CHAPTER FIVE

CAPITALIZATION/DISCOUNT RATES

I. IBBOTSON BUILD-UP METHOD

Ibbotson Associates [Stocks, Bonds, Bills and Inflation (SBBI), Valuation Edition] (acquired by Morningstar in 2007) provides a model that uses both historical data and current inputs to estimate the cost of equity capital for a company. The cost of capital is sometimes referred to as the expected or required rate of return.

Ibbotson's Build-Up[1] formula starts with the risk free rate and adds expected risk premiums designed to reflect the additional risk of an equity investment. The key variables used in estimating the cost of capital can be found in the 2005 SBBI Valuation Edition, Table 3-3, as follows:

The primary formula is: $K_e = R_f + ERP + IRP_i + SP + SCR$ *where:*

K_e	=	*cost of equity*
R_f	=	*risk free rate of return*
ERP	=	*expected equity risk premium, or the amount by which investors expect the future return on equity securities to exceed the risk free rate*
IRP_i	=	*expected industry risk premium for industry i reflecting the relative risk of companies in that industry (if appropriate)*
SP	=	*size premium*
SCR	=	*specific company risk for the company*

[1] One of multiple methods available in BVMPro capitalization rates section.

The table[2] shown below is reproduced from Ibbotson's SBBI: Valuation Edition 2005 Yearbook, Table C-1 and will change according to data gathered in any given year.

KEY VARIABLES IN ESTIMATING THE COST OF CAPITAL

	Value
Yields (Riskless Rates) [3]	
Long-term (20-year) U.S. Treasury Coupon Bond Yield	4.8%
Equity Risk Premium [4]	
Long-horizon expected equity risk premium (historical): large company stock total returns minus long-term government bond income returns	7.2
Long-horizon expected equity risk premium (supply side): historical equity risk premium minus price-to-earnings ratio calculated using three-year average earnings	6.1

Size Premium[5]

Decile	Market Capitalization of Smallest Company (in millions)		Market Capitalization of Largest Company (in millions)	Size Premium (Return in Excess of CAPM)
Mid-Cap, 3-5	$1,607.931	-	$6,241.953	0.95%
Low-Cap, 6-8	$506.410	-	$1,607.854	1.81
Micro Cap, 9-10	$1.393	-	$505.437	4.02
Breakdown of Deciles 1-10				
1- Largest	$14,099.878	-	$342,087.219	-0.37
2	$6,258.530	-	$14,096.886	0.60
3	$3,473.335	-	$6,241.953	0.75
4	$2,234.146	-	$3,464.104	1.07
5	$1,607.931	-	$2,231.707	1.44
6	$1,098.284	-	$1,607.854	1.75
7	$746.249	-	$1,097.603	1.61
8	$506.410	-	$746.219	2.36
9	$262.974	-	$505.437	2.86
10-Smallest	$1.393	-	$262.725	6.41
Breakdown of the 10th Decile				
10a	$144.122	-	$262.725	4.54
10b	$1.393	-	$143.916	9.90

[2] Used with permission, *SBBI: Valuation Edition 2005 Yearbook*, updated annually; all rights reserved.
[3] As of December 31, 2004. Maturity is approximate.
[4] See Chapter 5 of *SBBI Valuation Edition 2005 Yearbook* for complete methodology.
[5] See Chapter 7 of *SBBI Valuation Edition 2005 Yearbook* for complete methodology.

A. EQUITY RISK PREMIUM

The historical equity risk premium shown in the table above is calculated as the return an investor would have received in excess of the return on Treasury securities by the S&P 500 during the period from 1926 through the date of publication.

Why focus on the long-term period? Ibbotson offers the following observations:

1. Long-term historical returns have shown surprising stability.
2. Short-term observations may lead to illogical forecasts.
3. Focusing on the recent past ignores dramatic historical events and their impact on market returns. We don't know what major events lay ahead.
4. Law of large numbers: more observations lead to a more accurate estimate.

In addition to these observations, another justification of using long-term data is that investments in closely held businesses generally represent long-term investments. Thus, uses of Ibbotson's equity risk premia are more likely to match investment horizons than the use of premiums calculated with short-term data.

Inherent in this discussion is the assumption that past returns provide a valid estimate of current (and future) cost of capital. Recent research suggests that this assumption may be invalid. Ibbotson notes that there has been a recent (over the past 20 years) increase in the average price to earnings ratio (P/E), and this increase accounts for part of the historical equity risk premium. Since similar increases in P/E ratio are not expected, future equity risk premiums are expected to be lower. This lower expected premium can be seen in the "supply side" equity risk premium calculation in the table above.[6]

While recent research raises questions about whether the equity risk premium should be reduced based upon this "supply side" argument, Ibbotson does not recommend making this adjustment. The following is quoted from Ibbotson's *2006 SBBI Valuation Edition*, pages 92 to 98:

> *"Long-term expected equity returns can be forecasted by the use of supply side models. The supply of stock market returns is generated by the productivity of the corporations in the real economy. Investors should not expect a much higher or lower return than that produced by the companies in the real economy. Thus, over the long run, equity returns should be close to the long-run supply estimate.*
>
> *From the end of 1925 to the end of 2005, the overall stock market price grew faster than GDP per capita. This is primarily because the price-to-earnings ratio increased 1.74 times during the same period.*
>
> *As mentioned earlier, one of the key findings of the Ibbotson and Chen study is that* P/E *increases account for only a small portion of the total return of equity (0.65% of the total 10.36%). The reason we present supply side equity risk premium going back only 20 years is because the P/E ratio rose dramatically over this time period, which caused the growth rate in the P/E ratio calculated from 1926 to be relatively high. The subtraction of the P/E growth factor from equity returns has been responsible for the downward adjustment in the supply side equity risk premium compared to the*

[6] For a more thorough discussion of this and other possible adjustments to the historical equity risk premium, see Ibbotson's *SBBI Valuation Edition* and Ibbotson and Chen's *Stock Market Returns in the Long Run: Participating in the Real Economy*.

historical estimate. Beyond the last 20 years, the growth factor in the P/E *ratio has not been dramatic enough to require an adjustment.*

This section has briefly reviewed some of the more common arguments that seek to reduce the equity risk premium. While some of these theories are compelling in an academic framework, most do little to prove that the equity risk premium is too high. When examining these theories, it is important to remember that the equity risk premium data outlined in this book (both the historical and supply side estimates) are from actual market statistics over a long historical time period."

B. SIZE PREMIUM

The correlation between company size and return has been well documented by Ibbotson and other researchers. Over long periods of time, returns on investments in smaller firms have consistently and significantly exceeded returns on investment in larger firms. The size premium is the extra return a willing investor would expect to receive over the large equity security by investing in smaller equity securities on the NYSE/AMEX/NASDAQ. Since virtually all closely held companies are smaller than even the smallest of the S&P 500 companies examined by Ibbotson, an analyst should always consider the inclusion of a size premium in their build-up model.

In Ibbotson's *SBBI Valuation Edition*, long-term returns for all publicly traded stocks are calculated. These returns are then ranked, based on company size, into deciles. The resulting table (shown on the previous page) clearly illustrates that average returns for small publicly traded companies have been consistently and significantly higher than average returns for large corporations. Since the typical closely held business would fall into the tenth decile in terms of size, the risk premium for this decile is of great interest for the valuation analyst.

In order to gain greater insight into the small stock risk premium, Ibbotson splits the tenth decile (with the smallest companies) in half, calculating returns on the smallest five percent (decile 10b) and second smallest five percent (decile 10a) of public companies. The results are striking. As can be seen in the exhibit, the size premium for the smallest five percent (10b) is 9.90 percent, more than double the premium for the 10a companies. This suggests that the risk premiums for very small companies may be significantly higher than previously recognized.[7]

C. INDUSTRY RISK PREMIUM

Ibbotson's general equity risk premium and size premia are not industry specific. Since some industries are inherently riskier than others, inclusion of an industry specific risk premium can result in a more precise estimate of the cost of capital for a specific company in that industry.

Ibbotson has developed an industry premium methodology that valuators may now reference and cite in their valuation reports. This methodology relies on the full information beta estimation process that is outlined in the *SBBI Valuation Edition Yearbook*. The full information beta methodology uses data from companies participating in an industry to evaluate the risk characteristics of that industry. The full information approach provides a risk index for each industry. The risk index compares the risk level of a specific industry to the total market.

[7] A comprehensive discussion of the statistical relationship between size and historical returns can be found in *Ibbotson's SBBI Valuation Edition*, Chapter 7.

Only industries with full information beta were included in the analysis, with a minimum of five companies in each industry. The equation is as follows:

$IRP_i = (RI_i \times ERP) - ERP$ where:

IRP_i	=	The expected industry risk premium for industry i, or the amount by which investors expect the future return of the industry to exceed that of the market as a whole
RI_i	=	The risk index for industry i
ERP	=	The expected equity risk premium

Source: *SBBI Valuation Yearbook*, Chapter Three, The Buildup Method, Industry Premia.

Table 3-5 in the *SBBI Valuation Yearbook*, Chapter Three, Industry Premia Estimates provides the valuator with industry premia by SIC code.

In addition, the determination of this additional risk premium or discount can be determined by focusing on how the general economy compares with the expectations for the particular industry. Key questions include: How has this industry reacted to similar general economic conditions in the past? What are the industry forecasts and how do they relate to this company? What is its position in the industry? In addition to answering the aforementioned questions, it is necessary to compare the financial analysis of the company to the industry financial analysis; and finally, assess the additional company specific risk based on the financial analysis of the company.

D. SPECIFIC COMPANY RISK PREMIUM

The final variable in Ibbotson's Build-up model addresses company specific risk factors. If used correctly, the previous four factors (risk free rate, equity risk premium, size premium and industry premium) should yield the estimated cost of capital for an equity investment in a smaller, typical company in the identified industry. To assume that this estimated cost of capital is appropriate for the analyst's company would be to ignore possibly critical aspects of that company.

For example, the target company could be relatively new or it could have a lengthy record of strong performance and a dominant position in its market. Other characteristics, such as poor planning, the quality of management, lack of capital, access to debt and inadequate business experience must be considered. A thorough analysis of the company's risk ratios and how they compare with industry norms can help identify these company specific risks.

The specific company risk described above is referred to as "unsystematic risk". This risk measures the uncertainty of returns arising from characteristics of the industry and the individual company. In a well-balanced economic portfolio the unsystematic risk can be eliminated through diversification. This is not the case with an investment in one closely held company's stock.

In evaluating company specific risks, the authors of Practitioners Publishing Company's *Guide to Business Valuation* suggest that the following factors be considered in the specific company risk premium:

1. The Company's Financial Risk

The term financial risk is defined broadly in this context to include not only risks from debt financing, but also the relative risk from all means of financing the business. This would include current liabilities and the choice to liquidate non-cash assets into cash to finance capital investment or pay a dividend. An assessment of financial risk therefore involves all of the following:[8]

a) Interest-bearing leverage and coverage ratios
b) Total leverage ratios, such as total liabilities to equity
c) Liquidity ratios, such as the current and quick ratio
d) Volatility of earnings:
   Forecasting future earnings growth may add an additional risk premia to the calculations of a discount rate. Estimating growth in earnings should only be undertaken in situations where the analyst has strong reason to believe there is a high likelihood of continued growth (see Chapter Four). If this is the case, then much of the risk of forecasting growth is eliminated.
e) Turnover ratios, such as inventory and receivables turnover

A company that runs too lean, or is too highly leveraged with debt, will generally be riskier than a company that is not so highly burdened.

2. The Diversification of the Company's Operations

Generally, the more diversified a company is in terms of products, customer base, geographic locations, etc., the less the relative risk compared to other companies.

3. Other Operational Characteristics

The analyst should also assess all other factors that could lead to additional positive or negative adjustments. Such factors often include key-man issues and management depth and competence.

Exercise

Using the Ibbotson data on page 1 and 2 of Chapter Five, calculate the discount and capitalization rates using the Ibbotson Build-up Method – 10th decile, historical. Your analysis of unsystematic risk (based on your ratio analysis, industry statistical comparisons, financial analysis, industry analysis and economical analysis of the sample company) determined that the company specific risk factors are the following:

1. 1 percent for additional size premia
2. -2.4 percent for industry risk
3. 1.25 percent for earnings volatility
4. 1.50 percent for difference in the debt structure of the company compared to the industry (leverage)
5. 1.75 percent for other specific factors

[8] See Practitioners Publishing Company's *Guide to Business Valuation, 15th Edition.*

Additionally:

1. Use a long-term sustainable growth rate of 3 percent and an income tax effective rate of 40 percent.
2. Use the cash to earnings factor of 6.1 percent and an intangible earnings factor of 5 percent.

Sample Company
Ibbotson Build-Up Method
December 31, 2005

Risk-free long-term U.S. Government bond rate			+		Note A
Equity risk premium	+				Note B
Size Premium	+				Note C
Return in excess of risk-free rate	=		+		
Industry risk premium			+		Note D
Risk premium for company specific risk:					
Additional risk for size premia	+				Note E
Leverage/liquidity	+				Note E
Earnings volatility	+				Note E
Other factors peculiar to entity	+				Note E
Total risk premium for company specific risk	=		+		
After-tax net cash flow discount rate			=		
Long-term sustainable growth rate			-		Note F
After-tax net cash flow capitalization rate for next year			=		
Adjustment to current year (1 plus growth rate)			÷		
After-tax net cash flow capitalization rate for current year			=		
Cash to earnings factor			+		Note G
After-tax net income capitalization rate for the current year			=		
Intangible earnings factor			+		Note H
After-tax intangible capitalization rate for the current year			=		
Tax effect [1-tax rate (40%)]			÷		
Pre-tax net income capitalization rate for the current year			=		
Pre-tax intangible capitalization rate for the current year			=		

Note A	20-year yield to maturity on U.S. government bonds at the valuation date, from *Wall Street Journal.*
Note B	Long-horizon expected equity risk premium (historical) from *Stocks, Bonds, Bills, and Inflation: Valuation Edition: 2005 Valuation Edition*, ©2005 Ibbotson Associates, Inc.
Note C	Micro-Cap, 10, Size decile portfolios of NYSE/AMEX/NASDAQ, size premium, from *Stocks, Bonds, Bills and Inflation: 2005 Valuation Edition* ©2005 Ibbotson Associates, Inc.
Note D	Consider using: Industry premia estimates from *Stocks, Bonds, Bills, and Inflation: 2005 Valuation Edition*, ©2005 Ibbotson Associates, Inc.
Note E	Subjective risk premium for company-specific risks.
Note F	Long-term sustainable growth rate of economic equity returns based on industry outlook and discussions with management.
Note G	Increment to convert to net earnings; EPS less dividend per share, or company's actual increment.
Note H	Additional subjective risk premium associated with intangible earnings.

Exercise

Calculate the cash to earnings factor. Assume the after-tax net cash flow capitalization rate for the current year using the Ibbotson Build-Up Approach is 17.97%, (see the Ibbotson Build-Up Approach exercise on the previous page). Proof your cash to earnings factor.

Sample Company
Cash to Earnings Factor
Ibbotson Build-Up Approach

	Earnings	Depr	Working Capital	CapX	Debt	Cash Flow	Factor
2005	$ 1,361,661	$ 396,900	$ (100,000)	$ (300,000)	$ (100,000)	$ 1,258,561	92.43%
2004	836,342	352,500	(100,000)	(300,000)	(100,000)	688,842	82.36%
2003	521,057	253,100	(100,000)	(300,000)	(100,000)	274,157	52.62%
2002	707,770	234,312	(100,000)	(300,000)	(100,000)	442,082	62.46%
2001	721,829	211,400	(100,000)	(300,000)	(100,000)	433,229	60.02%
	$ 4,148,659	$1,448,212	$ (500,000)	$(1,500,000)	(500,000)	$ 3,096,871	
Averages	$ 829,730	$ 289,640	$ (100,000)	$ (300,000)	(100,000)	$ 619,370	74.65%

After-tax net income capitalization rate for the current year (_____% / 74.65%) _____

After-tax net cash flow capitalization rate for the current year _____

Cash to earnings factor _____

Proof

	Earnings	Cash Flow
Benefit Stream	$ 829,730	$ 619,370
Capitalization Rate		
Enterprise Value (rounded)	$	$

II. CAPITAL ASSET PRICING MODEL (CAPM)

The CAPM, by definition, is an equilibrium asset pricing theory that shows that equilibrium rates of expected return on all risky assets are a function of their co-variance with the market portfolio.[9]

This method for determining a capitalization or discount rate is based on the theory that investors in risky assets require a rate of return above a risk-free rate as compensation for bearing the risk associated with holding the investment.

A. ASSUMPTIONS

These are the assumptions underlying the capital asset pricing model:

1. Investors are risk averse.
2. Rational investors seek to hold portfolios, which are fully diversified.
3. All investors have identical investment holding periods.
4. All investors have the same expectations regarding expected rate of return and how capitalization rates are generated.
5. There are no transaction costs.
6. There are no taxes.
7. The rate received from lending money is the same as the cost of borrowing,
8. The market has perfect diversity and liquidity so an investor can readily buy or sell any fractional interest.

B. CALCULATION OF EXPECTED RETURN

Expected return = Risk-free rate + Beta x { Expected return on a market portfolio — Risk-free rate }

Abbreviated, the variables and the equation appear as follows:

$ER_i = R_f + \beta(ER_m – R_f)$

The risk-free (R_f) rate is represented by the 30-day Treasury bill rate. The expected return on a market portfolio (R_m) is the actual capital appreciation of the S&P 500 Index. The beta coefficient (β or beta) is a key variable in the CAPM equation. In the standard CAPM calculation, it represents the covariance of the rate of return on the subject security, with the rate of return on the market divided by the variance of the market. More simply, it measures the volatility of the subject security as compared to the market.

To understand beta fully, two terms must be understood:

1. Variance is a measure of the squared deviation of the actual return of a security from its expected return.
2. Covariance is a statistical measure of the interrelationship between two securities.

[9] The International Glossary of Business Valuation Terms defines the CAPM as "a model in which the cost of capital for any stock or portfolio of stocks equals a risk-free rate plus a risk premium that is proportionate to the systematic risk of the stock or portfolio."

In the standard calculation of CAPM, beta is computed using the return on investment (ROI) of the subject security. Since ROI is calculated using the stock price, the analyst rarely uses the standard CAPM. If the stock price is known, is there a need for valuation?

Some analysts alter the CAPM model by modifying certain variables. The risk-free rate (R_f) is represented by the intermediate term (five to 10 year) Treasury bond yield rate. Beta (*B*) is modified so that it represents the co-variance of the pre-tax return on equity (ROE) of the subject company, with the ROE of other specific companies or industry averages divided by the variance of the ROE of the industry. Finally, rather than using the expected return on a market portfolio as the ER_m, it is represented by the average pre-tax ROE of the specific companies or the industry in which the subject company operates.

C. CALCULATION OF BETA (β)[10]

A beta[11] of 1.0 would indicate the subject company is no more or no less volatile than the industry. In this example the beta of 0.8501 indicates that the subject company is less volatile than the industry. As such, it would appear to be a better risk. Thus, a total risk-premium less than the industry would probably be appropriate for the company. Based on this analysis, it can be seen that the expected rate of return for a company should be positively related to its beta.

D. SECURITY MARKET LINE (SML)

The expected return on a security with a beta of zero is the risk-free rate, since a zero beta indicates no relative risk. The expected return on a security with a beta of one is the expected return of the market, since a beta of one indicates that the security has the same relative risk as the market.

A shortcoming of CAPM is the fact that it utilizes some amounts of comparative information in its various forms. Since it may be extremely difficult to locate industry data, it may be difficult to use CAPM to develop a discount/capitalization rate. It is equally as difficult to find specific comparable company data for a closely held company.

E. IS CAPM A PRE-TAX OR AN AFTER-TAX METHOD? THE ANSWER: IT DEPENDS

CAPM describes the cost of equity for a given company, and is equal to the risk-free rate plus some amount to compensate for the risk involved in excess of the risk-free rate. Thus, there are several elements to CAPM coming from both sides of the tax equation. This risk-free rate is usually a government bond rate, which is pre-tax to the investor. The expected return on a market portfolio is generated from after corporate tax average returns of the market, usually comparing the return to that of the S&P 500. Beta is public market volatility, generated by stock transactions, which is after corporate tax (but again, pre-investor tax). These companies' 10K forms do consider known tax liabilities in their bottom lines. However, this liability may not be the actual tax. In valuing a closely held company, beta is generally developed from comparable public companies or is calculated using the average pre-tax ROE (for equity capital) or ROI (for investment) of the specific company. ROI, as used to develop beta, is calculated as:

[10] β or *b* often (but not always) indicate beta in financial equations.
[11] Historical beta research can be performed by KeyValueData.

$$\frac{\text{(Ending Stock Price - Beginning Stock Price) + Dividends}}{\text{Beginning Stock Price}}$$

This generates an after-tax rate (or variable) as the capacity to pay dividends (a key element) is based on after-tax earnings.

When you use CAPM to generate a capitalization rate, the risk rate for the general public market is an after-tax rate; therefore, CAPM is an after-tax method. Ibbotson considers its build-up method, loosely based on CAPM, to be an after-tax calculation. If you use RMA's ROE, it is pre-tax. Be certain you identify your variables if you use CAPM to quantify a capitalization/discount rate.

F. EXPECTED LONG-TERM EARNINGS GROWTH RATE

Long-term, sustainable growth rates for a company can be estimated in various ways, but must always reflect the long-term nature of a business entity. Further, it is essential that the rate reflect the benefit stream employed in valuation. That is, one cannot estimate revenue growth and then apply it to cash flow—the result would be distorted.

> *"Since 1926, the U.S. economy has been able to sustain a nominal growth rate of approximately 6.0 to 6.5 percent over time. This is a combination of the real growth rate and inflation."*[12]
>
> *"Some analysts believe that in a capitalistic society, it is reasonable to assume that any business entity's growth, regardless of short-term prospects, will eventually plateau at the 6 to 6.5 percent long-term level of growth for the economy."*[13]
>
> *"A thorough evaluation of the subject company's historical growth can be utilized to assist in this growth determination. Published estimates of industry growth rates, such as those compiled by [Morningstar] can also be relevant analytical tools. Currently, many analysts use a long-term sustainable growth rate between 3 percent and 6 to 6.5 percent, depending on the underlying characteristics of the subject entity, its industry, and its future prospects. Some analysts use the anticipated inflation rate, which has historically averaged approximately 3 percent. This rate assumes no real growth in the underlying business."*[14]
>
> *"Overall, the deciding factor in determining how to reflect growth in the rates of return still must be informed professional judgment."*[15]

By comparison, our analysis of NAF's ***long-term sustainable growth*** rate was calculated at a rate approximating 5% (1999 through 2004) based upon the near-term economic outlook for the Company's public sector-dependent characteristics.

[12] James R. Hitchner, *Financial Valuation Applications and Models*, Second Edition, Wiley, c. 2006, p. 157
[13] Ibid., p. 157
[14] Ibid., p. 157
[15] Ibid., p. 157

Example of a Calculation of the Cash to Earnings Factor

Assume the after-tax net cash flow capitalization rate for the current year using the Ibbotson Build-Up Approach is 14.02%, see the Ibbotson Build-Up Approach on the next page.

Sample Company
Cash to Earnings Factor
Ibbotson CAPM Build-Up Approach

	Earnings	Depr	Working Capital	CapX	Debt	Cash Flow	Factor
2005	$ 1,361,661	$ 396,900	$ (100,000)	$ (300,000)	$ (100,000)	$ 1,258,561	92.43%
2004	836,342	352,500	(100,000)	(300,000)	(100,000)	688,842	82.36%
2003	521,057	253,100	(100,000)	(300,000)	(100,000)	274,157	52.62%
2002	707,770	234,312	(100,000)	(300,000)	(100,000)	442,082	62.46%
2001	721,829	211,400	(100,000)	(300,000)	(100,000)	433,229	60.02%
	$ 4,148,659	$1,448,212	$ (500,000)	$(1,500,000)	(500,000)	$ 3,096,871	
Averages	$ 829,730	$ 289,640	$ (100,000)	$ (300,000)	(100,000)	$ 619,370	74.65%

After-tax net income capitalization rate for the current year (14.02% / 74.65%)	18.78%
After-tax net cash flow capitalization rate for the current year	14.02%
Cash to earnings factor	4.76%

Proof

	Earnings	Cash Flow
Benefit Stream	$ 829,730	$ 619,370
Capitalization Rate	18.78%	14.02%
Enterprise Value (rounded)	$ 4,400,000	$ 4,400,000

Exercise

Using the Ibbotson data on pages 1 and 2 of this chapter, calculate the discount and capitalization rates using the Ibbotson Build-Up Method. The Industry beta is 1.15. Use size premia of 2.86%, which is in the 9th decile. Your analysis of unsystematic risk based on your ratio analysis, industry statistical comparisons, financial analysis, industry analysis and economic analysis of the sample company determined that the company specific risk factors are .5% for additional size premia, .75% for earnings volatility, .25% for difference in the debt structure of the Company compared to the industry (leverage), and 0% for other specific factors. Use a long-term sustainable growth rate of 3% and an income tax effective rate of 40%. Use the cash to earnings factor of 4.76% and an intangible factor of 5%.

Sample Company
Modified CAPM Ibbotson Build-Up Method
December 31, 2005

Risk-free long-term U.S. Government bond rate			+	_____	Note A
Equity risk premium	+	_____			Note B
Beta	x	_____			Note B1
Average company comparative return	=	_____			
Size premium	+	_____			Note C
Return in excess of risk-free rate	=		+	_____	
Risk premium for company specific risk:					
Additional risk for size premia	+	_____			Note D
Leverage/liquidity	+	_____			Note D
Earnings volatility	+	_____			Note D
Other factors peculiar to entity	+	_____			Note D
Total risk premium for company specific risk	=		+	_____	
After-tax net cash flow discount rate			=	_____	
Long-term sustainable growth rate			-	_____	Note E
After-tax net cash flow capitalization rate for next year			=	_____	
Adjustment to current year (1 plus growth rate)			÷	_____	
After-tax net cash flow capitalization rate for current year			=	_____	
Cash to earnings factor			+	_____	Note F
After-tax net income capitalization rate for the current year			=	_____	
Intangible earnings factor			+	_____	Note G
After-tax intangible capitalization rate for the current year			=	_____	
Tax effect [1-tax rate (40%)]			÷	_____	
Pre-tax net income capitalization rate for the current year			=	_____	
Pre-tax intangible capitalization rate for the current year			=	_____	

Note A	20-year yield to maturity on U.S. government bonds at the valuation date, from *Wall Street Journal.*
Note B	Long-horizon expected equity risk premium (historical) from *Stocks, Bonds, Bills, and Inflation: 2005 Valuation Edition*, ©2005 Ibbotson Associates, Inc.
Note B1	Source: Standards & Poors
Note C	Micro-Cap, 9-10, Size decile portfolios of NYSE/AMEX/NASDAQ, size premium, from *Stocks, Bonds, Bills and Inflation: 2005 Valuation Edition* ©2005 Ibbotson Associates, Inc.
Note D	Subjective risk premium for company-specific risks.
Note E	Long-term sustainable growth rate of economic equity returns based on industry outlook and discussions with management.
Note F	Increment to convert to net earnings; EPS less dividend per share, or company's actual increment.
Note G	Additional subjective risk premium associated with intangible earnings.

III. EQUITY RISK PREMIUM: DUFF & PHELPS, LLC RISK PREMIUM REPORT

Another source of equity risk premiums (ERPs) used in the development of discount and capitalization rates can be found in the annual *Risk Premium Report* (the "Report") published by Duff & Phelps, LLC. This report was formerly known as the *Standard & Poor's Corporate Value Consulting Risk Premium Report* and is based on research conducted by Roger Grabowski and David King. The Report is published annually and can be purchased from Morningstar at their website address http://corporate.morningstar.com/ib/asp/subject.aspx?xmlfile=1425.xml. An example of the 2005 report is located in Appendix IX.

The Duff & Phelps ERP measurements are based on company information from the Center for Research in Security Prices (CRSP) database and the Standard & Poor's Compustat database. The study begins with 1963, the year the Standard & Poor's Compustat database was established. The Report consists of two parts; Part I presents data related to historical equity risk premiums and company size and Part II presents data quantifying the relationship between historical equity risk premiums and company risk.

A. COMPANIES INCLUDED IN THE DATA

Companies included in the measurement data must meet certain criteria including the following:

1. Must be included in both the CRSP and the Compustat databases
2. Excludes financial service companies (Standard Industrial Classification = 6)
3. Must be publicly traded for 5 years
4. Must have sales greater than $1 million in any of the previous 5 years
5. Must have a positive 5-year average earnings before interest, taxes, depreciation and amortization (EBITDA) for the previous five fiscal years

Duff & Phelps also created a separate "high financial risk" portfolio consisting of companies:

1. Identified by Compustat as in bankruptcy or liquidation
2. With 5-year average net income available to common equity for the previous five years less than zero
3. With 5-year average operating income for the previous five years less than zero
4. With negative book value of equity at any of the previous five fiscal year-ends
5. With debt-to-total capital of more than 80%

B. SIZE MEASUREMENT

Company data is sorted by eight measures of size and each measurement of size is included as a separate exhibit in the Report. The measures of size include:

1. Market value of common equity (common stock price times number of common shares outstanding)
2. Book value of common equity (does not add back the deferred tax balance)
3. 5-year average net income for previous five fiscal years (net income before extraordinary items)
4. Market value of invested capital (market value of common equity plus carrying value of preferred stock plus long-term debt (including current portion) and notes payable)
5. Total assets (as reported on the balance sheet)
6. 5-year average EBITDA for the previous five fiscal years
7. Sales (net)
8. Number of employees (either at year-end or yearly average, including part-time and seasonal workers)

Companies that meet the criteria noted above are then divided evenly into twenty-five portfolios for each measure of size. Companies included in the high financial risk portfolio are shown as a separate line item in each of the size measurement categories.

C. DATA PRESENTATION

The Duff & Phelps data are presented in a series of exhibits in Appendix IX.

Part I of the Report includes:

Exhibits A-1 through A-8	ERP vs. company size (eight measures of size)
Exhibits B-1 through B-8	Premiums over Capital Asset Pricing Model (CAPM) vs. company size (eight measures of size)

Part II of the Report includes:

Exhibits C-1 through C-8	Relation between size and company risk (eight measures of size)
Exhibits D-1 through D-3	ERP vs. company risk (three measures of risk)

The three company risk measures are as follows:

- Operating margin (the lower the margin, the greater the risk)
- Coefficient of Variation in Operating Margin (the greater the coefficient of variation, the greater the risk)
- Coefficient of Variation in Return on Equity (the greater the coefficient of variation, the greater the risk)

D. DATA USE

The ERPs developed by the Duff & Phelps data can be used to calculate a discount cost of equity using a build-up model (using the data reported in Exhibits A-1 through A-8) or the Modified Capital Asset Pricing Model (MCAPM) (using the data reported in Exhibits B-1 through B-8).

The Report suggests that the "smoothed" average premium is the most appropriate indicator for most of the portfolio groups. The "smoothed" premium refers to how the premium is determined, that being from a regression analysis with the average historical ERP as the dependent variable and the logarithm of the average sorting criteria as the independent variable. One benefit of the use of the "smoothed" premium is that if an analyst is estimating the required rate of return for a company that is significantly smaller than any of the companies found in the smallest of the 25 portfolios, it is appropriate to extrapolate the ERP using the slope and constant terms from the regression relationships used in deriving the "smoothed" premiums.

E. BUILD-UP METHOD

An example of using the build-up method to determine a required rate of return on equity, assume that the subject company has the following characteristics:

Eight Measures of Size	Amount
Market value of equity	$120 million
Book value of equity	$100 million
5-year average net income	$10 million
Market value of invested capital	$180 million
Total assets	$300 million
5-year average EBITDA	$30 million
Sales	$250 million
Number of employees	200

Using each of the exhibits A-1 through A-8 (for each of the size measurements) we extract the following ERP data:

Eight Measures of Size	Company Size	Exhibit	Guideline Portfolio	Smoothed Average ERP *
Market value of equity	$120 million	A-1	24	12.3%
Book value of equity	$100 million	A-2	24	11.3%
5-year average net income	$10 million	A-3	23	11.4%
Market value of invested capital	$180 million	A-4	24	12.0%
Total assets	$300 million	A-5	23	11.2%
5-year average EBITDA	$30 million	A-6	24	11.8%
Sales	$250 million	A-7	23	11.1%
Number of employees	200	A-8	25	12.6%
Mean				11.7%
Median				11.6%

- over the riskless rate

The Report states that it has used the Ibbotson Associates' income return on long-term Treasury bonds as their measure of the historical riskless rate, therefore a 20-year Treasury bond yield is the most appropriate measure of the riskless rate to use with the Duff & Phelps ERPs.

So, if we have a riskless rate of 4.7% as of the valuation date, the Duff & Phelps data would indicate a required rate of return on equity ranging from 15.8% to 17.3%, with an average of 16.4%. From this point, the valuator needs to consider the company specific risk factor. For more, refer to discussion on this subject earlier in this Chapter.

Observation
It is important, as with all other methodologies presented in this course, to acquire and read the underlying analysis and supporting data provided in the Duff & Phelps report before using the data.

Exercise

Using the Duff & Phelps 25th portfolio data provided, calculate the Average Risk Premium. Weight each factor equally except for Book Value of equity and Total Assets as you have determined that those are not relevant size measures.

Size Characteristic	Smoothed Average ERP	Weight	Weighted ERP
MV of Equity	13.79%		
BV of Equity	12.56%		
5 Year Ave. Net Income	13.11%		
MV of Invested Capital	13.40%		
Total Assets	12.85%		
5 Year Ave. EBITDA	13.02%		
Total Sales	12.40%		
Number of Employees	12.61%		
		Average Duff & Phelps Equity Risk Premium	%

Solution

Using the Duff & Phelps 25th portfolio data provided, calculate the Average Risk Premium. Weight each factor equally except for Book Value of equity and Total Assets as you have determined that those are not relevant size measures.

Size Characteristic	Smoothed Average ERP	Weight	Weighted ERP
MV of Equity	13.79%	1	13.79%
BV of Equity	12.56%	0	-
5 Year Ave. Net Income	13.11%	1	13.11%
MV of Invested Capital	13.40%	1	13.40%
Total Assets	12.85%	0	-
5 Year Ave. EBITDA	13.02%	1	13.02%
Total Sales	12.40%	1	12.40%
Number of Employees	12.61%	1	12.31%
		Average Duff & Phelps Equity Risk Premium	13.06%

IV. WEIGHTED AVERAGE COST OF CAPITAL (WACC)

Another calculation used to develop a discount or capitalization rate is known as the weighted average cost of capital, or WACC. A company's capital structure can be made up of the following in any number of combinations:

1. Common Equity
2. Preferred Equity
3. Long-term Debt

As its name implies, WACC actually blends a company's cost of equity with its cost of debt to arrive at the company's overall cost of capital. WACC is used when the valuation analyst wants to determine the value of the entire capital structure of a company such as in an acquisition scenario.

WACC adds versatility to the valuation in that it can be developed based on a number of assumptions involving the company's debt in its capital structure. These assumptions can include greater debt, less debt, or debt under different terms.

A. CALCULATION OF THE WEIGHTED AVERAGE COST OF CAPITAL

Assuming a simple capital structure consisting only of common equity and long-term debt, the formula to develop WACC is as follows:

$WACC = (k_e \times W_e) + (k_{d/(pt)} [1\text{-}t] \times W_d)$ where:

WACC	=	Weighted Average Cost of Capital
k_e	=	Cost of common equity capital
W_e	=	Percentage of common equity in the capital structure, *at market value*
$K_{d/(pt)}$	=	Cost of debt capital (pre-tax) for the company
t	=	Effective income tax rate for the company
W_d	=	Percentage of debt in the capital structure, *at market value*

Note that if the capital structure of the company includes preferred equity, the formula would change to reflect the third component as follows:

$$WACC = (k_p \times W_p) + (k_e \times W_e) + (k_{d/(pt)} [1\text{-}t] \times W_d)$$

Where k_p is the cost of preferred equity and W_p is the percentage of preferred equity in the capital structure at market time.

The WACC as computed is an "after-tax WACC" as it is normally applied to cash flows after entity-level taxes.

An important point to note in calculating the WACC for a privately-held company is that since no market values exist for the capital structure weightings, the analyst must *estimate* the market values in order to eventually arrive at their market value. Another point to note that the analyst will typically assume that the book value of the debt approximates its market value, particularly if the debt is from a third-party institution (i.e., bank).

Calculation of the WACC for a privately-held company is a circular process and can be illustrated as follows:

Example:

Assume the following information applies to Terra Company:

- *Book value* of long-term debt = $300,000 (30%)
- *Book value* of common equity = $700,000 (70%)
- Interest rate on the long-term debt = 5.0%
- Cost of equity (using a build-up method) = 22%
- Effective tax rate = 40%
- Net cash flow to invested capital = $250,000

First Iteration

The analyst must first *estimate* the market values of the capital structure weightings and include the estimations in the formula. For this example, the book values are the first estimate of the market value weights. Applying the estimates to the WACC formula, the result is as follows:

WACC = $(k_e \times W_e) + (k_{d/(pt)} [1\text{-}t] \times W_d)$
= $(0.22 \times 0.70) + (0.05 [1 - 0.40] \times 0.30)$
= $(0.154) + (0.03 \times 0.30)$
= $0.154 + 0.009$
= 0.163
= 16.3%

Proof – First Iteration

With the first iteration resulting in a WACC of 16.3%, the analyst then applies this to the net cash flow to invested capital to calculate a value. For this example a capitalization valuation model is used although a discounting valuation model could also be used. Using an assumed growth rate of 3.0% to calculate a capitalization rate, the proof calculation is as follows:

Estimated value = Net cash flow to invested capital / (WACC – Growth Rate)
= $250,000 / (0.163 – 0.03)
= $250,000 / 0.133
= $1,879,699

Subtracting the book value of the debt, $300,000, from the estimated value of $1,879,699 implies a market value of the equity of $1,579,699. This results in capital structure weights of 16% for debt and 84% for equity. The calculated weights are significantly different from the book value weights of 30% for debt and 70% for equity that the analyst started with. Therefore, the analyst must adjust the weightings and recalculate using a second iteration.

Second Iteration

The calculated weights were lower for debt (15% vs. 30%) and higher for equity (85% vs. 70%) than the assumed weights. Using the first iteration as a guide, the analyst may adjust the capital structure weights to 20% for debt and 80% for equity. Including these amounts in the formula yields the following WACC calculation:

WACC = $(k_e \times W_e) + (k_{d/(pt)} [1\text{-}t] \times W_d)$
= $(0.22 \times 0.80) + (0.05 [1 - 0.40] \times 0.20)$
= $(0.176) + (0.03 \times 0.20)$
= $0.176 + 0.006$
= 0.182
= 18.2%

Proof – Second Iteration

Once again using an assumed growth rate of 3.0%, the proof of the second iteration is as follows:

Estimated value = Net cash flow to invested capital / (WACC – Growth Rate)
= $250,000 / (0.182 – 0.03)
= $250,000 / 0.152
= $1,644,737

The resulting calculated capital structure weights are:

Common equity	=	($1,644,737 - $300,000) / $1,644,737	=	81.7%
Long-term debt	=	$300,000 / $1,644,737	=	18.2%

Note that the calculated weights are much closer to the assumed weights, 81.7% vs. 80% for equity and 18.2% vs. 20% for debt, than in the first iteration. This implies that a WACC of 18.2% is reasonable for this company.

Additional iterations may be performed in order to arrive at calculated weights that are even closer to the assumed weights.

Practice Pointer

The process of going through these iterative calculations is greatly simplified by use of automated spreadsheet functions such as the Iteration function in Excel or certain software programs that perform the iteration automatically.

Alternatively, here is an algebraic formula that bypasses the iterations:

$$E_{FMV} = \frac{NCF_{I/C} - D\,(C_D - g)}{C_E - g}$$

Legend:
E_{FMV} – Fair Market Value of Equity
$NCV_{I/C}$ – Net Cash Flow to Invested Capital
D – Total Interest Bearing Debt
C_D– After Tax Interest Rate
C_E – Cost of Equity
g – Long Term Sustainable Growth Rate

B. WACC – WHICH CAPITAL STRUCTURE TO USE

As noted earlier, use of the WACC can add versatility to the valuation in that it can be developed based on a number of assumptions involving the company's debt in its capital structure. These assumptions can include greater debt, less debt, or debt under different terms and be based on the existing capital structure, a potential buyer's capital structure, an industry-average capital structure, or an optimal capital structure.

For example, if a controlling interest is being valued and the standard of value being used is fair market value, then the analyst can use an industry-average capital structure since a controlling interest would have the ability to change the capital structure of the company. On the other hand, if a non-controlling (minority) interest is being valued, the existing capital structure should be used as a non-controlling (minority) interest would not have the ability to change the existing capital structure.

If the analyst is valuing a controlling interest for a possible sale of the company and a potential buyer is known (investment value standard), then the potential buyer's capital structure or an optimal capital structure may be warranted for the calculation.

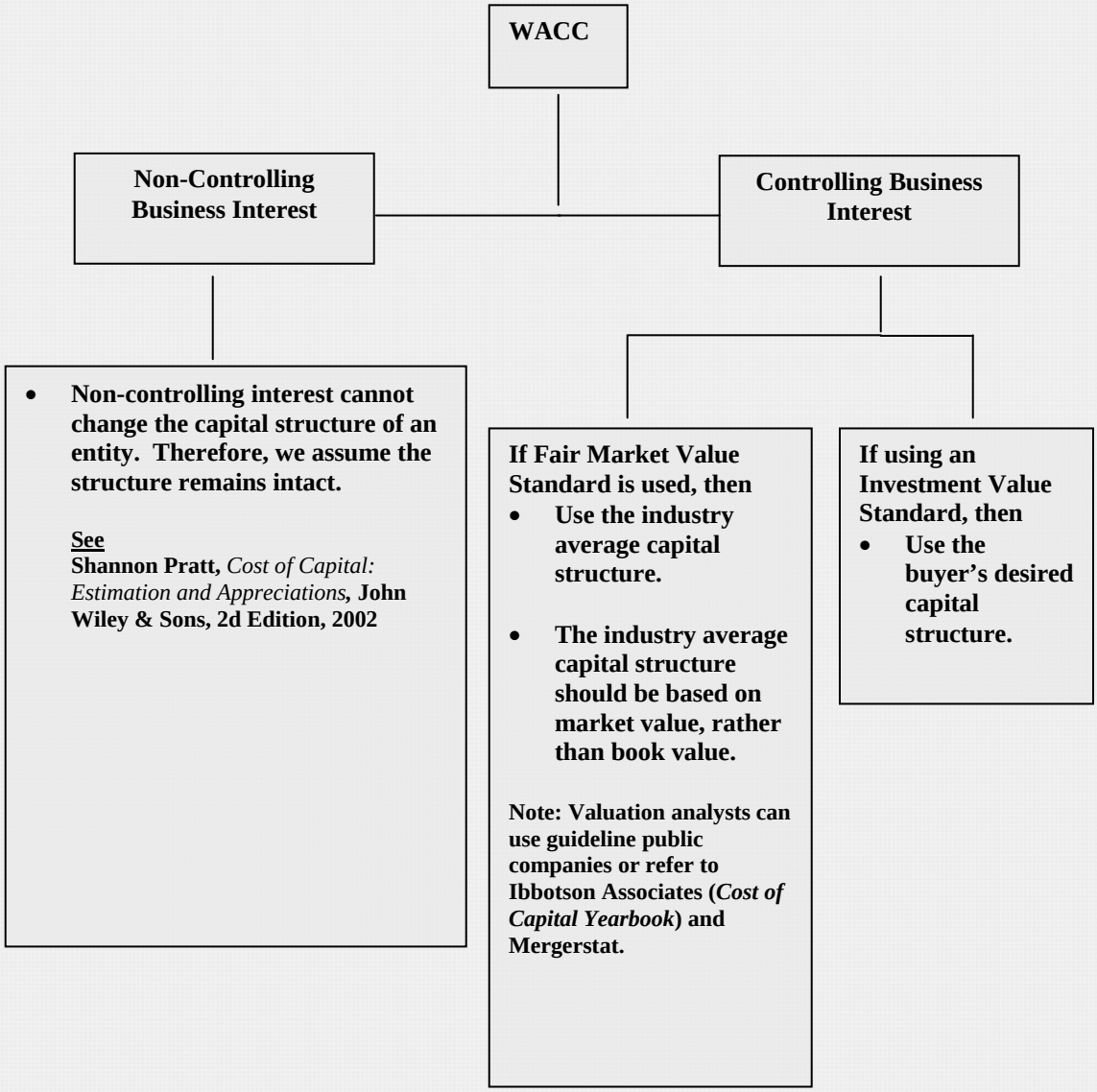
C. WACC – DETERMINING THE VALUE OF EQUITY

WACC is used primarily when the analyst is valuing the entire capital structure (debt plus equity) of a company and is applied to net cash flow to invested capital (see Chapter Four). WACC can still be used to value only the equity of a company. This is accomplished by calculating the value of the entire capital structure and then subtracting the company's debt, resulting in the value of the company's equity.

Practice Pointer

- **The Weighted Average Cost of Capital (WACC) used to value a closely held business may differ depending on whether non-controlling or controlling interest is being purchased.**

The following flow chart provides an overview of current practice



Exercise

Calculate the WACC. Assume debt is $1,516,337, book value of shareholder's equity is $3,912.997, cost of debt is 7 percent, tax rate is 37 percent, risk-free rate is 4.8 percent, Beta is 1.15, equity risk premium is 7.2 percent, small stock premium is 2.86 percent and the company specific risk premium is 1.5 percent. Assume a weighted average net cash flow to invested capital of 983,600 dollars. In order to arrive at the market value of the equity the valuator will perform numerous reiterations or use the average industry capital structure. For this exercise, use $5,255,000 as the market value of the equity. This was arrived at by performing numerous reiterations of the WACC.

	Weight		**Weighted**
2005	5	$ 1,361,661	$ 6,808,305
2004	4	$ 836,342	3,345,368
2003	3	$ 521,057	1,563,171
2002	2	$ 707,770	1,415,540
2001	1	$ 721,829	721,829
	15		$ 13,854,213
			15
Weighted average (Rounded)			$ 923,600

Weighted average adjusted net income	$ 923,600
Non-cash charges (e.g depreciation, amortization, deferred revenue, deferred taxes)	400,000
Capital expenditures necessary to support projected operations	(300,000)
(Additions) deletions to net working capital necessary to support projected operations	(100,000)
Interest expense (net of tax deduction resulting from interest as a tax deductible expense)	60,000
Weighted net cash flows to invested capital	$ 983,600

Exercise

Calculate the weighted average cost of capital. Assume debt is $1,516,337 and book value of equity is $3,912,997, cost of debt is 7%, tax rate is 37% risk free rate is 4.8%, BETA is 1.15, equity risk premium is 8.28%, small stock premium is 2.86% and the company specific risk premium is 1.5%. Assume a weighted average net cash flow to invested capital of $983,600. Assume the equity at market value is $6,864,862. Use a long-term sustainable growth rate of 3%. Round percentages to four digits.

Sample Company
Weighted Average Cost of Capital (WACC)
December 31, 2005

	Amount	Percent
Debt	$	%
Equity (at market value)	$	%
Total	$	%

	Weight		Cost		1-Tax Rate		
Cost of Debt	%	x	%	x		=	%

	RF		ERP		SSP		SCR		
Cost of Equity		+		+		+		=	%
Weight								x	%
								=	%
Cost of Debt									%
Cost of Equity									%
WACC									%

Reiteration	
Weighted average net cash flow to invested capital	$ 983,600
Times 1 plus growth rate	1.03
Weighted average net cash flow to invested capital times growth rate	
WACC (discount rate)	%
Less growth rate	
WACC (capitalization rate)	
Total invested capital	
Less debt	
Market value of equity	

V. MARKET MULTIPLES

Market multiples can help an analyst compare a privately held company to the market, based on expectations the public has of similar publicly traded companies. The valuation analyst will need to determine which, if any, of the market-based multiples might apply to the subject company. Using market data, the valuation analyst calculates a number of ratios, such as Price/Earnings, Price/Cash Flow, Price/Revenue, Dividend/Price and Price/Book Value, and uses these same ratios, if applicable, to calculate the value of a share in a privately held company.

A. PRICE EARNINGS RATIO (P/E)

Price Earnings is probably the most commonly used market method to describe the price of a share of stock. This method utilizes price/earnings (P/E) ratios of comparable publicly traded companies involved in the same industry as the subject company. The rate is determined by taking the inverse of the P/E ratios of publicly traded companies and calculating the weighted average of these inverted ratios, possibly using multiple time periods.

Proponents of this method argue that the inverse or reciprocal P/E ratio of public companies in the same industry as the subject company is the best available comparable capitalization or discount rate to utilize in valuing a small closely held business. P/E ratios are the inverse of the capitalization rate.

This method has some appeal due to the fact that P/E ratios for thousands of publicly traded companies are published daily.

The primary argument against this method is that large, diversified, publicly traded companies are not reasonably comparable for a smaller closely held business. Some reasons contributing to this conclusion are:

1. Minority interests versus controlling interest
2. Capital structure
3. Stock market fluctuations
4. Supply versus demand for particular stocks
5. Diversity in reported financial information

P/E ratios are based on earnings after depreciation, amortization, interest on all debt, compensation to all employees (including stockholder/employees) and all federal and state corporate income tax. In order to use a P/E ratio, the analyst must be working with an earnings figure that is similar in all respects.

Exercise

Convert the Public Company P/E ratio to a capitalization rate

Sample Company
Historical Comparable Price Earnings Ratio
December 31, 2005

	Weights	2001	2002	2003	2004	2005
Weights		1	2	3	4	5
Category:						
Basset Furniture, Inc.	3	14.0	20.0	17.5	15.5	18.0
LADD Furniture	1	38.0	65.5	44.0	N/A	N/A
Kimbell	2	13.0	20.5	16.0	13.5	15.5
Pulaski	4	20.0	13.5	22.5	12.0	12.0
Weighted average price/earnings ratio multiplier						16.2
Convert public company P/E ratios to percentage (capitalization rate) (1 ÷ 16.2)						

B. PRICE/CASH FLOW (P/CF)

Price per share divided by cash flow.

1. Cash flow is typically defined, for purposes of this calculation, to be net income plus depreciation and amortization.
2. This measure is considered relevant for companies with high non-cash charges reflected in the income statement—usually found in depreciation and amortization.

C. PRICE/REVENUE (P/R)

Price per share divided by the revenue.

1. This multiple works well for service type companies, or those with few assets. These kinds of companies will often sell at prices related to their revenues.
2. The assumption behind this ratio is that a certain level of revenue will generate a certain "level" of earnings, or earnings potential. The higher the return on revenue (earnings divided by revenue) the higher the price to revenue will be.
3. A regression analysis can often be fit nicely to this market multiple.

D. DIVIDEND/PRICE (D/P)

Dividend divided by price is usually called the dividend yield.

1. Most closely held companies do not pay dividends due to the double taxation, making this approach to pricing a share of closely held stock difficult.
2. Some public stocks do not sell well based on dividend yield, as the companies pay minimal dividends or none at all. Others, such as Real Estate Investment Trusts (REITs), pay a high proportion of earnings as dividends and will have a correspondingly high yield. In either case, the decision to pay or not pay a dividend is not influenced by any minority owner, so the approach is probably irrelevant when valuing a minority interest.

3. Public or private companies, who do not pay dividends, may have the capacity to pay a dividend, which can be calculated. If the analyst can show such a payout would not appreciably deny the company its ability to finance operations and growth, price to dividend might be applicable.

An example of the Dividend Yield Capitalization Method is shown below:

Sample Company
Schedule of Dividend Yield Capitalization Method
December 31, 2005

	Weights	2001	2002	2003	2004	2005
Period weights		1	2	3	4	5
Puluski Furniture	4	2.00	1.00	2.50	2.80	3.00
Bassett Furniture	3	2.40	2.20	2.70	3.00	3.30
LADD Furniture	1	-	1.10	1.60	1.90	-
Kimball International	2	3.20	2.90	2.90	3.60	3.40
Additional (+) or (-) adjustments				-		
Weighted average dividend yield (capitalization rate)				2.67		

(As applied to dividends or dividend paying capacity)

Sample Company
Value Line or Standards & Poor's Guide (either may be used)
December 31, 2005

Year	Dividends (Adj)*	Net Income After Tax*	Percent	Weight	Weight x%
2001	57.200	238,985	24.00%	1	24.00%
2002	61.200	347,600	18.00%	2	36.00%
2003	61.200	404,600	15.00%	3	45.00%
2004	61.200	380,940	16.00%	4	64.00%
2005	57.200	380,837	15.00%	5	75.00%
				15	244.00%
					÷ 15
Weighted Average					16.27%

*The dividend payouts of publicly traded companies are reported on a pre-tax basis after corporate income tax. Therefore, the dividend paying capacity method is an after-tax method which is consistent with the type of earnings selected for the method of valuation. The dividend payouts for the comparable publicly traded companies were obtained from Value Line Investment Survey.

E. PRICE/BOOK VALUE (P/BV)

The market price per share divided by book value per share.

1. Book value, or common equity, per share is total owners' equity minus preferred stock divided by the number of common shares outstanding.
2. The purpose of this ratio is to test whether the market price is worth more (or less) than the cost of the assets. If the result is greater than one, it indicates market value exceeds book value and can often be used as a sign of competent management.

F. EARNINGS PER SHARE (EPS)

EPS is net income minus preferred stock dividends divided by the number of common shares outstanding.

1. A trailing EPS is calculated for the past year.
2. The valuation analyst must also decide whether to make this calculation based on fully diluted earnings or primary (undiluted) earnings.

VI. THE RISK RATE COMPONENT MODEL (RRCM)

The RRCM[16] is a business build-up model designed to identify an appropriate capitalization rate based on the perceived risks associated with an enterprise. Many valuation analysts believe that a business build-up model is a better approach to use when the enterprise is considered too small for market data methods.

The RRCM begins by taking a safe or reasonable rate of return (e.g., intermediate term bond rate) and adds to that rate a weighted average risk premium for each of the following general risk factor categories:

Primary Factors

1. Competition
2. Financial strength
3. Management ability and depth
4. Profitability and stability of earnings

Other Factors to Consider

1. National economic effects
2. Local economic effects

The Risk Rate Component Model identifies more specific risk factors that fall within the four primary risk factor categories. Each of these specific risk factors is evaluated and assigned a risk premium percentage and then weighted according to the relative degree of influence it has on the general category where it resides. Then a weighted average of all of the specific risk factors for each category is calculated. These weighted averages then become the risk premium factors for each of the general risk factor categories. The general risk categories can then be weighted relative to the perceived importance that each general category has relative to the others.

[16] Available in BVMPro.

Section 5 of Revenue Ruling 59-60 requires the valuation analyst to use informed judgment when weighing the various factors or components. The valuation analyst using the RRCM should document in working papers how each component has been considered. Valuation analysts can reduce the subjective nature of the analysis of the various components by conducting site visits, gathering industry information, conducting interviews with managements and other informed persons and performing detailed analytical analysis through ratio analysis. Risk can be quantified in several ways: as weak, no effect, or strong; or High, Medium, Low and No Risk, or; Heavy, Moderate, Light, None. The valuation analyst setting up a quantification chart should be consistent in his or her application.

Each risk factor that can be analyzed in ratio analysis should, where possible, be compared to similar ratios from industry publications (e.g., RMA, etc.) in order to compare the position/performance of the subject company to comparable companies.

A. RRCM RISK FACTORS

The four general risk factor categories: Competition, Financial Strength, Management Ability and Depth and Profitability and Stability of Earnings are synthesized from the Black/Green Build-up Summation Method, the James Schilt Risk Premium Guidelines, The Complete Guide to Buying a Business by Arnold Goldstein (1983), How to Value a Small Business, Real Estate Today, by Harold S. Olafson (1984), Selling Your Business, Business Week, Bradley Hitchings (1985) and the BNA Tax Management: Estates, Gifts and Trusts Portfolios (221d) (1985).

The following table lists suggested underlying risk components the analyst should review for each category: Each risk component can be analyzed by ratio analysis [R], questionnaires to be completed with management [Q] or through other analysis and worksheets [A] [17].

[17] Suggested questionnaires and analytical worksheets can be found in The Value of Risk© 2001 and 2002, Hanlin and Claywell.

RRCM Risk Factors

Competition		**Financial Strength**	
Q	Proprietary content, including patents and copyrights	R	Current ratio
A	Relative size of company	R	Quick ratio
Q	Relative product or service quality	R	Sales to working capital ratio
Q	Product or service differentiation	R	Accounts receivable to working capital ratio
Q	Covenant not to compete	R	Inventory to working capital ratio
Q	Market strength—competition	R	Net sales to inventory turnover
A	Market size and share	R	Total sales to assets
Q	Pricing competition	R	Net fixed assets to net worth
Q	Ease of market entry	R	Miscellaneous assets to net worth
	Other pertinent factors specific to the subject company	R	Total debt to net worth
		R	Total assets to total equity
Management Ability and Depth		R	Total debt to assets
R	Accounts receivable turnover	R	Long-term debt to equity
R	Accounts payable turnover	R	Interest coverage
R	Inventory turnover		Other pertinent factors specific to the subject company
R	Fixed asset turnover		
R	Total asset turnover	**Profitability and Stability of Earnings**	
R	Employee turnover	Q	Years in business
R	Management depth	Q	Industry life cycle
Q	Facilities condition	R	Return on sales (before taxes)
Q	Family involvement	R	Return on assets
Q	Books and records—quality and history	R	Return on equity
Q	Contracts for sales	R	Operating earnings growth rate
Q	Contracts for purchases	R	Sales growth rate
Q	Contracts for management	R	Trading ratio (sales to net worth)
Q	Contracts—other	R	Standard deviation
R	Gross margin		Other pertinent factors specific to the subject company
R	Operating margin		
R	Operating cycle		
	Other pertinent factors specific to the subject company		

The RRCM assumes the risk premiums and the safe rate of return are on a pre-tax basis; therefore, this method generates a capitalization rate for use on a pre-tax basis. If the valuator using the RRCM desires a discount rate, then a factor for long-term growth should be added.

A business build-up summation capitalization method below shows how the RRCM can work.

Sample Company
Build-Up Summation Capitalization Method
December 31, 2005

Risk Factor (by General Category):	
Competition	6.44
Financial Strength	4.00
Management Ability and Depth	5.33
Profitability and Stability of Earnings	4.00
Total Weighted Average Risk Factor Premiums	19.77
Calculation of Capitalization Rate:	
Total weighted average risk factor premium	19.77
Assumed safe rate of return (Standard & Poors)	4.80
National economic premium (or discount)	2.00
Local economic premium (or discount)	2.00
Indicated pre-tax capitalization rate (rounded)	28.57

	Risk Index	**Weight**	
Competition			
Proprietary content	8.00	1.00	8.00
Relative size of company	8.00	1.00	8.00
Relative products/service quality	4.00	1.00	4.00
Product/service differentiation	6.00	1.00	6.00
Market strength	8.00	1.00	8.00
Market size and share	8.00	1.00	8.00
Pricing competition	6.00	1.00	6.00
Ease of market entry	2.00	1.00	2.00
Patent/copyright protection	8.00	1.00	8.00
Other considerations	-	-	-
Competition weighted average		9.00	6.44
Financial			
Total debt to assets	4.00	1.00	4.00
Long-term debt to equity	4.00	1.00	4.00
Current ratio	4.00	1.00	4.00
Quick ratio	4.00	1.00	4.00
Interest coverage	4.00	1.00	4.00
Other considerations	-	-	-
Financial weighted average		5.00	4.00

Continued on next page

	Risk Index	Weight	
Management			
Accounts receivable turnover	8.00	1.00	8.00
Inventory turnover	6.00	1.00	6.00
Fixed asset turnover	6.00	1.00	6.00
Total asset turnover	6.00	1.00	6.00
Employee turnover	4.00	1.00	4.00
Management depth	4.00	1.00	4.00
Facilities condition	2.00	1.00	2.00
Family involvement	6.00	1.00	6.00
Books and records quality and history	2.00	1.00	2.00
Contracts	8.00	1.00	8.00
Gross margin	8.00	1.00	8.00
Operating margin	4.00	1.00	4.00
Other considerations	-	-	-
Management weighted average		12.00	5.33
Stability			
Years in business	4.00	1.00	4.00
Industry life cycle	4.00	1.00	4.00
Return on sales	4.00	1.00	4.00
Return on assets	4.00	1.00	4.00
Return on equity	4.00	1.00	4.00
Other considerations	-	-	-
Stability weighted average		5.00	4.00

PARTICIPANT NOTES