to June 2009, the longest since the 1929 crisis. But in many persons' opinion the recession continued, whence why this author is using the term the Great Recession of 2008–2010.

nominal terms, and it should be used to discount expected returns that also are expressed in nominal terms.

One can estimate the long-term overall economic inflation forecast imbedded in the risk-free rate by taking the difference in yield between the risk-free security and the yield on TIPS. While this long-term estimated inflation rate provides an overall inflation framework for a valuation, it is not necessarily equal to the estimated rate of inflation in the net cash flows as the rate of inflation likely will vary year-to-year and will be specific to the circumstances of the subject company.

Long-term U.S. government bonds are generally considered free of default risk but are not entirely "risk-free." Bonds are sensitive to future interest rate fluctuations. Investors are not sure of the purchasing power of the dollars they will receive upon maturity or the reinvestment rate that will be available to them to reinvest the interest payments received over the life of the bond. As a result, the long-term empirical evidence is that returns on long-term government bonds on the average exceed the returns on T-bills.[2]

The long-term premium of government bond returns in excess of the average expected interest rates on T-bills (average of future forward rates) is commonly referred to as the *horizon premium*. The horizon premium compensates the investor for the maturity risk of the bond. The horizon premium equals the added return expected on long-term bonds *on the average* due to inflation and interest rate risk. As interest rates change unexpectedly in the future, the bond price will vary. That is, bonds are subject to market risk due to unexpected changes in interest rates. The horizon premium compensates investors for the market risk that their expectations of interest rates today, period by period over the term of the bond, will in fact be wrong.

In valuing "going-concern" businesses and long-term investments made by businesses, practitioners generally use long-term U.S. government bonds as the risk-free security and estimate the ERP in relation to long-term U.S. government bonds. This convention represents a realistic, simplifying assumption. Most business investments have long durations and suffer from a reinvestment risk comparable to that of long-term U.S. government bonds. As such, the use of long-term U.S. government bonds and an ERP estimated relative to long-term bonds more closely matches the investment horizon and risks confronting business managers making capital allocation decisions and valuators in applying valuation methods.

[2]When short-term interest rates exceed long-term rates, the yield curve is said to be "inverted."

Many financial analysts today use the 20-year U.S. government bond yield to maturity as of the date of valuation. Some analysts use either a 10-year or a 30-year yield, but as a practical matter these yields have not differed greatly from the 20-year yield.

While the choice of risk-free rate was relatively easy during periods of stability, the very use of a risk-free rate as the building block upon which the cost of equity capital is based became problematic beginning in September 2008 as the financial crisis started to unfold. All U.S. government security yields declined and long-term U.S. government bond yields, the typical benchmark used in cost of equity capital models, became abnormally low for several months. If the analyst used historical realized risk premiums as an estimated equity risk premium as is often typically used, these abnormally low interest rates resulted in unreasonably low estimates of the cost of equity capital as of the important valuation date, December 31, 2008.[3] Exhibit I displays the 10-year and 20-year yields on constant maturity U.S. government bonds from 2005 through 2010.

Most analysts would agree that the world economies were (and likely still are as of the date of this writing) in crisis. Financial crises are often accompanied by a "flight to quality" such that the nominal returns on "risk-free" securities fall dramatically for reasons other than inflation expectations, and, thus, without adjustment, become less

Exhibit 1

10-year and 20-year (constant maturity)
U.S. Government Bond Yields

	U.S. Government Bond Yields			U.S. Government Bond Yields	
	10-Year	20-Year		10-Year	20-Year
Year End 2005	4.39	4.61	May-09	3.47	4.34
Year End 2006	4.71	4.91	Jun-09	3.53	4.30
Year End 2007	4.04	4.50	Jul-09	3.52	4.29
			Aug-09	3.40	4.14
Jan-08	3.67	4.35	Sep-09	3.31	4.02
Feb-08	3.53	4.37	Oct-09	3.41	4.19
Mar-08	3.45	4.30	Nov-09	3.21	4.07
Apr-08	3.77	4.49	Dec-09	3.85	4.58
May-08	4.06	4.74	Jan-10	3.63	4.38
Jun-08	3.99	4.59	Feb-10	3.61	4.40
Jul-08	3.99	4.63	Mar-10	3.84	4.55
Aug-08	3.83	4.47	Apr-10	3.69	4.36
Sep-08	3.85	4.43	May-10	3.31	4.05
Oct-08	4.01	4.74	**Jun-10**	2.97	**3.74**
Nov-08	2.93	**3.71**	**Jul-10**	2.94	**3.74**
Dec-08	2.25	**3.05**	**Aug-10**	2.47	**3.23**
Jan-09	2.87	**3.86**	**Sep-10**	2.53	**3.38**
Feb-09	3.02	**3.98**	**Oct-10**	2.63	**3.64**
Mar-09	2.71	**3.61**	**Nov-10**	2.81	**3.80**
Apr-09	3.16	4.10	Dec-10	3.30	4.13

Source: Board of Governors of the Federal Reserve System

[3]Roger J. Grabowski, "Cost of Capital Estimation in the Current Distressed Environment," *The Journal of Applied Research in Accounting and Finance* (July 2009): 31–40.

reliable as the best building block upon which to estimate the cost of equity capital.

Macroeconomic research suggests that short-term inflation expectations remain fairly stable, and therefore the dramatic decline in the government bond yields in November and December 2008 was not likely due to expected declines in expected long-term inflation.[4] In fact, long-term (10-year horizon) Consumer Price Index (CPI) expectations continued to be at 2.5% at the end of 2008.[5]

While short-term inflation expectations had decreased,[6] many commentators were warning that long-term inflation would increase, not decrease, given the projected U.S. budget deficit. Based on surveys of professional forecasters, yields on long-term U.S. government bonds were also expected to increase.

Following the bottom at December 31, 2008, yields on 20-year (constant maturity) U.S. government bonds increased. For example, as of September 30, 2009, the yield had increased to 4.1%. It appeared that the "flight to quality" that drove yields on U.S. government bonds to unreasonably low levels as of December 2008 had eased and yields on U.S. government bonds appeared to have returned to more normalized levels.

According to Federal Reserve Chairman Bernanke in his prepared testimony to the U.S. House of Representatives' Budget Committee on June 3, 2009, regarding increases in yields on longer-term government bonds and fixed rate mortgages:

> These increases appear to reflect concerns about large federal deficits but also other causes, including greater optimism about the economic outlook, a reversal of flight-to-quality flows, and technical factors related to the hedging of mortgage holdings.

Further evidence of the "flight to quality" and its impact on U.S. government interest rates was the implied forward volatility (based on options on exchange traded funds or "ETFs") on 20-year U.S. government bonds in November and December of 2008. The volatility had increased significantly (to approximately double the implied forward volatility in earlier months[7]), suggesting that the market was uncertain that the lower yields (and correspondingly higher prices) in November and December of 2008 were sustainable. (See Exhibit 2). By the fall of 2009 and spring of 2010, the implied forward volatility had decreased to a level approximately equal to the average for months leading up to the November–December, 2008 "flight to quality."

In summary and examining the data in Exhibit 2, the evidence suggests that the yields on 20-year U.S. government bonds represented aberrations during the last months of 2008 and the first months of 2009, overly influenced temporarily by the "flight to quality" (low interest rates in bold).

Subsequently, the risk-free rate returned to more "normal" levels until the summer of 2010 as the European sovereign debt crisis caused another "flight to quality". In addition the Federal Reserve Bank began making massive purchases of U.S. government securities (referred to as Quantitative Easing round 2 or "QE2"). While the Federal Reserve made purchases of securities with maturities of 10-years or less, the combination of the sovereign debt crisis and QE2 purchases appear to have driven interest rates to abnormally low levels and caused implied forward volatilities to increase during the summer and fall of 2010.

The entire process f normalizing risk-free interest rates begins with identifying whether the market interest rate has been influenced by the "flight to quality." We follow changes in the market interest rates relative to a rolling average of prior months interest rates and various economic indicators monthly, for example, the flow of funds, the implied volatility derived from options, changes in estimates of inflation, etc. Once we suspect that the market interest rates are abnormally low, we use a build-up approach to estimate a normalized risk-free rate looking at the real rate of interest and inflation estimates.

If one was estimating the cost of equity capital in any of these periods of abnormally low interest rates, one would need to be cautious that one's application of the cost of equity capital model does not result in an unrealistically low cost of equity estimate.

Equity Risk Premium

The *equity risk premium* (often interchangeably referred to as the *market risk premium*) is defined as the extra return (over the expected yield on risk-free securities) that investors expect to receive from an investment in a diversified portfolio of common stocks.

Three driving forces behind the discussions that have evolved on ERP include:

[4] V. V. Chari, Lawrence Christiano, and Patrick J. Kehoe, "Facts and Myths about the Financial Crisis of 2008," Federal Reserve Bank of Minneapolis Research Department, Working paper 666, October 2008.

[5] "Survey of Professional Forecasters: Fourth Quarter 2008," Federal Reserve Bank of Philadelphia (November 17, 2008); "The Livingston Survey: December 2008," Federal Reserve Bank of Philadelphia (December 9, 2008).

[6] "The Livingston Survey: June 2009," Federal Reserve Bank of Philadelphia (June 9, 2009): 1.

[7] Implied volatility for 3-month options on iShares Lehman 20+year Treasury Bonds averaged 31.5% in November and December 2008 compared to an average of 15.0 during the first 10 months of 2008. The implied volatility averaged 13.4% for the six months of October, 2009 to March 2010.

Exhibit 2

Implied Volatilities for Options on S&P 500 and Options on U.S. Government Bonds and Interest Rates on Constant Maturity 20-Year U.S. Government Bonds

	S&P 500 ETF Implied Volatility		iShares Lehman 20+ Year Treasury Bond		20-Year Treasury
	30 Day	3 Month	30 Day	3-Month	Yield
Year End 2005	10.77	12.66	8.70	9.24	4.61
Year End 2006	10.26	11.02	7.49	8.08	4.91
Year End 2007	21.53	22.60	14.95	14.36	4.50
Jan-08	26.12	23.98	17.58	16.29	4.35
Feb-08	24.58	24.93	17.81	17.31	4.37
Mar-08	25.04	24.59	16.85	17.24	4.30
Apr-08	19.40	19.98	12.95	13.34	4.49
May-08	15.93	18.89	13.08	14.17	4.74
Jun-08	22.80	22.51	11.52	12.97	4.59
Jul-08	22.06	21.84	11.09	12.32	4.63
Aug-08	19.11	21.25	10.76	12.13	4.47
Sep-08	39.17	31.30	18.69	16.12	4.43
Oct-08	52.08	46.36	16.81	18.46	4.74
Nov-08	51.76	48.39	28.84	31.09	**3.71**
Dec-08	36.27	37.57	31.33	31.21	**3.05**
Jan-09	39.63	38.68	26.10	25.26	**3.86**
Feb-09	40.92	39.48	25.14	25.41	**3.98**
Mar-09	39.53	39.39	17.99	19.40	**3.61**
Apr-09	33.32	33.16	19.81	19.88	4.10
May-09	26.76	28.11	22.02	21.80	4.34
Jun-09	23.94	25.28	18.97	19.45	4.30
Jul-09	22.76	24.48	16.90	17.80	4.29
Aug-09	22.70	25.42	16.11	17.26	4.14
Sep-09	22.63	23.02	15.86	16.79	4.02
Oct-09	26.93	25.37	15.59	16.31	4.19
Nov-09	21.56	23.03	13.25	14.53	4.07
Dec-09	17.57	20.34	12.49	14.32	4.58
Jan-10	21.68	21.78	10.89	12.43	4.38
Feb-10	16.64	18.87	9.87	10.93	4.40
Mar-10	14.84	16.92	10.94	11.94	4.55
Apr-10	17.65	19.03	10.89	12.55	4.36
May-10	27.15	26.47	17.48	18.41	4.05
Jun-10	29.82	28.78	16.15	16.43	**3.74**
Jul-10	21.29	23.07	13.49	14.41	**3.74**
Aug-10	24.36	25.92	20.38	19.24	**3.23**
Sep-10	20.42	22.38	15.97	16.54	**3.38**
Oct-10	19.29	19.98	17.71	16.80	**3.64**
Nov-10	20.52	21.17	18.06	17.36	**3.80**
Dec-10	15.31	17.89	16.40	16.49	4.13

(1) 30 day implied volatility
(2) 3 month implied volatility
Sources: Bloomberg and *Board of Governors of the Federal Reserve System*

1. What returns can be expected by retirement plans from investments in publicly traded common stocks?
2. What expected returns are being priced in the observed values of publicly traded common stocks?
3. What is the appropriate cost of capital to use in discounting future cash flows of a company or a project to their present value equivalent?

Because of the importance of the ERP estimate and the fact that we find many practitioners confused about estimating ERP, we report on recent studies of the long-term average or *unconditional ERP*. That is, what is a reasonable range of ERP that can be expected over an entire business cycle?

Research has shown that ERP is cyclical during the business cycle. We use the term *conditional ERP* to mean the ERP that reflects current market conditions.

We report on reasonable ERP estimates through the Great Recession of 2008–2010 and conclude with our recommended ERP.

Defining the Equity Risk Premium

The ERP (or notational RP_m) is defined as:

$$RP_m = R_m - R_f$$

where:

RP_m = the equity risk premium
R_m = the expected return on a fully diversified portfolio of equity securities
R_f = the rate of return expected on a risk-free security

The ERP means, in practice, a general equity risk premium using as a proxy for the "market," either the Standard & Poor's (S&P) 500 or the New York Stock Exchange (NYSE) composite stock index. ERP is a forward-looking concept. It is an expectation as of the valuation date for which no market quotes are directly observable.

In this paper, we are addressing returns of publicly traded stocks. Those returns are commonly used to establish a beginning benchmark for estimating the cost of equity capital for closely held investments.

Estimating the ERP

While an analyst can observe premiums realized over time by referring to historical data (i.e., realized return approach or *ex post* approach), such realized premium data do not represent the ERP expected in prior periods, nor do they represent the current ERP. Rather, realized premiums may, at best, represent only a sample from prior periods of what may have then been the *expected* ERP.

To the extent that realized premiums on the average equate to expected premiums in prior periods, such samples *may be* representative of current expectations. But to the extent that prior events that are not expected to reoccur caused realized returns to differ from prior expectations, such samples should be adjusted to remove the effects of these nonrecurring events. Such adjustments are needed to improve the predictive power of the sample.

Alternatively, you can derive implied forward-looking estimates for the ERP from data on the underlying expectations of growth in corporate earnings and dividends or from projections of specific analysts as to dividends and future stock prices (*ex ante* approach).[8]

The goal of either approach is to estimate the true *expected* ERP as of the valuation date. Even then the expected ERP can be thought of in terms of a *normal* or *unconditional* ERP (i.e., the long-term average) and a *conditional* ERP based on current levels of the stock market and economy relative to the long-term average.[9] We address issues involving the conditional ERP later.

There is no one universally accepted methodology for estimating ERP. A wide variety of premiums are used in practice and recommended by academics and financial advisors.

Realized Risk Premium (*ex post*) Approach

Let us examine briefly the issues surrounding estimating the *unconditional ERP* using realized risk premium data. While academics and practitioners agree that ERP is a forward-looking concept, some practitioners, including taxing authorities and regulatory bodies, use historical data only to estimate the ERP under the assumption that historical data are a valid proxy for current investor expectations (the *ex post* approach). They like the appearance of accuracy, and we do emphasize the word *appearance*. There are alternative conventions one could use to summarize realized risk premiums. Before one concludes on the accuracy of using realized risk premiums as an estimate of the ERP, one must consider the adjustments to the realized risk premiums.

In using the realized risk premiums, there are certain issues besides deciding on the risk-free rate (short-term or long-term) upon which to benchmark the ERP estimate that one must address:

- Is the arithmetic average or geometric average the more appropriate method of summarizing realized return data over the sample period for use in discounting expected cash flows?
- Should returns be measured over one-year holding periods or over longer holding periods?
- Do we introduce bias by using arithmetic averages of realized risk premiums?[10]

In the realized risk premium approach, the estimate of the ERP is the risk premium (realized return on stocks in excess of the risk-free rate) that investors have, on the average, realized over some historical holding period (realized risk premium).

The underlying theory is that the past provides a reasonable indicator of how the market will behave in the future and investors' expectations are influenced by

[8]See, for example, Eugene F. Fama and Kenneth R. French, "The Equity Premium," *Journal of Finance* (April 2002): 637–659.

[9]Robert Arnott, "Historical Results," *Equity Risk Premium Forum, CFA Institute (AIMR)* (November 8, 2001): 27.

[10]These issues are discussed in detail in Appendix 9A of *Cost of Capital: Applications and Examples* 4th ed.

the historical performance of the market. If period returns on stocks (e.g., monthly stock returns) are not correlated (e.g., this month's stock returns are not predictable based on last month's returns), and if expected stock returns are stable through time, then the arithmetic average of historical stock returns provides an unbiased estimate of expected future stock returns.

Similarly, the arithmetic average of realized risk premiums provides an unbiased estimate of expected future risk premiums (the ERP). Because of this statistical characteristic, this author has chosen to present all conclusions in terms of their arithmetic average equivalency, even where the methodology used to estimate the ERP is not based on realized risk premiums. Converting all analyses to a common equivalent measurement also facilitates the reader's ability to draw meaningful comparisons.

A more indirect justification for use of the realized risk premium approach is the contention that, for whatever reason, securities in the past have been priced in such a way as to earn the returns observed. By using an estimated cost of equity capital incorporating the average of realized risk premiums, you may to some extent replicate this level of pricing.

Selecting A Sample Period

The average realized risk premium is sensitive to the period chosen for the average. While the selection of 1926 as a starting point corresponds to the initial publishing of the forerunner to the current S&P 500, that date is otherwise arbitrary.

In addition, the average realized returns calculated using 1926 return data as a beginning point may be too heavily influenced by the unusually low interest rates during the World War II period. Some observers have suggested that the period including the 1930s, 1940s, and the immediate post–World War II boom years may have exhibited an unusually high average realized return premiums. The 1930s exhibited extreme volatility while the 1940s and early 1950s saw a combination of record low interest rates and rapid economic growth that led the stock market to outperform Treasury bonds by a wide margin.

> The low real rates on bonds may have contributed to higher equity returns in the immediate postwar period. Since firms finance a large part of their capital investment with bonds, the real cost of obtaining such funds increased returns to shareholders. It may not be a coincidence that the highest 30-year average equity return occurred in a period marked by very low real returns on bonds. As real returns on fixed-income assets have risen in the last decade, the equity premium appears to be returning to the 2% to 3% norm that existed before the postwar surge.[11]

[11]Jeremy Siegel, *Stocks for the Long Run* (New York: McGraw-Hill, 1994), 20.

Exhibit 3

Bond Income Returns vs. Inflation 1942–1951

Year	Income Return	Rate of Inflation
1942	2.46%	9.29%
1943	2.44%	3.16%
1944	2.46%	2.11%
1945	2.34%	2.25%
1946	2.04%	18.16%
1947	2.13%	9.01%
1948	2.40%	2.71%
1948	2.25%	−1.80%
1950	2.12%	5.79%
1951	2.38%	5.87%

Source: Shannon P. Pratt and Roger J. Grabowski, *Cost of Capital: Applications and Examples* 4th ed. (John Wiley and Sons, Inc., 2010), page 122. Used with permission.

And the years 1942 through 1951 were a period of artificial stability in U.S. government bond interest rates. In April 1942, the Federal Reserve publicly committed itself to maintaining an interest rate ceiling on government debt, both long term and short term, to support the financing of World War II. After World War II, the Fed continued maintaining an interest rate ceiling fearing return to the high unemployment of the Great Depression. But postwar inflationary pressures caused the Treasury and the Fed to reach an accord announced March 4, 1951, freeing the Fed of its obligation of pegging interest rates.[12]

Exhibit 3 displays the income returns on long-term U.S. government bonds for the years 1942 through 1951 (the return used by Morningstar in calculating the realized risk premiums) versus inflation.

During these 10 years long-term U.S. government income returns averaged 2.3% while inflation averaged 5.66%, indicating that the realized risk premiums calculated for these years was biased high compared to a more normal risk-free rate benchmark. To better understand the effect of the interest rate accord on the realized risk premiums, this author recalculated the realized risk premiums for 1926 through 2010 after normalizing the income return on long-term U.S. government bonds for the years 1942 through 1951 to an amount at least equal to the annual rate of inflation as reported in the *SBBI Yearbook* (except 1949 when inflation was −1.8%). Making that adjustment lowered the realized risk premium from the published 6.7% to 6.2% for 1926–2010. One can interpret the results as the realized risk premium data reported in the *SBBI Yearbook* is biased high by 50 basis

[12]For an account of the history during this period, see for example Robert J. Hetzel and Ralph F. Leach, "The Treasury-Fed Accord: A New Narrative Account" available at http://www.richmondfed.org/publications/research/economic_quarterly/2001/winter/pdf/hetzel.pdf

points (.50%). We will term this the WWII Interest Rate Agreement bias.

Has the relationship between stock and bond risk chan ed

If we disaggregate the 85 years reported in the *SBBI Yearbook* into two sub-periods, the first covering the periods before and the second covering the periods after the mid-1950s, we find that the period since the mid-1950s has been characterized by a more stable stock market and a more volatile bond market compared to the earlier period. Interest rates, as reflected in Long-term U.S. Government Bond Income Return statistics as summarized in the *SBBI Yearbook*, have become more volatile in the later period. The effect is amplified in the volatility of Long-term U.S. Government Bond Total Returns as summarized in the *SBBI Yearbook*, which include the capital gains and losses associated with interest rate fluctuations. From these data, we can conclude that the relative risk of stocks versus bonds has narrowed; based on this reduced relative risk, we would conclude that the ERP is likely lower today. As a result, we question the validity of using the arithmetic average of one-year returns since 1926 as the basis for estimating today's ERP.

Evidence since 1871 clearly supports the premise that the difference between stock yields and bond yields is a function of the long-run difference in volatility between these two securities.[13] And if you examine the volatility in stock returns (as measured by rolling 10-year average standard deviation of real stock returns), you find that the volatility beginning in 1929 dramatically increased and that the volatility since the mid-1950s has returned to prior levels until the Great Recession of 2008–2010.[14] This also suggests that the arithmetic average realized risk premiums reported for the entire data series since 1926 as reported in the *SBBI Yearbook* (for 1926–2010 equal to 6.72%) likely overstate expected returns.[15]

Exhibit 4

Realized Equity Risk Premiums Over Long-Term U.S. Government Bond Returns

Nominal (i.e. without inflation removed)	1926–1955	1956–2010
Realized risk premiums:		
Arithmetic Average	10.5%	4.6%
Geometric Average	7.5%	3.1%
Standard Deviations:		
Stock Market Annual Returns	25.3%	17.4%
Long-term U.S. Government Bond Total Returns	4.7%	11.2%
Ratio of Equity Volatility to Bond Volatility	5.4	1.6

Source: Calculated (or Derived) based on CRSP® data, ©2011 Center for Research in Security Prices (CRSP®), University of Chicago Booth School of Business.

If the average expected risk premium has changed through time, then averages of realized risk premiums using the longest available data become questionable. A shorter-run horizon may give a better estimate if changes in economic conditions have created a different expected return environment than that of more remote past periods. Why not use the average realized return over the past 20-year period? A drawback of using averages over shorter periods is that they are susceptible to large errors in estimating the *true* ERP due to high volatility of annual stock returns. Also, the average of the realized premiums over the past 20 years may be biased high due to the general downward movement of interest rates since 1981 (and is subject to a large standard error).

While we can observe realized returns only in the stock market, we can observe both expected returns (yield to maturity) and realized returns in the bond market. Prior to the mid-1950s, the difference between the yield at issue and the realized returns was small since bond yields and therefore bond prices did not fluctuate very much.

Beginning in the mid-1950s until 1981, bond yields trended upward, causing bond prices to generally decrease. Realized bond returns were generally lower than returns expected when the bonds were issued (as the holder experienced a capital loss if sold before maturity). Beginning in 1981, bond yields trended downward, causing bond prices to generally increase. Realized bond returns were generally higher than returns expected when the bonds were issued (as the holder experienced a capital gain if sold before maturity). If we choose the period during which to measure realized premiums beginning from the late 1950s/early 1960s to today, we will be including a complete interest rate cycle.[16]

Even if we use long-term observations, the volatility of annual stock returns will be high. Assuming that the 85-year average gives an unbiased estimate, still a 95% confidence interval for the unobserved *true* ERP spans a range of approximately 2.4% to 11.0%.[17]

[13]Clifford S. Asness, "Stocks versus Bonds: Explaining the Equity Risk Pre-

[14]Laurence Booth, "Estimating the Equity Risk Premium and Equity Costs: New Ways of Looking at Old Data," *Journal of Applied Corporate Finance* (Spring 1999):100–112 and "The Capital Asset Pricing Model: Equity Risk Premiums and the Privately-Held Business," 1998 CICBV/ASA Joint Business Valuation Conference (September 1998): 23.

[15]The Duff & Phelps *Risk Premium Report* uses data on returns since 1963.

[16]Booth, footnote 12.

[17]Calculated as two standard errors around the average; 6.72% +/− (1.96 ×

Comparing Investor Expectations to Realized Risk Premiums

Much has recently been written comparing the realized returns as reported in sources such as the *SBBI Yearbook* and the ERP that must have been expected by investors, given the underlying economics of publicly traded companies (e.g., expected growth in earnings or expected growth in dividends) and the underlying economics of the economy (e.g., expected growth in gross domestic product [GDP]). Such studies conclude that investors could not have expected as large an ERP as the equity risk premiums actually realized.[18]

- Elroy Dimson, Paul Marsh, and Mike Staunton studied the realized equity returns and equity premiums for 17 countries (including the United States) from 1900 to the end of 2009.[19]

Dimson, Marsh, and Staunton observe larger equity returns earned in the second half of the twentieth century compared to the first half due to (1) corporate cash flows growing faster than investors anticipated (fueled by rapid technological change and unprecedented growth in productivity and efficiency), (2) transaction and monitoring costs falling over the course of the century, (3) inflation rates generally declining over the final two decades of the century and the resulting increase in real interest rates, and (4) required rates of return on equity declining due to diminished business and investment risks.

They conclude that the observed increase in the overall price-to-dividend ratio during the century is attributable to the long-term decrease in the required risk premium and that the decrease will most likely not continue into the future.

They also conclude that downward adjustments to the realized risk premiums due to the increase in price/dividend ratio and downward adjustments to the historic average dividend yield to today's dividend yield to arrive at a forward ERP are reasonable. One can estimate a range of likely forward ERP estimates by removing the increase in price-to-dividend ratio (making that sole adjustment results in the high-end of the range) and adjusting dividend yield to current levels (making both adjustments results in the low-end of the range).

Assuming that the standard deviation of annual returns on equity will approximately equal the historical standard deviation, their analysis indicates an estimate of the U.S. ERP in early 2010 of 4.0%–4.5% arithmetic average versus long-term U.S. government bonds for one-year holding period returns.[20]

- Roger Ibbotson and Peng Chen report on a study in which they estimated forward-looking long-term sustainable equity returns and expected ERPs since 1926. They first analyzed historical equity returns by decomposing returns into factors including inflation, earnings, dividends, price-to-earnings ratio, dividend-payout ratio, book values, return on equity, and GDP per capita (the fundamental building blocks of "supply side" equity returns). They forecast the ERP through supply side models built from historical data. These authors determine that the long-term ERP that could have been expected given the underlying economics was less than the realized premium.[21] In the update to this study reported in the *SBBI Yearbook*, the long-term ERP since 1926 that could have been expected given the underlying economics (the supply side model estimate) was approximately 5.2% calculated on an arithmetic average basis compared to the realized risk premium of 6.7% calculated on an arithmetic average basis.[22] The greater-than-expected realized risk premiums were caused by an unexpected increase in market multiples relative to economic fundamentals (i.e., decline in the discount rates) for the market as a whole.

William Goetzmann and Roger Ibbotson, commenting on the supply side approach of estimating expected risk premiums, note:

> These forecasts tend to give somewhat lower forecasts than historical risk premiums, primarily because part of the total returns of the stock market have come from price-earnings ratio expansion. This expansion is not predicted to continue indefinitely, and should logically be removed from the expected risk premium."[23]

[18]Studies by Robert D. Arnott and Peter L. Bernstein, "What Risk Premium is Normal?" *Financial Analysts Journal* (March/April 2002): 64–85 and Eugene F. Fama and Kenneth R. French, "The Equity Premium," *Journal of Finance* (April 2002): 637–659 are discussed in Chapter 9, *Cost of Capital: Applications and Examples* 4th ed.

[19]Elroy Dimson, Paul Marsh, and Mike Staunton, "Global Evidence on the Equity Premium," *Journal of Applied Corporate Finance* (Summer 2003): 27–38; "The Worldwide Equity Premium: A Smaller Puzzle" *EFA 2006 Zurich Meetings Paper*, April 7, 2006; *Credit Suisse Global Investment Returns Sourcebook 2010* (London: Credit Suisse/London Business School, 2010).

[20]Based on Grabowski's converting premium over total returns on bonds as reported by Dimson, Marsh, and Staunton, removing the impact of the growth in price-dividend ratios from the geometric average historical premium and converting to an approximate arithmetic average.

[21]Roger G. Ibbotson and Peng Chen, "Long-Run Stock Market Returns: Participating in the Real Economy," *Financial Analysts Journal* (January/February 2003): 88–98; Charles P. Jones and Jack W. Wilson, "Using the Supply Side Approach to Understand and Estimate Stock Returns," Working paper, June 6, 2006.

[22]*2010 Ibbotson SBBI Valuation Yearbook* (Morningstar, 2010): 66.

[23]William N. Goetzmann and Roger G. Ibbotson, "History and the Equity Risk Premium," *Handbook of the Equity Risk Premium*, Rajnish Mehra, editor (Elsevier, 2008), Chapter 12, pp 522–523.

So one can interpret that a forward estimate of the long-term ERP derived from data in the *SBBI Yearbook* should be 5.2% (supply side model on an arithmetic average basis) in early 2010 minus the .50% WWII Interest Rate bias discussed above or 4.7% for one-year holding period returns. So a reasonable range of forward ERP estimates derived from the supply side model adjusted is consistent with the Dimson, Marsh and Staunton forward estimate.

Each of these studies attempts to improve the estimate of the *true* ERP by removing the effects of changes in underlying economics that caused the realized risk premiums to differ from the ERP investors expected. The greater than expected historical realized equity returns were caused by an unexpected increase in market multiples and a decline in discount rates relative to economic fundamentals.

Such changes in economics that caused unexpectedly large realized risk premiums include an unexpected shift in relative market volatility of returns of bonds compared to stocks and an unexpected reduction in total income taxes paid by businesses and investors as a percentage of business operating earnings.

Long-term Unconditional ERP Estimate

The evidence presented in most of the studies represents a long-term average or *unconditional* estimate of the ERP. That is, what is a reasonable range of ERP that can be expected over an entire business cycle? 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 period 1926–2010 of 6.72%.

Several academic studies suggest that the ERP varies over the business cycle; it is lowest in periods of business expansion and greatest in periods of recession. The ERP appears to be positively correlated with long-term bond yields (increasing as bond yields increase) and with the default premium (increasing as the differential between Aaa- and Baa-rated bond yields increases).[24]

We use the term *conditional ERP* to mean the ERP that reflects current market conditions. For example, when the economy is near or in recession (as reflected in recent relatively low returns on stocks), the *conditional* ERP is at the higher end of the range (e.g., at December 31, 2008). When the economy improves (with expectations of improvements reflected in recent increasing stock returns), the *conditional* ERP moves toward the midpoint of the range. When the economy is near its peak (and reflected in recent relatively high stock returns), the *conditional* ERP is more likely at the lower end of the range.

Forward-looking (*ex ante*) approaches can be used to estimate the conditional ERP as of the date the estimate was made.[25] Forward-looking approaches can be categorized into three groups based on the approach taken:

1. *Bottom-up implied ERP estimates.* This category of approach uses expected growth in earnings or dividends to estimate a bottom-up rate of return for a number of companies. An expected rate of return for an individual company can be implied by solving for the present value discount rate that equates the current market price of a stock with the present value of expected future dividends, for example. A bottom-up implied ERP begins with the averaging of the implied rates of return (weighted by market value) for a large number of individual companies and then subtracting the government bond rate. The bottom-up approach attempts to directly measure investor's expectations concerning the overall market by using forecasts of the rate of return on publicly traded companies.
2. *Top-down implied ERP estimates.* This category of approach examines the relationships across publicly traded companies over time between real stock returns, price/earnings ratios, earnings growth, and dividend yields. An estimate of the real rate of equity return is developed from current economic observations applied to the historical relationships. Subtracting the current rate of interest provides an estimate of the *expected* ERP implied by the historical relationships.
3. *Surveys.* This approach relies on opinions of investors and financial professionals through surveys of their views on the prospects of the overall market and the return expected in excess of a risk-free benchmark.

In comparing implied ERP estimates to realized risk premiums, one should compare the implied estimates to the geometric average of realized risk premiums, remembering that the implied estimates are forward looking and the realized risk premiums are historical.[26] Therefore, when presenting implied ERP estimates, we convert

[24]For example, see Fabio Fornari, "The Size of the Equity Premium," Working paper, January 2002.

[25]Forward-looking approaches can be used to estimate the range of the long-term average ERP also by looking at the results of the forward-looking approaches over a long period of time, such as, over the entire span of a business cycle. The results of such an analyses are discussed in detail in Chapter 9 of *Cost of Capital: Applications and Examples* 4th ed.

[26]The authors confirmed this interpretation with both Roger Ibbotson and Aswath Damodaran.

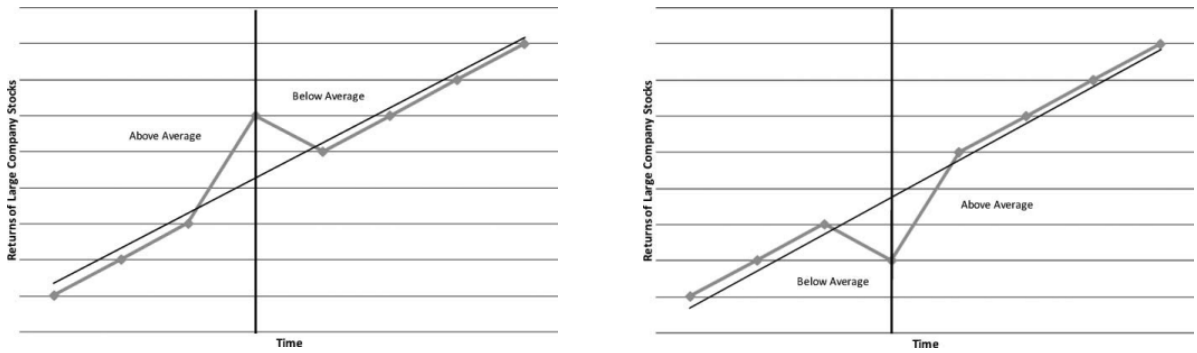


Exhibit 5
Relationship of Conditional ERP to Long-Term ERP
Scenario A: Conditional ERP Estimate at Peak of Stock Market Cycle
Scenario B: Conditional ERP Estimate at Trough of Stock Market Cycle

the implied ERP estimate to an equivalent arithmetic average.[27]

Conditional Estimate of Erp and the Great Recession of 2008-2010

Beginning in September 2008 the stock market and the economy started to tumble into crisis.

If one views pricing of the stock market over the long-term, one can see in Exhibit 5 the long-term versus the short-term relationships. In scenario A we see the long-term trend in the returns in large company stocks. This trend parallels the long-term ERP estimate over time. We all know that the stock market goes through cycles. Stocks get bid up at times faster than the long-term average. In scenario A we see a depiction of one of those upward cycles when the returns increase faster than the long-term average ("above average"). Assume we are estimating the conditional ERP at the valuation date (indicated by the vertical line). The conditional ERP will be lower than the average for some time in order for the average over the long-run to return to the average (that is, because it was above the average for a period, it will be below average to get back to the average). These above average returns occurred during the "tech boom"; assume our valuation date were at the peak of the tech boom, the conditional ERP at that point would be less than the average.

Similarly in scenario B we see a decline from the long-term average (e.g., last half of 2008). Assume we are estimating the conditional ERP at the valuation data (indicated by the vertical line). The conditional ERP will be greater than the average for some time in order for the average over the long-run to return to the average (that is, because it was below the average for a period, i.e., losses during 2008, it will be above average to get back to the average).

As the stock market declined and the risk to the economy increased, implied ERP estimates increased while realized risk premiums decreased. If one were estimating cost of equity capital using a method just like "normal times" (e.g., using realized risk premiums), the estimate would be flawed.

The Great Recession of 2008–2010 has proven to be anything but ordinary times. The "standard" practice of many practitioners has been to simply add the "spot" yield on 20-year U.S. government bonds to the arithmetic average of realized risk premiums as reported by Morningstar once each year at the prior year-end in the *SBBI Yearbook* as their base cost of capital estimate. But this methodology has created numerous erroneous estimates of a base cost of equity capital all through the Great Recession of 2008–2010.

For example, as of December 2007, the yield on 20-year U.S. government bonds equaled 4.5% and the Morningstar realized risk premiums for 1926–2007 was 7.1%. But at December 2008, the yield on 20-year U.S. government bonds was 3.0% and the Morningstar realized risk premiums for 1926–2008 was 6.5%. So just at the time that the risk in the economy *increased* to maybe the highest point, the base cost of equity capital using realized risk premiums *decreased* from 11.6% (4.5% plus 7.1%) to 9.5% (3.0% plus 6.5%).

Similarly at August 31, 2010, the yield on 20-year U.S. government bonds was 3.3% and the Morningstar

[27]In making that adjustment we used the following estimated relationship: arithmetic average equivalent = geometric average risk premium estimate + (standard deviation of risk premium estimates)^2/2. We used the standard deviation of realized risk premiums for the years 1956–2010 of approximately 17% to arrive at an estimate of 1.4% to add to the geometric averages to estimate the arithmetic average equivalents.

realized risk premiums for 1926–2009 was 6.7%. So during the summer of 2010 when the Euro sovereign debt crisis was at its height, the base cost of equity capital using realized risk premiums was 10.1% (3.4% plus 6.7%), which was less than the base cost of equity capital before the beginning of the Great Recession.

Let us relate this relationship to observations of implied volatilities of the stock market and bond market, interest rates and implied ERP estimates. For our comparison we will use data on implied volatility on options for the S&P 500 and U.S. government bonds and interest rates on constant maturity 20-year U.S. government bonds (Exhibit 2).

Implied volatility is the market's best estimate of the future volatility over the term of the option. When the crisis began to unfold (September 15, 2008, Lehman Brothers filing for bankruptcy), the stock market moved down and fear enveloped the financial markets. We see that the implied volatilities increased in the S&P 500 and long-term U.S. government bond options, peaking in the October–December 2008 period. At the same time, though, the interest rates on U.S. government bills and bonds declined to levels below those justified by the real rate of interest plus expected rates of inflation. This increased volatility in the expected interest rates implies that the market questioned whether such low interest rates were sustainable. Exhibit 2 also displays the interest rates month to month.

So anyone estimating the implied ERP at the end of December 2008 had to deal with both the declining stock market (function of increased risk evidenced by the increasing volatility of the S&P 500 options) and the declining long-term U.S. government interest rates.

Bottom-up lmplied ERP Estimates

While one can use various sources as is discussed in *Cost of Capital: Applications and Examples* 4th ed., we summarize the work of Professor Damodaran in this paper. Professor Aswath Damodaran calculates implied ERP estimates for the S&P 500 and now publishes his estimates on his website. He uses a two-stage model projecting expected distributions (dividends and stock buy-backs) based on average of analyst estimates for earnings growth for individual firms comprising the S&P 500 for the first 5 years and he assumes that growth thereafter will equate to the risk-free rate. He solves for the expected return (discount rate) that equates the expected distributions to the current level of the S&P 500. He benchmarks his implied ERP estimates by subtracting the current yield on 10-year U.S. government bonds from the expected return on the S&P 500.

Professor Damodaran's implied ERP estimate, converted to an arithmetic average equivalent over 20-year U.S. government bonds, as of December 31, 2010 equaled approximately 5.30%.

Top-down ERP Estimates

Stephen Hassett has developed a model for estimating the implied ERP and the estimated S&P 500 based on the current yield on long-term U.S. government bonds and the *risk premium factor* (RPF). The RPF is the empirically derived relationship between the risk-free rate, S&P 500 earnings, real interest rates and real GDP growth to the S&P 500 over time. The RPF appears to change only infrequently.[28] The model can be used monthly or even daily to estimate the S&P 500 and the *conditional* ERP based on the current level of interest rates.

The formula is as follows:

$$\text{S\&P 500} = \text{S\&P Earnings I}\{[R_f \times (1+\text{RPF})] - [(R_f - \text{Rea Interest Rate} + \text{Long-Term GOP growth})]\}$$

where the implied ERP$=R_f \times (1+\text{RPF})$.

Hassett's implied ERP estimate, converted to an arithmetic average equivalent over 20-year U.S. government bonds, as of December 31, 2010 equaled approximately 5.50%.

ERP Surveys

John Graham and Campbell Harvey report the results from surveys of chief financial officers of U.S. corporations.[29] Their most recent survey, converted to an arithmetic average equivalent over 20-year U.S. government bonds, as of mid-December, 2010, implied an ERP of approximately 3.5%.

Matching lmplied ERP Estimates with the Risk-free Rate

The question is during periods when risk-free rates are abnormally low due to the "flight to quality": do you measure the implied ERP against the *actual* risk-free rates or against *normalized* risk-free rates? If one estimates the ERP against the actual risk-free rates, the conditional ERP will be greater simply by the fact that risk-free rates are lower than one would expect given the real rate of interest, inflation expectations and reinvestment risk. Comparing implied ERP estimates over-time and comparing implied ERP estimates to realized risk premiums

[28]Stephen D. Hassett, "The RPF Model for Calculating the Equity Market Risk Premium and Explaining the Value of the S&P 500 with Two Variables," *Journal of Applied Corporate Finance* 22, 2 (Spring 2010): 118–130.

[29]John R. Graham and Campbell R. Harvey, "Expectations of Equity Risk Premia, Volatility and Asymmetry from a Corporate Finance Perspective," National Bureau of Economic Research Working paper, July 2003; John R. Graham and Campbell R. Harvey, "The Equity Risk Premium in 2010," Working paper, August 2010; December 2010 survey data provided by Campbell Harvey.

Exhibit 6

Implied ERP Estimates Benchmarked Against Actual and Normalized 20-Year U.S. Government (Constant Maturity) Bond Yields

		Risk-Free Rate		Hassett Implied ERP		Damodaran Implied ERP	
	S&P 500	Actual	Normalized	vs. Actual Risk-Free Rate	vs. Normalized Risk-Free Rate	vs. Actual Risk-Free Rate	vs. Normalized Risk-Free Rate
Dec-08	903.25	3.03%	4.50%	7.09%	5.62%	7.05%	5.58%
Jan-09	825.88	3.94%	4.50%	6.18%	5.62%	7.20%	6.64%
Feb-09	735.09	4.01%	4.50%	6.11%	5.62%	8.09%	7.60%
Mar-09	797.87	3.55%	4.50%	6.57%	5.62%	7.57%	6.62%
Apr-09	872.81	4.10%	4.10%	5.17%	5.17%	6.78%	6.78%
May-09	919.14	4.32%	4.32%	5.72%	5.72%	6.49%	6.49%
Jun-09	919.32	4.29%	4.29%	5.90%	5.90%	6.50%	6.50%
Jul-09	987.48	4.30%	4.30%	5.86%	5.86%	6.08%	6.08%
Aug-09	1,020.62	4.15%	4.15%	5.72%	5.72%	5.95%	5.95%
Sep-09	1,057.08	4.03%	4.03%	5.59%	5.59%	5.53%	5.53%
Oct-09	1,036.19	4.20%	4.20%	5.69%	5.69%	5.58%	5.58%
Nov-09	1,095.63	4.06%	4.06%	5.33%	5.33%	5.28%	5.28%
Dec-09	1,115.10	4.58%	4.58%	6.41%	6.41%	5.03%	5.03%
Jan-10	1,073.87	4.41%	4.41%	6.03%	6.03%	5.18%	5.18%
Feb-10	1,104.49	4.41%	4.41%	5.98%	5.98%	5.04%	5.04%
Mar-10	1,169.43	4.58%	4.58%	6.38%	6.38%	4.82%	4.82%
Apr-10	1,186.69	4.37%	4.37%	6.22%	6.22%	5.26%	5.26%
May-10	1,089.41	4.07%	4.07%	5.57%	5.57%	5.43%	5.43%
Jun-10	1,030.71	3.76%	4.00%	6.36%	6.12%	5.71%	5.47%
Jul-10	1,101.60	3.77%	4.00%	6.35%	6.12%	5.35%	5.12%
Aug-10	1,049.33	3.27%	4.00%	6.85%	6.12%	5.70%	4.97%
Sep-10	1,141.20	3.41%	4.00%	6.71%	6.12%	5.83%	5.24%
Oct-10	1,183.26	3.67%	4.00%	6.44%	6.12%	5.47%	5.14%
Nov-10	1,180.55	3.80%	4.00%	6.31%	6.12%	5.49%	5.29%
Dec-10	1,257.64	4.14%	4.14%	5.48%	5.48%	5.76%	5.76%

Source: www.damodaran.com and Duff & Phelps calculations

become problematic as most prior periods did not have interest rates so dramatically influenced by the "flight to quality."

We have prepared Exhibit 6 which display implied ERP estimates estimated against the *actual* benchmark 20-year U.S. government bond yields and against *normalized* yields (adjusting the yields for December 2008 through March 2009 and June 2010 through November 2010) based on the Damodaran bottom-up implied ERP estimates and the Hassett top-down estimates (converted to an equivalent premium over 20-year U.S. government bonds) month-by-month for December 2008 through December 2010. Given that the implied ERP estimates are comparable to the geometric average of realized risk premiums, we converted the implied ERP estimates to their arithmetic average equivalent.

This author believes that using a normalized risk-free rate and benchmarking one's estimate of ERP against that normalized risk-free rate is likely easier for most practitioners to implement. Why?

First, in any period in which the risk-free rate is temporarily reduced due to the flight-to-quality, one must re-estimate the ERP. This requires a monthly re-estimate of ERP.

Second, the monthly re-estimate of ERP assumes that the implied ERP model is accurate and that inputs are updated in a timely fashion (remembering that in aggregate analysts tend to update their estimates of expected growth in earnings only with a lag).

Third, are we assuming a degree of precision in our cost of equity capital estimates that is realistic? Given that we are valuing entire businesses, do the values of the subject businesses change monthly with such precision? Are future years' cash flow estimates for the business changing monthly with such precision?

This author has adopted the convention of making a periodic update to our ERP as economic conditions and market expectations change benchmarked against a "normalized" risk-free rate on 20-year U.S. government bond. We monitor both ERP estimates and changes in risk-free rates monthly and only after we see evidence from several sources that a change in ERP estimate is warranted, do we implement a change.

For example, after much consideration, Dr. Pratt and this author recommended using an ERP of 6% benchmarked against a 4.5% "normalized" yield on U.S. 20-year government bonds as of December 31, 2008. That is we recommended using as the basic building blocks upon

which to estimate the cost of equity capital at December 31, 2008, 4.5% as the yield on U.S. 20-year government bonds and an ERP of 6%.

Similarly, after much consideration, this author recommended using an ERP of 5.5% benchmarked against a 4.0% "normalized" the yield on U.S. 20-year government bonds during the summer and early fall of 2010.

Other authors may offer alternative views to this approach, but this author believes his approach is well supported.[29]

As our focus is valuation of businesses and investments by businesses, the *conditional* ERP will generally be of less importance over time, and once the worst of the crisis is behind us we can fall back on using the long-term, *unconditional* ERP in developing discount rates. But as of the beginning of 2011, it is this author's opinion that we have not returned to a period of economic stability and the appropriate *conditional* ERP is at the higher end of the long-term range. This can be depicted by looking at the long-term relationship of the pricing of the S&P 500 in Exhibit 7.

Matching the Conditional ERP with the Historic Realized Risk Premiums in the Duff & Phelps Risk Premium Report

For those who use the Duff & Phelps *Risk Premium Report* in estimating the cost of equity capital, the conditional ERP estimate should also be considered in using the Size Study exhibits and the *Risk Study* exhibits for use in the build-up method. In deriving the average realized risk premiums reported in their exhibits, the Duff & Phelps studies use realized risk premiums since 1963.

If one's estimate of the ERP on a forward-looking basis were materially different from the average historical realized premium since 1963, it may be reasonable to assume that the other historical portfolio returns reported would differ on a forward-looking basis by approximately a similar differential. For example, at the end of 2010, the average realized premium since 1963 of the market equaled 4.3%. This is the market risk premium, RP_m, inherent in the Size Study exhibits and the *Risk Study* exhibits.

The risk premiums displayed in the Size Study exhibits for the build-up method equals RP_{m+s} (RP_m, the market risk premium, plus RP_s, a size premium). Similarly, the risk premiums displayed in the Risk Study exhibits for the build-up method equals RP_{m+s+u}, (RP_m plus RP_s plus RP_u).

Assume that one adopts this author's estimate of the ERP at the end of 2010 of 5.5%. That difference (1.2%═5.5% minus 4.3%) can be added to the average risk premium, RP_{m+s}, for the portfolio (observed or "smoothed") that matches to the size of the subject company to arrive at an adjusted "forward-looking" risk premium for the subject company (matching one's forward-looking ERP estimate). Then this forward-looking risk premium can be added to the risk-free rate as of the valuation date to estimate an appropriate cost of equity capital for the subject company. This estimate of the cost of equity capital is before consideration of any risk premium attributable to the specific company, RP_u, or to the industry.

Similarly, that difference (1.2%═5.5% minus 4.3%) can be added to the average risk premium, RP_{m+s+u}, for the portfolio (observed or "smoothed") that matches to the risk of the subject company to arrive at an adjusted "forward-looking" risk premium for the subject company (matching the forward-looking ERP estimate). Then this forward-looking risk premium can be added to the risk-free rate as of the valuation date to estimate an appropriate cost of equity capital for the subject company.

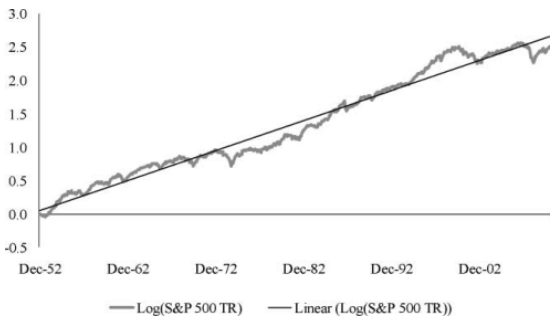


Exhibit 7
S&P 500 Index from January 1953–December 2010

Summary

The results presented in this chapter do not point to a single estimate of ERP. They point to a conclusion that the normal ERP is in a range that is consistent with the principle that investor's expectations are not homogeneous. Different investors have different cash flow expectations and future assessments of the risk that those cash flows will be realized. You can think of this in terms of the dividend discount model; numerous combinations of expected future cash flows and discount rates equate to the existing price.[30]

[29]Aswath Damodaran, "What is the Riskfree Rate? A Search for the Basic Building Block," Stern School of Business Working paper, December 2008.

[30]Pablo Fernandez, "Equity Premium: Historical, Expected, Required and Implied," Working paper, February 18, 2007: 28.

Estimating the ERP is one of the most important issues when you estimate the cost of capital of a subject business or project. You need to consider a variety of alternative sources, including examining realized returns over various periods and employing forward-looking estimates such as those implied from projections of future prices, dividends, and earnings.

What is a reasonable estimate of the *unconditional* or long-range ERP? While giving consideration to long-run historical arithmetic average of realized risk premiums, this author concludes that the post-1925 historical arithmetic average of one-year realized risk premiums as reported in the *SBBI Yearbook* results in an expected normal ERP estimate is too high. Dr Pratt and this author also believe that the common practice of mechanically estimating the cost of equity capital based on the reported realized risk premiums should be abandoned. For example, the decline in the ERP estimate from December 2007 to December 2008 if one mechanically applies this data, results in nonsensical estimate of the cost of equity capital as of December 31, 2008.

Some practitioners express dismay over the necessity of considering a forward ERP since that would require changing their current "cookbook" practice of relying exclusively on the post-1925 historical arithmetic average of one-year realized premiums reported in the *SBBI Yearbook* as their estimate of the ERP. Remember that valuation is a forward-looking concept, not an exercise in mechanical application of formulas. Correct valuation requires applying value drivers reflected in today's market pricing. One needs to mimic the market. The entire valuation process is based on applying reasoned judgment to the evidence derived from economic, financial, and other information and arriving at a well-reasoned opinion of value. Estimating the ERP is no different.

After considering the evidence, a reasonable long-term estimate of the *normal* or *unconditional* ERP should be in the range of 3.5% to 6%. This estimate is consistent with the *SBBI Yearbook* supply side ERP estimate (5.2% as of the beginning of 2010) minus the WWII Interest Rate bias (due to the interest rate accord from 1942 through 1951) or 4.7%.

This conclusion is consistent with the reasoning of the Delaware Chancery Court in *Global GT LP and Global GT LTD v. Golden Telecom, Inc. (Del. Court of Chancery, April 23, 2010)*.

Golden's expert selected 7.1%, the long-term "historical" ERP from Morningstar's *2008 Ibbotson SBBI Valuation Yearbook* (based on realized risk premiums over the selected time period, in this case 1926−2007).

The petitioners' expert, on the other hand, selected an ERP of 6.0% ". . . based on his teaching experience, the relevant academic and empirical literature, and the 'supply side' ERP reported in the *2007 Ibbotson Yearbook*."

In regards to the selection of ERP, the Court rejected the use of the Morningstar/Ibbotson ERP of 7.1% and instead chose the lower estimate of 6% citing the ". . . wealth of recent academic and professional writings that supports a lower ERP estimate. . ." that were put forth in the hearing. The Court went on to say that the ". . . relevant professional community has mined additional data and pondered the reliability of past practice and come, by a healthy weight of reasoned opinion, to believe that a different practice should become the norm. . ."

The Court continued:

> ". . . to cling to the Ibbotson Historic ERP blindly gives undue weight to Ibbotson's use of a single data set. 1926 might have been a special year because, for example, that was the year when Marilyn Monroe was born, but it has no magic as a starting point for estimating long-term equity returns. . . .
>
> If one is going to use an approach that simply involves taking into account historical equity returns, then one has to consider that very well-respected scholars have made estimates in peer-reviewed studies of long-term equity returns for periods much longer than Ibbotson, and have come to an estimate of the ERP that is closer to the supply side rate Ibbotson himself now publishes as a reliable ERP for use in a DCF valuation. . .
>
> In arguing that continued use of the simple Historic ERP is unjustifiable, (the petitioners' expert) has substantial support in the professional and academic valuation literature. Shannon Pratt, for example, has urged his readers who still use an ERP of 7% to 'immediately make a downward adjustment to reflect recent research results,' and has written that the 'ERP as of the beginning of 2007 should be in the range of 3.5% to 6%'"

The Delaware Chancery Court handles more valuation matters than any other court. Its decisions have been cited by other courts and this author would expect that other courts will likely consider this decision in their future decisions.

But as of December 31, 2010, this author concludes that given the risks in the economy as we begin 2011, that the *conditional* ERP should be at the upper-end of the long-term range relative to long-term U.S. government bond yields. Therefore, benchmarked against the actual 4.14% yield on 20-year government bonds as of December 31, 2010 (which we will assume is approximately equal to a *normalized*, long-term U.S. government bond yield), the ERP of 5.5% appears reasonable.

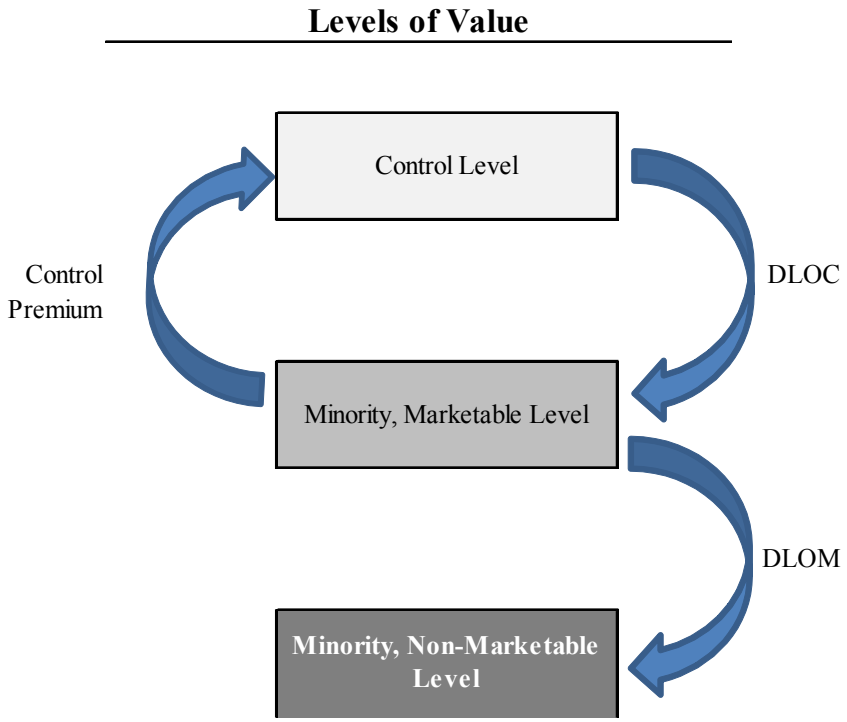
The author thanks Jim Harrington and Renee Frantz of Duff & Phelps LLC for their assistance in preparing this paper.

CHAPTER 10 – VALUATION DISCOUNTS, CORRELATION, AND CONCLUSION OF VALUE

I. Review of Levels of Value

A. IIBV 101 covered the topic of levels of value and related adjustments to value. This chapter provides a brief review of the levels of value and how valuation adjustments apply to the income approach.

B. Levels of value chart



DLOC = Discount for Lack of Control
DLOM = Discount for Lack of Marketability

C. The issue of valuation adjustments (control premiums, DLOCs, DLOMs) is more relevant in U.S. practice than elsewhere in the world.

1. The valuation profession outside the U.S. is largely focused on valuation for financial reporting and mergers/acquisitions. These assignments mostly require control valuations.

2. Although financial reporting and M&A assignments constitute a major portion of the valuation profession in the U.S., there is also a high demand for the valuation of fractional interests from the following market niches:

   a. Estate Tax Law

      (1) The U.S. government taxes estates between generations at an approximate rate of 50% above certain thresholds. (the U.S. is in a transitional phase in its tax laws as of 2011 and no one knows how inheritances will be taxed in the future).

         (a) Investments in closely-held companies comprise a significant portion of many wealthy estates. Part of the tax planning for these estates involves gifting non-control interests in companies to heirs over a long period of time. Each individual gift is valued on a non-control basis as per the definition of Fair value.

   b. Equitable Distribution

      (1) Interests in closely-held companies are subject to equitable distribution in divorce in all 50 states in the U.S.

   c. Shareholder Disputes

      (1) Many State laws protect non-controlling investors from being squeezed out of their firms by controlling shareholders.

   d. These market niches in the U.S. all potentially involve litigation. Consequently, valuation experts are hired on both the plaintiff and defendant sides to opine on the closely-held values. It is often the case that the experts agree on a control value but have vast differences of opinion regarding the value of a non-controlling interest.

3. The questions addressed in this chapter involve the following:

   a. If the assignment is to value a control level investment in the subject company, what value is yielded by the type of income approach completed?

      (1) If the valuation method yields a non-control value, what adjustment is needed to arrive at a control value?

b. If the assignment is to value a non-control interest in a closely-held company, what factors contribute to a DLOM and how can the discount be supported?

4. At the current time, the issue of fractional interests is far more evolved in the U.S. (out of necessity) than elsewhere in the world. Therefore much of the research on this issue is specific to the U.S. market and does not automatically transfer to other markets.

II. Level of Value from the Income Approach

A. The level of value that results from an income approach methodology depends on the assumptions used by the analyst during the analysis.

1. If the income stream used is control income stream, then the approach yields a control level value.

a. A control income stream is one in which adjustments or addbacks are made which reflect a controlling investor's cash flow. The assumption here is that a non-controlling investor would not be able to benefit from the income stream.

(1) Excess officer compensation

(2) Above fair market rent on properties owned by the controlling shareholder

(3) Other perquisites

2. If the income stream used is a non-control income stream, then the approach yields a non-control, marketable level value.

a. If there is a full pro rata distribution of annual cash flow (i.e. the controlling investor does not aggrandize cash flows to himself to the exclusion of the non-controlling investor), then a discount for lack of marketability may still be warranted.

b. The opposite is also true. If the controlling shareholder keeps 100% of the cash flow, the non-controlling shares may still not be worth zero.

B. If the income approach is derived from rates of return from the public market, and the public market is constituted by non-control trading in publicly-held stock, then how can the income approach result in a control level value?

1. At one time, the income approach methods were assumed to yield a non-control level value, regardless of the adjustments made to the income stream. This widespread assumption changed in the mid-1990s based on the following observations:

    a. If the income stream has been adjusted to reflect the benefits of control, it is unreasonable to expect that applying a market-derived discount rate will yield a non-control value.

    b. Management of publicly-traded companies have different motivation from managers of closely-held companies.

        (1) CEOs of public companies are charged with maximizing the value of the company's shares.

        (2) Closely-held company owners are usually focused on maximizing their own after-tax cash flow.

    c. Public company CEOs and management are subject to external constraints that keep them from aggrandizing personal cash flows to the exclusion of all other shareholders.

        (1) The public company Board of Directors would likely fire management. Private company management does not answer to a Board of Directors.

        (2) Banking, accounting and governmental institutions can often direct, or at least influence, the conduct of management in a public company. Private company management is only subject to legal and tax constraints.

C. Non-control, marketable or Non-control, non-marketable?

1. The income approach yields a non-control, marketable level value.

    a. The rate of return in the income approach is derived from the public market, where securities have immediate liquidity.

    b. The present value of the projected cash flows are therefore assumed to have liquidity. If the closely-held subject company cannot be liquidated in the same manner as a public company, then a DLOM should be considered.

III. Discount for Lack of Control

A. It is accepted practice that a non-controlling interest in a closely-held firm is worth less than a control interest. Best practice however is still dealing with two questions:

1. What criteria do we use to assess the size of the discount?

2. How is the discount quantified? (i.e. what empirical evidence exists to quantify the discount)

B. To assess the severity of the non-controlling investor's position we consider the benefits of control and the extent to which a controlling investor uses those benefits to divert cash flows to himself and away from the non-controlling investor.

1. Typical powers of control include:

   a. The ability to unilaterally control financial and operating policies, or the ability to appoint persons to the Board which controls policies.

   b. The power to declare dividends

   c. The power to set salaries

   d. The ability to sell the business

   e. The ability to liquidate assets within the business

   f. The ability to hire and fire personnel

   g. The ability to contract with related parties, including external entities owner or controlled by the controlling shareholder

   h. The power to repurchase outstanding stock or issue new shares

   i. The power to make acquisitions or divest product lines

   j. The ability to sell a controlling interest in the company without participation by the non-controlling shareholders

2. The control powers should be assessed for each subject company in the context of a control investor's ability to divert cash flow from the non-controlling owner to the control owner.

    a. The discount for lack of control therefore should be thought of in terms of cash flow.

        (1) If a company is worth £100 on a control basis and an analyst opines that the same company is worth £65 on a non-control basis (after a 35% discount for lack of control), what support is there to document the lower level of cash flow the results in a £65 present value?

C. For any investment that is less than 100%, there may be degrees of control, which are determined by:

1. Applicable laws in the local country

2. Articles of incorporation

3. Shareholder and Operating Agreements

4. The distribution of the remaining ownership interests

    a. If the subject interest is 10%, is there one other controlling shareholder who owns 90% or are there nine other 10% investors?

    b. Operating control may exist for interests of less than 50% if there is no controlling shareholder.

5. Swing blocks

    a. Small non-control interests may have a substantial degree of control if they can combine with another owner to reach the threshold of control set by local laws.

        (1) For example if there are two 49% shareholders, the third 2% interest represents a swing block.

        (2) Similarly, if there are three 33.3% interests, all three holdings represent swing blocks.

6. There is virtually no empirical evidence available to quantify degrees of control. Hence this issue must be addressed with experience and judgment.

D. Empirical Evidence for the DLOC

1. There is no direct evidence to support the DLOC. Traditionally, the discounts have been derived from the inverse of control premiums paid in the market.

2. Control premiums can be observed from studies of premiums paid in the public market. In the U.S., such studies include:

   a. Factset Mergerstat Review (available from www.bvresources.com)

      (1) This source tracks the M&A market monthly and provides updates on premiums paid and valuation multiples

   b. Factset Mergerstat/BVR Control Premium Study (www.bvresources.com)

      (1) Data includes control premiums, implied non-control discounts, and valuation multiples for over 7,500 transactions in the U.S. public market. Searchable by deal type: merger/acquisition; control takeover; private equity; management buyout; leveraged buyout. The majority of deals are merger and acquisition.

3. The formula for deriving a DLOC from a control premium is:

   DLOC = 1 – [1/(1 + control premium)]

   Or

   DLOC = Control premium/(1 + control premium)

4. Theoretical flaws with using transaction premiums as empirical evidence:

   a. Public market premiums usually include factors that go beyond Fair value.

      (1) Synergistic value, or the additional cash flows earned by combining the acquirer and the target's operations, often drives tender offers in the markets.

      (2) Bidding wars between multiple acquirers sometimes drives prices above even synergistic value.

(3) A material number of acquisitions made turn out to have been ill-advised (as evidenced by the number of failed mergers) and are completed because of the egos of the parties involved or because of poor analysis.

b. The factors that define control in a closely-held business (i.e. the factors listed in III.B.1 above), are typically not what is being paid for when a public company makes an acquisition in the market.

(1) Most of the control powers listed are actually completed by operations managers in a public company.

(2) Other powers, such as selling the business are usually put out to a shareholder vote.

(3) Public non-controlling shares have a high degree of liquidity, which may compensate for lack of unilateral controls.

(a) Some non-control investors in closely-held companies could conceivably wait decades to liquidate their investment.

(4) Public companies, unlike their closely-held counterparts, employ management that is incentivized to maximize shareholder value.

(a) Closely-held controlling shareholders are incentivized to maximize personal cash flows.

(5) Public company shareholders enjoy institutional and legal protections not shared by non-controlling investors in closely-held companies.

c. The Arbitrage Argument

(1) Put forth by Eric Nath[13] this reasoning is straightforward.

[13] Eric Nath, "How Public Guideline Companies Represent Control Value for a Private Company," *Business Valuation Review*, December 1997.

(a) If public companies always trade at a discount to their "control" value, then why is it that only a small fraction of companies are taken over in a given year?

(b) Value cannot exist in a void. For value to exist there has to be a market willing to pay. The fact that so little takeover activity goes on (i.e. the number of takeovers in a given year relative to the number of public companies), one can argue that the value is not there.

d. Unfortunately, there is no empirical evidence in the markets that measures how investors price the powers of control in closely-held businesses.

IV. Discount for Lack of Marketability

A. The income approach yields either a control level value or a non-control-marketable value depending on the analysis. If the assignment is to place the company on a non-control, non-marketable level, then a discount for lack of marketability (DLOM) is needed.

1. IIBV 101 covered the concepts behind the DLOM

a. Studies show that investors value liquidity. The faster a stock can be converted to cash, the higher its perceived value.

b. A non-control interest in a closely-held company suffers from illiquidity in addition to a lack of control. Hence a DLOM is necessary if the preliminary analysis yields a value on a marketable level.

c. Some practitioners believe even a control position in a closely-held company may require a DLOM.

(1) This is refuted by the fact that a control shareholder controls the cash flows during a period of illiquidity.

B. Empirical Evidence

1. Studies of Initial Public Offerings

a. Several U.S. studies look at initial public offerings. Companies that apply to go public are obligated to report transactions in their stock for the three years leading up to the public offering.

(1) These transactions of the stock as a closely-held business are then compared to the IPO price, and, depending on the study, prices of the public company in the ensuing months.

(a) E.G. Transaction as private company, 2008 = $10.00/share

IPO Price = $14.00/share

Implied DLOM = 28.6% (i.e. 1.0 – 10/14)

(2) Differences between the earlier closely-held prices and the subsequent public price are taken as an indication of the DLOM.

(3) Collectively pre-IPO studies tend to show average discounts in the range of 40-45%.

b. Sources for IPO Studies

(1) Willamette Management Associates

(a) Study transactions back three years prior to an IPO

(b) Eliminate insider and option transactions

(c) Smooth effects of earnings changes between early and later transactions.

(d) Smooth effect of changes in industry IPO between early and later transactions.

(e) Willamette publishes the study results but not the underlying data.

(2) Valuation Advisors Studies

(a) Included in the study are 6,800 transactions between 1985 and the present.

(b) Searchable by industry classification, date of IPO, revenue level, asset level, income level, and type of stock.

(c) Valuation Advisors does not remove insider transactions or make adjustments to the prices.

(d) Available through www.bvresources.com

c. Critique of IPO Studies

(1) IPO studies have been criticized as having a survivor bias. That is, only the most successful companies go public. Since the companies that drop out of the IPO process are not studied, the DLOM amounts are overestimated.

(a) For example, for every company that went from $10/share to a public price of $14/share, there are many whose stock prices remain unchanged or increased a lesser amount.

(2) This argument is refuted on two bases:

(a) Most of the pre-IPO transactions were made knowing the company was an IPO candidate. This factor likely also drives up the pre-IPO price relative to other closely-held companies.

(b) Closely-held companies that are IPO candidates tend to be larger, more profitable, and more diverse than the typical closely-held company. Hence, the implied discount may understate the difference between a liquid and illiquid price in the private market.

2. Studies of Restricted Stock

a. The U.S. market has restricted stock, or Rule 144 stock[14], which is stock in a public company that cannot be sold for a certain period of time unless under a narrow set of circumstances.

[14] Called Rule 144 from the U.S. Security and Exchange Commission Rule 144 which outlines the terms under which restricted stock can be sold in the market.

(1) Even after the restriction is expired, the stock is subject to "dribble out" provisions meaning that shares of the restricted block of stock can be sold piecemeal over a period of time.

(2) Studies have been done which compare the sales of restricted stock under Rule 144 to the publicly traded stock of the same company.

b. The SEC has shortened the restriction period on restricted stock from 2 years to 6 months over the past ten years. Consequently, the studies done over time show a decline in the discounts between the public and restricted shares.

c. The limitation of the restricted stock evidence is that restricted shares in a public owned company which will gain liquidity in a relatively short period of time will likely understate illiquidity compared to closely-held shares could take years to sell.

d. FMV Opinions Restricted Stock Study

(1) This study goes beyond the simple analysis of restricted stock trades.

(2) Includes 590 transactions going back over twenty years

(3) The DLOM is determined through a three step process:

(a) Determine the restricted stock equivalent discount.

- The database can be searched using most relevant criteria such as operating profit margin, return on invested capital, and growth.
- From the subset of data points that are most relevant to the subject company, a restricted stock equivalent discount is determined.
- This discount is equivalent to the discounts implied in earlier studies.

(b) Determine the private equity discount

- Closely-held stock is correlated with large blocks of restricted stock (which take longer to "dribble out" than smaller blocks). The market discounts of large blocks of restricted stock are compared to the market discounts of small blocks. The Study data reflects that large blocks of restricted stock are worth less than smaller blocks.

As a result, the restricted stock discount is increased in a range of .80x to 1.20x the initially reported restricted stock discount.

(c) Consider the market volatility at the transaction dates in the study relevant to market volatility as of the valuation date.

- By comparing the VIX indices on various dates, an additional increase to the discount may be warranted. For example, the VIX index was higher in late 2008 than most transaction dates for Rule 144 stock. This may warrant another increase in the discount.

C. Put Options

1. A put option is a contract in which the investor buys the right to sell a stock at a predetermined price. The investor is betting that the market price of the stock will decline. If it does, then he can exercise the option: buy the stock at the lower price and sell it at the predetermined or exercise price.

   a. Put options have been equated to the DLOM since, in effect, when the investor purchases the option he is buying insurance against a decline in the stock's price. This is equivalent to a non-controlling investor who fears a loss in value of a stock while he is trying to liquidate.

   b. The cost of the option is divided by the stock price to yield the equivalent DLOM. The price of the option is seen as the equivalent of an investor putting a price on illiquidity.

      (1) The factors that would increase a DLOM are also the two factors that increase the value of an option:

         (a) Time period

            - The longer the time period to a liquidity event, the less attractive the investment and the greater the DLOM. The time to expiration is also a key factor which increases the option value.

         (b) Volatility

            - Higher volatility of earnings increases risk, makes a stock less attractive, and increases the DLOM. The higher the volatility variable in the Black Scholes Model, the higher the value of the option.

2. LEAPs

   a. Long term equity anticipation securities are options of public companies that are sold on the market. Research has been conducted over the years by Robert Trout[15] and Ronald Seaman[16] on the LEAPs sold in the market.

      (1) Their research suggests that the DLOM in the closely-held market at a minimum should range from 20% to 25% and go up from there.

3. Quantitative Marketability Discount Model (QMDM)

   a. Use a discounted cash flow method to calculate a non-marketable non-control value. The DCF model is based on non-controlling interest cash flows. The percentage difference between the non-control DCF and control value constitutes the DLOM.

   b. In contrast to the empirical studies and option models above, the QMDM is an internal methodology based on company factors used to develop the DLOM.

      (1) Hence it can provide more persuasive evidence since it does not rely on the user accepting a correlation between the subject company and restricted stock or pre-IPO companies.

   c. Six assumptions must be made which represent the inputs to the model:

      (1) Probable future economic benefits

      (2) Expected growth rate in the value of the company

      (3) Expected dividend or distributions to the shareholder

      (4) Expected growth in dividends or distributions to the shareholder

      (5) Required holding period return to the shareholder

      (6) Expected holding period for the subject interest

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[15] Robert R. Trout, *"Minimum Marketability Discounts*", BVR, September 2003
[16] Ronald Seaman, "*A Minimum Marketability Discount*", BVR, Winter, 2005

d. The model assumes that the analyst has already derived a non-control, marketable level value (something equivalent to the public non-control investor status)

e. The six factors above outline the key inputs a DCF model. Since each input is from a non-controlling investor's perspective, the model forces the analyst to review the internal factors that an outside investor would consider before buying a non-control interest.

(1) For example, the holding period represents the anticipated number of years that the controlling shareholder would hold on to the company before sale. Factors to consider include age of the controlling shareholder, financial condition that could force a sale, etc.

(a) A non-controlling investor is interested in the possibility of a company liquidity event in which he could decide to cash in his investment if desired.

- The prospect of a control shareholder who is 40 years old with no plans to leave the company is quite different from a 75 year old control shareholder who wants to retire.

f. The QMDM has been accused of being a "black box" meaning that the six variables above are entered and a DLOM is provided. The user does not have access to the calculations.

(1) In reality, if the analysis of the six factors above has been completed, then the analyst does not need the QMDM model. A separate DCF model can be built which will reflect the non-control level value.

(2) The DCF model below presents a typical example. The analyst developed a control value for the company of €12.3 million using a control level cash flow in the income approach.

(a) To develop a combined DLOC and DLOM, a second DCF is developed which captures the non-control investors' variables.

- It was determined that the most likely holding period for the control shareholder would be seven years, at which time the company would be sold.

- The non-controlling investor's rate of return is judged to be higher, at 20.0%.

- The case below involves an extreme case in which the control shareholder diverts all available cash flow to himself through excess compensation and similar methods. Hence, the non-controlling investor's only hope for any cash flow is through a sale of the company.

Minority Investor
Discounted Cash Flow Analysis

Assumptions	
Minority rate of return	20.0%
Growth rate	5.0%
Control value	€ 12,300,000
Minority , non-marketable value	€ 3,223,393
Combined DLOC and DLOM	73.8%

	2011	2012	2013	2014	2015	2016	2017	Transaction
Free Cash Flow	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 11,550,000
Cost of equity	*20.0%*	*20.0%*	*20.0%*	*20.0%*	*20.0%*	*20.0%*	*20.0%*	*20.0%*
Cash Flow in Period								
Period to Discount	0.50	1.50	2.50	3.50	4.50	5.50	6.50	7.0
PV of Free Cash Flow	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 0	€ 3,223,393

- The control value was determined to be €12.3 million and the non-control value €3.2 million, implying a combined discount of 73.8%.

- Notwithstanding the empirical studies, this underscores how quickly a non-control interest value can decline relative to a control interest, especially when a non-controlling investor is deprived of annual pro rata cash flows.

V. Correlation and Conclusion of Value

A. Assuming that more than one valuation methodology was used in the valuation process, the analyst must conclude on a final value from the indications in each approach.

B. The following steps are necessary before opining on a final value:

1. Reread the engagement letter to be sure which level of value is requested.

2. Determine which level of value resulted from each of the valuation methodologies chosen in the analysis.

   a. If the preliminary indications of value from each approach are expressed on different levels, then apply premiums or discounts to express each value on the same level.

3. Once the methodologies used are expressed on the same level, select a preliminary indication of value.

    a. Support for the final conclusion should be made clear, especially if there are disparate indications of value from each approach.

4. If the single preliminary indication is not expressed at the same level as requested in the engagement letter, apply discounts or premiums as necessary.

C. Some considerations for review of each valuation approach are discussed below.

1. Cost Approach

    a. As was discussed in IIBV 101, the cost approach is not relevant if the company has intangible value (assuming the cost approach was completed by restating the tangible assets and debt to fair value).

        (1) If the cost approach is close to, or above, the values expressed in the income and market approaches, then the analyst must make a determination as to whether the company is a going concern.

        (2) If the company is not a going concern, then it must be determined whether a forced or orderly liquidation value is necessary.

2. Market and Income Approaches

    a. There should not be a material difference between the values expressed in the market and income approaches since theoretically one approach is the inverse of the other.

        (1) The income approach is based on rates of return from the market, adjusted to reflect the risk of the subject company.

        (2) The market approach is based on multiples from the market, adjusted to reflect the risk of the subject company. The rates of return are the inverse of the market multiples.

    b. If there is a material difference, then it is likely that one, or both, of the analyses contain errors. Each approach should be reviewed as follows:

        (1) Market Approach

(a) How many guideline companies were used? Does the number of guideline companies provide a robust data base?

- If there were only three or four guideline companies, there is the possibility that each of them could be outliers.

(b) Are the guideline companies truly similar?

- Revisit the criteria used to select GPCs.
- Are the public GPCs so much larger than the subject company that comparison is unrealistic?

(c) Review the data and analysis

- Revisit the public filings for each GPC to make sure data was entered correctly. Were GPC adjustments missed?
- Did the comparative analysis between the GPCs and the subject company identify a realistic subset of public companies whose multiples are more applicable to the subject?
- Were appropriate multiples used? If invested capital multiples, was the correct amount of debt deducted?

(d) Review dispersion statistic in the multiples used. If there is a high degree of dispersion, are the GPCs really similar to each other?

(e) Compare growth rates. One of the more common oversights between the income approach and market approach is an inconsistency between the projected growth in the income approach DCF model and the market implied growth in the multiples.

- Growth rates for the GPCs can be derived as follows:

1	NOPAT Mult = $\frac{\text{MVIC}}{\text{Net Operating Profit After Tax}}$
2	Invert the NOPAT multiple (this is the cap rate)
3	Growth = WACC - Inverted multiple

- Example:

MVIC =	£275,000
NOPAT =	30,000
NoPat Mult.=	9.17
Cap Rate =	10.9%
WACC =	15.0%
Growth =	4.1%

- The market's implied growth can be derived from the variables that were assessed during the market approach analysis. In the example above, we assume an MVIC of £275,000, net operating profit after tax of £30,000. The MVIC/NoPat multiple therefore is 9.17x, and the capitalisation rate is 10.9%.

- Since the capitalisation rate (WACC) = (K – G), then it follows that:

- G = WACC – Cap Rate

- In this case, the implied market growth is 4.1%. This computation should be done for all GPCs. Is there dispersion in the implied growth rates? How do the growth rates compare to what was used in the DCF?

(2) Income Approach

(a) Review the projections.

- How does the growth rate compare to the GPCs?

- Compare the cost structure and profit margins to the guideline companies. If there is a difference, has this been taken into consideration in the multiple adjustment?

(b) Compare the WACC or cost of equity (plus growth) to the market multiples

- If there is a significant difference between the capitalisation rate used in the market approach and the inverted multiples from the market approach, then risk has probably not been assessed properly in one or both models.

D. Non-control Interest Sanity Check

1. If the assignment is to value a subject company on a non-control, non-marketable level, some analysts perform the valuation on a control level and then take a DLOC and DLOM based on external empirical studies.

   a. While this is not an unreasonable practice, it could result in a value that is unrealistic since factors that are outside the company and its industry were used.

2. A sanity check is recommended in which the control cash flows are matched to the adjusted non-control, non-marketable value to yield an internal rate of return.

   a. This rate of return expresses the discount rate or risk factor of the non-controlling investor relative to the control value of the entity. See the example below.

LMN, Plc
Discounted Cash Flow Analysis - Original

Assumptions		
Minority rate of return		14.0%
Long term growth		5.0%
Control value		€ 13,200,732
DLOC @	15.0%	(1,980,110)
Minority, marketable value		11,220,622
DLOM @	35.0%	(3,927,218)
Minority, non-marketable value		€ 7,293,404

	2011	2012	2013	2014	2015	2016	2017	Residual
Free Cash Flow	€ 890,000	€ 1,023,500	€ 1,146,320	€ 1,260,952	€ 1,374,438	€ 1,470,648	€ 1,558,887	€ 18,187,018
Cost of equity	*14.0%*	*14.0%*	*14.0%*	*14.0%*	*14.0%*	*14.0%*	*14.0%*	*14.0%*
Cash Flowin Period								
Period to Discount	0.50	1.50	2.50	3.50	4.50	5.50	6.50	6.5
NPV Factor	0.9366	0.8216	0.7207	0.6322	0.5545	0.4864	0.4267	
PV of Free Cash Flow	€ 833,561	€ 840,873	€ 826,121	€ 797,134	€ 762,172	€ 715,372	€ 665,171	€ 7,760,326

   b. In the example above, the control level value was discounted by 15.0% to recognize the DLOC and then by another 35.0% to recognize the DLOM, resulting in a value of €7.29 million, which is a combined discount of 44.8%.

   c. The sanity check involves calculating the non-control IRR based on the discounted value and the undiscounted control cash flows. This is done through the goal-seek function in excel.

LMN, Plc
Discounted Cash Flow Analysis - Minority Investor IRR

Assumptions	
Minority rate of return	21.3%
Long term growth	5.0%
Control value	€ 7,295,000

	2011	2012	2013	2014	2015	2016	2017	Residual
Free Cash Flow	€ 890,000	€ 1,023,500	€ 1,146,320	€ 1,260,952	€ 1,374,438	€ 1,470,648	€ 1,558,887	€ 10,014,556
Cost of equity	*21.3%*	*21.3%*	*21.3%*	*21.3%*	*21.3%*	*21.3%*	*21.3%*	*21.3%*
Cash Flow in Period								
Period to Discount	0.50	1.50	2.50	3.50	4.50	5.50	6.50	6.5
NPV Factor	0.9078	0.7481	0.6165	0.5081	0.4187	0.3451	0.2844	
PV of Free Cash Flow	€ 807,941	€ 765,698	€ 706,733	€ 640,660	€ 575,485	€ 507,455	€ 443,285	€ 2,847,741

d. The analyst should be aware of the effective discount rate that is assigned to the non-control interest when the 15% DLOC and 35% DLOM are taken. In this case, the IRR is 21.3% for the non-control investor versus 14.0% for the control investor.

(1) In effect, the DLOC and DLOM, which in many cases are based on external data, represent a 7.3% premium for non-control risk. While this is not necessarily unusual or inappropriate, the analyst should be aware of it and prepared to defend it.

CHAPTER 11 – INCOME APPROACH CASE STUDY

Yorkshire Foods, Plc

Yorkshire Foods, Plc
Case Information

Company Description

Yorkshire Foods, Plc is a manufacturer and distributor of food products, including baked goods, confections, and produce. The firm has two processing plants, one outside of the City of York, England which makes breads, rolls, muffins and confections, and a plant outside of Luton, England which processes and packages both fresh and frozen vegetables. The Company sells its products primarily to grocery chains in the UK, although it hopes to expand its market to the European continent.

Since freshness is a requirement of the end customer, Yorkshire focuses on delivery of much of its product base within a 24-hour period after production. Some packaged produce and certain baked goods with longer shelf-lives can support a long delivery timeline. The Company sells its product to major food chains such as Asda, Morrison, Sainsbury, and Tesco as well independent grocery stores and local convenient stores.

Yorkshire is a private Company which is 100% owned by Mr. John Milton. Mr. Milton started the business in 1968 with his brother, Charles, whom he bought out in 1977. The Company is capitalised with 10,000 shares of common stock. Mr. Milton is 72 years old and has two adult children to whom he wants to gift shares while incurring "as little inheritance tax as possible." He ran the Company by himself until 2005 at which time he went in to semi-retirement and hired Robert Burns as Chief Executive Officer. Mr. Burns does not own stock but reportedly would like to acquire an interest depending on the results of the valuation.

You are part of the valuation team that has been assigned the task of valuing Yorkshire Foods, Plc for tax purposes. This is a Fair value assignment. The valuation date is December 31, 2011. Your assigned task is to put together the income approach valuation after participating with the team in the initial research and analysis.

Case Assignment #1 (45 minutes)

The class should divide into groups of 3-4 persons so that there is at least one laptop computer in each group. The financial statements for Yorkshire Foods, Plc are contained in the Appendix to Chapter 11, including Balance Sheets, Income Statements, Statements of Cash Flows, and Unadjusted Financial Ratios. Review these statements and complete the following.

1. Highlight any issues that you think will play a key role in the valuation.

2. Make a list of questions regarding the financial statement and operations that you want to present to Mr. Burns, Yorkshire's CEO.

Suggested questions and answers from the management interview will be handed out after discussion on Case Assignment #1.

Case Assignment #2 (20 minutes)

After reviewing the financial statements and management interview, the group may notice adjustments that should be made to Yorkshire's historical financial statements. Adjustments may be necessary to get an assessment of the Company's historical profitability and its capacity to generate cash flow in the future. If adjustments are necessary, enter the changes to the 2006 through 2011 financial statements on **Adjustments Tab** of the case excel spreadsheet (a hard copy is shown on the following page). The adjusted profits and margins will be calculated automatically and will be carried over to the financial ratio page.

Yorkshire Foods Plc
Income Statement Adjustments

	2006	2007	2008	2009	2010	2011
Reported revenue	£ 13,492,287	£ 14,480,270	£ 15,141,404	£ 18,292,647	£ 18,191,142	£ 18,648,443
Gross Profit	4,730,856	5,019,988	5,035,955	5,491,694	5,823,646	6,297,876
Total Overhead Costs	(4,043,991)	(4,359,291)	(4,326,038)	(6,849,214)	(5,184,887)	(5,326,520)
Operating profit	686,865	660,697	709,917	(1,357,520)	638,759	971,356
Reported profit before tax	596,498	660,697	709,917	(1,357,520)	638,759	971,356
Reported profit from continuing oper	395,957	660,697	709,917	(1,357,520)	638,759	971,356
Adjustments						
Adjustment #1						
Adjustment #2						
Adjustment #3						
Adjustment #4		-				
Total adjustments						

Case Assignment #3 (30 minutes)

Now that you have the answers to management's questions, have made adjustments (if needed), and have adjusted historical financial information and financial ratios, evaluate Yorkshire's historical operations based on adjusted operations and adjusted financial ratios. Make observations in the following areas:

Revenues/Growth

Profitability

Asset Management

Leverage

Case Assignment #4 (35 minutes)

Review the case information, making note of the key variables that will feed into the income approach assumptions. Time will be allotted later to enter specific metrics for each assumption, but the group should come to a general agreement on the following items:

1. Short term and long term sales growth potential
2. Levels of capital expenditures and working capital needed to support sales growth
3. Depreciation and amortisation
4. Cost of sales and overhead expenses
5. Target capital structure going forward
6. Levered and unlevered beta
7. Number of years for which you feel comfortable forecasting operations

Complete the analysis of depreciable assets on the **Depreciation tab** of the student excel file. Entries should be made in the green-shaded cells only. Assumptions are needed for:

- the average life of existing assets, property/plant/equipment and new improvements

- the capital investment that is needed in each of the next six years is required for PP&E and New Improvements

Case Assignment #5 (25 minutes)

The Assumptions tab of the Student excel file contains the inputs for each of the major parts of the Company's forecasted operations.

Given your analyses, key in the variables on the Assumptions tab of the student excel file. Note that inputs are needed in the green shaded cells only. For guidance, Yorkshire's 2011 metrics and 6-year average metrics are provided to the left.

1. After completing the inputs in the green-shaded cells, turn to the **Projections tab** and review the results of your assumptions.

    a. Are the growth rates in sales and profits sustainable?

    b. Are balance sheet assets enough to support higher sales?

    c. Is the pre-tax return on invested capital realistic?

    Review the cash flow forecast, income statement, balance sheet, and financial ratios on the Projections tab to make sure there are no unintended consequences.

Case Assignment #6 (25 minutes)

Estimate a cost of capital for Yorkshire using the information provided below.

1. Use the Damodaran Model from Chapter 7 to estimate the cost of equity for Yorkshire. Then calculate a weighted average cost of capital using a calculator and the assumptions shown below.

    a. Use the Hamada formula to calculate an appropriate levered beta.

UK 10-year Gov't Bond Yield, 12/31/11	2.10%
U.S. 20-year Treasury Yield, 12/31/11	2.57%
UK inflation rate, 12/31/11	4.20%
Average UK inflation rate, 1989-2010	2.72%
Equity Risk Premium	6.0%
Size Premium data	4.5%
UK Corporate income tax rate, 2012	26.0%
UK Corporate income tax rate, 2013	25.0%
Unlevered industry beta	1.05
Target capital structure % debt	20%
Target capital structure % equity	80%
Market interest rate on long term debt	4.5%
Yorkshire's % sales volume in Spain	10%
Spain's country risk premium	1.3%
Yorkshire's % sales volume in Ireland	15%
Ireland country risk premium	3.5%

Case Assignment #7 – Conclusion (20 minutes)

1. Calculate the perpetuity value and compete the valuation on the DCF tab.

2. The concluded value may result in an inconsistency in the WACC calculation requiring several iterations of the value calculations. As a check to your calculations in Part 1, use the WACC tab in the student excel file, entering the assumptions you have made. Note that the WACC tab allows you to perform iterations of the WACC calculation to correct the capital structure assumptions and the resultant market value of equity (as always, enter the required information into the green-shaded cells in the WACC tab).

Chapter 11 Appendix

1. Yorkshire Foods Plc Balance Sheets
2. Yorkshire Foods Plc Income Statements
3. Yorkshire Foods Plc Statement of Cash Flows
4. Yorkshire Foods Unadjusted Financial Ratios

Yorkshire Foods Plc
Historical Balance Sheets

For the fiscal year ended December 31,
(GBP)

	2006	2007	2008	2009	2010	2011	Percentage of Total Assets 2006	2007	2008	2009	2010	2011
ASSETS												
Non-current assets												
Intangible assets	£1,803,414	£1,740,362	£3,621,700	£1,803,414	£1,803,414	£1,803,414	23.0%	20.0%	32.9%	18.5%	17.4%	15.8%
							0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Gross property, plant & equipment	*6,877,744*	*7,231,316*	*8,027,960*	*8,116,708*	*7,550,431*	*7,850,592*	87.7%	83.2%	72.9%	83.3%	72.9%	68.8%
Less: accumulated depreciation	*(3,955,339)*	*(4,309,378)*	*(5,239,398)*	*(5,611,713)*	*(5,285,143)*	*(5,525,092)*	-50.4%	-49.6%	-47.6%	-57.6%	-51.1%	-48.4%
Property, plant and equipment, net	2,922,405	2,921,938	2,788,562	2,504,995	2,265,288	2,325,500	37.3%	33.6%	25.3%	25.7%	21.9%	20.4%
Total non-current assets	4,725,819	4,662,300	6,410,262	4,308,409	4,068,702	4,128,914	60.2%	53.7%	58.2%	44.2%	39.3%	36.2%
Current Assets												
Inventories	787,256	948,626	1,142,014	1,438,807	1,222,825	1,448,951	10.0%	10.9%	10.4%	14.8%	11.8%	12.7%
Trade receivables	1,756,141	2,082,269	2,119,566	2,413,842	2,773,112	2,582,516	22.4%	24.0%	19.3%	24.8%	26.8%	22.6%
Other receivables	106,629	152,403	158,289	65,954	100,298	74,740	1.4%	1.8%	1.4%	0.7%	1.0%	0.7%
Prepayments and accrued income	53,153	196,811	221,584	221,172	112,690	319,333	0.7%	2.3%	2.0%	2.3%	1.1%	2.8%
Cash at bank and in hand	415,642	647,226	955,466	1,295,615	2,075,082	2,860,685	5.3%	7.4%	8.7%	13.3%	20.0%	25.1%
Total current assets	3,118,821	4,027,335	4,596,919	5,435,390	6,284,007	7,286,225	39.8%	46.3%	41.8%	55.8%	60.7%	63.8%
Current Liabilities												
Trade and other payables												
Bank overdraft (LOC)		-	(778,433)	(1,251,355)	(1,700,294)	(1,844,117)	0.0%	0.0%	-7.1%	-12.8%	-16.4%	-16.2%
Bank term loan	(400,000)	-	(250,000)	(250,000)	(125,000)	-	-5.1%	0.0%	-2.3%	-2.6%	-1.2%	0.0%
Trade payables	(1,309,378)	(1,640,549)	(1,775,125)	(2,106,600)	(1,807,550)	(2,118,962)	-16.7%	-18.9%	-16.1%	-21.6%	-17.5%	-18.6%
Corporation tax	(112,035)	(122,429)	(271,270)	(123,014)	-	-	-1.4%	-1.4%	-2.5%	-1.3%	0.0%	0.0%
Other taxes & social security costs	(93,178)	(108,841)	(123,078)	(252,582)	(212,307)	(120,332)	-1.2%	-1.3%	-1.1%	-2.6%	-2.1%	-1.1%
Accruals & deferred income	(903,162)	(1,046,790)	(1,119,909)	(1,130,264)	(1,728,291)	(1,920,831)	-11.5%	-12.0%	-10.2%	-11.6%	-16.7%	-16.8%
Hire purchase creditors	(90,755)	(100,684)	(59,709)	-	(60,645)	(99,468)	-1.2%	-1.2%	-0.5%	0.0%	-0.6%	-0.9%
Current tax liabilities	-	-	-	-	(139,345)	(157,809)	0.0%	0.0%	0.0%	0.0%	-1.3%	-1.4%
Net Current Assets	210,313	1,008,042	219,395	321,575	510,575	1,024,706	2.7%	11.6%	2.0%	3.3%	4.9%	9.0%
Total Assets Less Current Liablities	4,936,132	5,670,342	6,629,657	4,629,984	4,579,277	5,153,620	62.9%	65.3%	60.2%	47.5%	44.2%	45.1%

Yorkshire Foods Plc
Historical Balance Sheets **(Continued)**

For the fiscal year ended December 31,
(GBP)

	2006	2007	2008	2009	2010	2011	Percentage of Total Assets 2006	2007	2008	2009	2010	2011
Non-current liabilities												
Other payables	-	-	(500,000)	(250,000)	(176,930)	(171,444)	*0.0%*	*0.0%*	*-4.5%*	*-2.6%*	*-1.7%*	*-1.5%*
Financial liabilities - borrowings long-term	(160,398)	(59,714)	-	-	-	-	*-2.0%*	*-0.7%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Accruals & deferred income	(204,182)	(175,476)	(147,504)	(130,124)	(113,212)	(96,672)	*-2.6%*	*-2.0%*	*-1.3%*	*-1.3%*	*-1.1%*	*-0.8%*
Provision for liabilities												
Deferred tax	(411,893)	(414,189)	(347,138)	(296,247)	(266,256)	(239,424)	*-5.3%*	*-4.8%*	*-3.2%*	*-3.0%*	*-2.6%*	*-2.1%*
Net Assets	4,159,659	5,020,963	5,635,015	3,953,613	4,022,879	4,646,080	*53.0%*	*57.8%*	*51.2%*	*40.6%*	*38.9%*	*40.7%*
Stockholders' Equity												
Called up share capital	2,031,751	2,309,751	2,394,751	2,404,751	2,339,750	2,414,751	*25.9%*	*26.6%*	*21.8%*	*24.7%*	*22.6%*	*21.2%*
Employee Share Ownership Trust	(222,467)	(204,227)	(182,947)	(182,947)	(181,047)	(200,787)	*-2.8%*	*-2.4%*	*-1.7%*	*-1.9%*	*-1.7%*	*-1.8%*
Share premium account	536,668	790,612	883,562	883,562	790,612	833,512	*6.8%*	*9.1%*	*8.0%*	*9.1%*	*7.6%*	*7.3%*
Share-based payment reserve	39,065	48,793	54,697	58,346	60,647	51,903	*0.5%*	*0.6%*	*0.5%*	*0.6%*	*0.6%*	*0.5%*
Capital redemption reserve	0	0	0	0	65,000	65,000	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.6%*	*0.6%*
Merger reserve	579,934	579,934	579,934	579,934	579,934	579,934	*7.4%*	*6.7%*	*5.3%*	*6.0%*	*5.6%*	*5.1%*
Retained earnings	1,194,708	1,496,100	1,905,018	209,967	367,983	901,767	*15.2%*	*17.2%*	*17.3%*	*2.2%*	*3.6%*	*7.9%*
Total Equity Shareholders' Funds	£4,159,659	£5,020,963	£5,635,015	£3,953,613	£4,022,879	£4,646,080	*53.0%*	*57.8%*	*51.2%*	*40.6%*	*38.9%*	*40.7%*
Selected Summary Accounts												
Total Assets	£7,844,640	£8,689,635	£11,007,181	£9,743,799	£10,352,709	£11,415,139						
Total Liabilities	3,684,981	3,668,672	5,372,166	5,790,186	6,329,830	6,769,059						
Current Liabilities	(2,908,508)	(3,019,293)	(4,377,524)	(5,113,815)	(5,773,432)	(6,261,519)						
Operating working capital	701,068	1,108,726	1,307,537	1,822,930	2,396,514	2,968,291						
Other current assets	159,782	349,214	379,873	287,126	212,988	394,073						
Other current liabilities	(1,108,375)	(1,278,060)	(1,514,257)	(1,505,860)	(2,079,943)	(2,198,972)						
Other working capital	(532,951)	(281,620)	(178,918)	76,881	208,127	1,055,786						
Other working cap as % of sales	-4.0%	-1.9%	-1.2%	0.4%	1.1%	5.7%						

Notes

Other working capital = current assets (excluding cash, trade receivables and inventories) minus other current liabilities (excluding trade payables)

Yorkshire Foods Plc
Historical Income Statements
For the fiscal year ended December 31,
(GBP)

	2006	2007	2008	2009	2010	2011	Percentage of Sales 2006	2007	2008	2009	2010	2011
Revenue	£ 13,492,287	£ 14,480,270	£ 15,141,404	£ 18,292,647	£ 18,191,142	£ 18,648,443	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Total cost of sales	(8,761,431)	(9,460,282)	(10,105,449)	(12,800,953)	(12,367,496)	(12,350,567)	*-64.9%*	*-65.3%*	*-66.7%*	*-70.0%*	*-68.0%*	*-66.2%*
Gross Profit	4,730,856	5,019,988	5,035,955	5,491,694	5,823,646	6,297,876	*35.1%*	*34.7%*	*33.3%*	*30.0%*	*32.0%*	*33.8%*
Selling and distribution costs	(1,866,779)	(2,125,122)	(2,040,733)	(2,443,390)	(2,671,610)	(2,990,768)	*-13.8%*	*-14.7%*	*-13.5%*	*-13.4%*	*-14.7%*	*-16.0%*
Administrative costs	(2,143,738)	(2,221,840)	(2,313,277)	(2,604,918)	(2,297,839)	(2,272,876)	*-15.9%*	*-15.3%*	*-15.3%*	*-14.2%*	*-12.6%*	*-12.2%*
Exceptional costs and share based pmts	-	-	-	-	(232,350)	(79,416)	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*-1.3%*	*-0.4%*
Goodwill impairment	(63,052)	(63,052)	-	(1,818,286)	-	-	*-0.5%*	*-0.4%*	*0.0%*	*-9.9%*	*0.0%*	*0.0%*
Other operating income	29,578	50,723	27,972	17,380	16,912	16,540	*0.2%*	*0.4%*	*0.2%*	*0.1%*	*0.1%*	*0.1%*
Total Overhead Costs	(4,043,991)	(4,359,291)	(4,326,038)	(6,849,214)	(5,184,887)	(5,326,520)	*-30.0%*	*-30.1%*	*-28.6%*	*-37.4%*	*-28.5%*	*-28.6%*
Operating profit	686,865	660,697	709,917	(1,357,520)	638,759	971,356	*5.1%*	*4.6%*	*4.7%*	*-7.4%*	*3.5%*	*5.2%*
Finance income	6,610	22,990	44,850	52,620	32,131	43,576	*0.0%*	*0.2%*	*0.3%*	*0.3%*	*0.2%*	*0.2%*
Finance costs	(96,977)	(52,378)	(34,076)	(111,361)	(58,438)	(64,964)	*-0.7%*	*-0.4%*	*-0.2%*	*-0.6%*	*-0.3%*	*-0.3%*
Profit before tax	596,498	631,309	720,691	(1,416,261)	612,452	949,968	*4.4%*	*4.4%*	*4.8%*	*-7.7%*	*3.4%*	*5.1%*
Tax	(200,541)	(204,935)	(178,511)	(124,771)	(180,971)	(253,863)	*-1.5%*	*-1.4%*	*-1.2%*	*-0.7%*	*-1.0%*	*-1.4%*
Profit from continuing operations	395,957	426,374	542,180	(1,541,032)	431,481	696,105	*2.9%*	*2.9%*	*3.6%*	*-8.4%*	*2.4%*	*3.7%*
Discontinued operations	-	-	-	-	(118,798)	-	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*-0.7%*	*0.0%*
Profit for the year	£395,957	£426,374	£542,180	-£1,541,032	£312,683	£696,105	*2.9%*	*2.9%*	*3.6%*	*-8.4%*	*1.7%*	*3.7%*
Depreciation expense	396,923	*406,870*	*430,625*	*477,027*	*367,280*	*387,911*	*2.9%*	*2.8%*	*2.8%*	*2.6%*	*2.0%*	*2.1%*
Amortisation expense	63,052	*63,052*	-	-	-	-	*0.5%*	*0.4%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Earnings before interest, tax, depreciation & amort.	*1,083,788*	*1,067,567*	*1,140,542*	*(880,493)*	*1,006,039*	*1,359,267*	*8.0%*	*7.4%*	*7.5%*	*-4.8%*	*5.5%*	*7.3%*

Yorkshire Foods Plc
Historical Cash Flows

For the fiscal year ended December 31,
(GBP)

	2006	2007	2008	2009	2010	2011	*Percentage of Sales* 2006	2007	2008	2009	2010	2011
Cash Flows												
Income from Operations	£686,865	£660,697	£709,917	-£1,357,520	£638,759	£971,356	*5.1%*	*4.6%*	*4.7%*	*-7.4%*	*3.5%*	*5.2%*
Non-cash items	483,531	469,900	454,896	2,276,458	452,067	450,374						
Working capital changes	444,877	(186,468)	(98,624)	(26,988)	189,551	195,364						
Taxes paid	(67,752)	(192,246)	(209,000)	(323,918)	(192,800)	(262,232)						
Capital investment, net of disposals	(201,219)	(403,374)	(136,408)	(188,336)	(40,079)	(336,111)						
Loss from discontinued operations, net		-			(76,369)							
Acquisition of subsidiary		-	(1,578,491)	-	-							
Total invested capital cash flow adjustments	659,437	(312,188)	(1,567,627)	1,737,216	332,370	47,395						
Net Invested Capital Cash Flow	*1,346,302*	*348,509*	*(857,710)*	*379,696*	*971,129*	*1,018,751*	*10.0%*	*2.4%*	*-5.7%*	*2.1%*	*5.3%*	*5.5%*
Interest expense, net	(90,367)	(29,388)	10,774	(58,741)	(26,307)	(21,388)						
Debt & capital lease repayment	(383,507)	(490,755)	(252,770)	(309,709)	(415,367)	(203,262)						
Debt incurred		-	750,000	-	-	-						
Proceeds from issuance of share capital	150,000	528,200	20,000	10,000	-	10,000						
Dividends paid	(100,278)	(124,982)	(148,892)	(154,019)	(154,667)	(162,321)						
Total cash flow adjustments	235,285	(429,113)	(1,188,515)	1,224,747	(263,971)	(329,576)						
Net change in cash	922,150	231,584	(478,598)	(132,773)	374,788	641,780						

Yorkshire Foods Plc
Unadjusted Financial Ratios

	2005	2006	2007	2008	2009	2010	6-Year Avg.
Revenue	£ 13,492,287	£ 14,480,270	£ 15,141,404	£ 18,292,647	£ 18,191,142	£ 18,648,443	CAGR
Revenue Growth		7.3%	4.6%	20.8%	-0.6%	2.5%	6.7%
Profitability Ratios							
Gross profit margin	35.1%	34.7%	33.3%	30.0%	32.0%	33.8%	33.1%
EBIT margin	5.1%	4.6%	4.7%	-7.4%	3.5%	5.2%	2.6%
EBT margin	4.4%	4.6%	4.7%	-7.4%	3.5%	5.2%	2.5%
ROE (EBT/Equity)	14.3%	13.2%	12.6%	-34.3%	15.9%	20.9%	7.1%
ROA (EBIT/Assets)	8.8%	7.6%	6.4%	-13.9%	6.2%	8.5%	3.9%
ROIC (EBIT/Equity & Debt)	14.3%	12.8%	10.6%	-24.9%	10.8%	14.7%	6.4%
Liquidity Ratios							
Current ratio	1.07	1.33	1.05	1.06	1.09	1.16	1.13
Coverage Ratios							
Times interest earned	n/m	n/m	n/m	n/m	n/m	n/m	n/m
Asset Management Ratios							
Cash & Investments/ Assets**	5.3%	7.4%	8.7%	13.3%	20.0%	25.1%	13.3%
Cash & Investments/ Revenue**	3.1%	4.5%	6.3%	7.1%	11.4%	15.3%	7.9%
Total asset turnover	1.72	1.67	1.38	1.88	1.76	1.63	1.67
Accounts Receivable (Days)	47.51	52.49	51.09	48.16	55.64	50.55	50.91
Inventory (Days)	32.80	36.60	41.25	41.03	36.09	42.82	38.4
Other current assets (Days)	4.32	8.80	9.16	5.73	4.27	7.71	6.7
Accounts Payable (Days)	54.55	63.30	64.12	60.07	53.35	62.62	59.7
Cash cycle	n/m	n/m	28.23	29.12	38.38	30.75	31.6
Other working cap/Sales	5.2%	7.7%	8.6%	10.0%	13.2%	15.9%	10.1%
Other current liabilities (Days)	46.2	49.3	54.7	42.9	61.4	65.0	53.2
Sales/Net fixed assets	4.6	5.0	5.4	7.3	8.0	8.0	6.4
Sales/Gross Working capital	64.2	14.4	69.0	56.9	35.6	18.2	43.0
Average life of fixed assets	n/a	17.6	18.2	17.8	18.6	20.4	18.5
Average age of assets	n/a	10.6	12.2	11.8	14.4	14.2	
Leverage Ratios							
Total debt/ equity	88.6%	73.1%	95.3%	146.5%	157.3%	145.7%	117.7%
Interest bearing debt/ equity	3.86%	1.19%	0.00%	0.00%	0.00%	0.00%	0.8%
Assets/ equity	188.6%	173.1%	195.3%	246.5%	257.3%	245.7%	217.7%

n/a = not available
n/m = not meaningful

Notes
1. Averages include only the full fiscal years of 2005 through 2010.
2. Other working capital items include all current asset less current liability accounts with the exception of trade receivables, inventory, and trade payables.

APPENDICES