



CENTRAL BANK OF EGYPT
Egyptian Banking Institute

ESTABLISHED 1922

NEW YORK INSTITUTE ^{OF} FINANCE

Corporate Finance & Valuation Methods Professional Certificate

Cost of Capital

Cost of Capital

4

Factors Influencing the Cost of Capital

- Risk/return overview
- Capital structure considerations and optimal capital structure
- Weighted average cost of capital (WACC)

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Cost of Debt Capital

- Cost of debt (after-tax)
- Yield to maturity as the cost of debt to the firm
- Estimating the cost of debt using credit market or credit default swap (CDS) spreads

6

Cost of Equity

- Cost of preferred stock
- Cost of equity estimated via dividend discount model
- Cost of equity estimated using the Capital Asset Pricing Model (CAPM)
- Risk-free rates, market risk premium and common stock betas
- Problems with betas
- Adjusting beta for leverage

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Implications of Cost of Capital for Corporate Funding Decisions

- Weighted average cost of capital revisited
- Optimal capital structure reconsidered



Day 2 Learning Objectives

After completing this session participants should be able to:

- Discuss the connection between the cost of capital to the firm and risk versus expected returns to investors for the different types of corporate securities;
- Describe the trade-offs issuers are considering when assessing the relative cost of different types of capital versus risk to the firm when trying to optimize capital structure;
- Calculate the after-tax cost of debt capital based on current borrowing rates;
- Calculate the cost of equity capital using both a dividend discount approach and the capital asset pricing model (CAPM);

Day 2 Learning Objectives (continued)

After completing this session participants should be able to:

- Discuss potential issues regarding the cost of equity capital as computed via CAPM as it relates to values used for equity betas, market risk premium and choice of risk-free rate;
- Explain the connection between common stock betas and company leverage, adjust beta for different degrees of leverage in capital structures and describe potential applications of adjusted betas;
- Calculate weighted-average cost of capital (WACC) and discuss the potential impact on WACC due to changes in capital structure, dividend policy or investment policy;
- Explain rationale for use of WACC or the cost of equity capital in a discounted cash flow valuation, including what cash flow measure either would be appropriate for valuing;



Module 4

Factors Influencing the Cost of Capital



Risk and Expected Return

- Cash flow valuation of projects and firms uses a risk-adjusted cost of capital to discount:
 - Forecast period net or free cash flows
 - Terminal value (if perpetuity formula method used)
- An appropriate cost of capital should reflect
 - Risk of the project or the securities being valued
 - Capital structure of firm as it impacts both the cost and level of risk
- What risk(s) and quantifying it/them for cost of capital
 - Related to investors' return expectations
 - Company/issue specific considerations (non-systematic risk)
 - Market/asset class related considerations (systematic risk)

Risk and Expected Return

- Expected returns need to be great enough to compensate investors for the level of risk of owning the asset
- Primary determinants of expected risk
 - Business operating considerations
 - Capital structure of firm
- Business operating considerations
 - Market(s)/sector(s) in which the company does business
 - Operating cost considerations (degree of operating leverage)
- Capital structure risk considerations
 - Seniority and nature of claim
 - Financial leverage

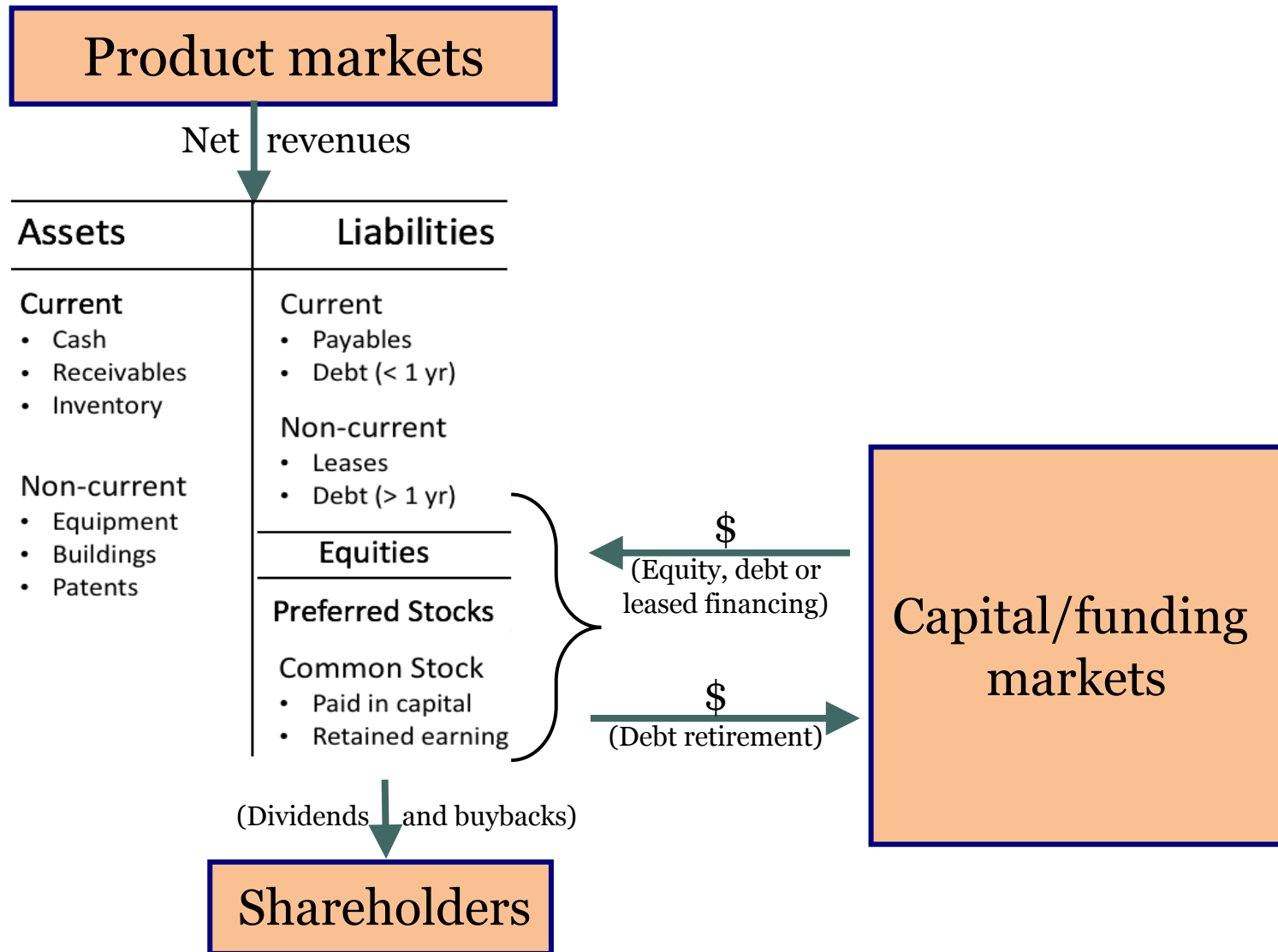
Risk and Expected Return

- Security-related considerations
 - Debt versus equity risk/return trade-offs
 - Impact of financial leverage
- Debt-related factors
 - Creditworthiness of issuer/borrower
 - Seniority of claim
 - Protective indenture provisions
 - Embedded options
- Equity-related factors
 - Market capitalization (large, mid or small cap)
 - Cyclicalities or stability of business
 - Intensity of competitive environment
 - Other factors

Optimal Capital Structure

- In general, the goal is to minimize the firm's cost of capital
 - That goal is constrained by a number of factors
 - Cost is quantified by WACC (weighted average cost of capital)
- Primary considerations
 - Equity capital is more expensive but a safer source of funding
 - Some debt will almost certainly enhance the value of the equity
 - Excessive debt threatens the firm with insolvency or bankruptcy
 - Debt is a less expensive but riskier source of financing
 - Bondholders' claims must be paid, or they become the owners
 - As indebtedness increases the cost of debt capital will likely rise
 - Management's goal is to find the optimal mix

Corporate Finance Decisions

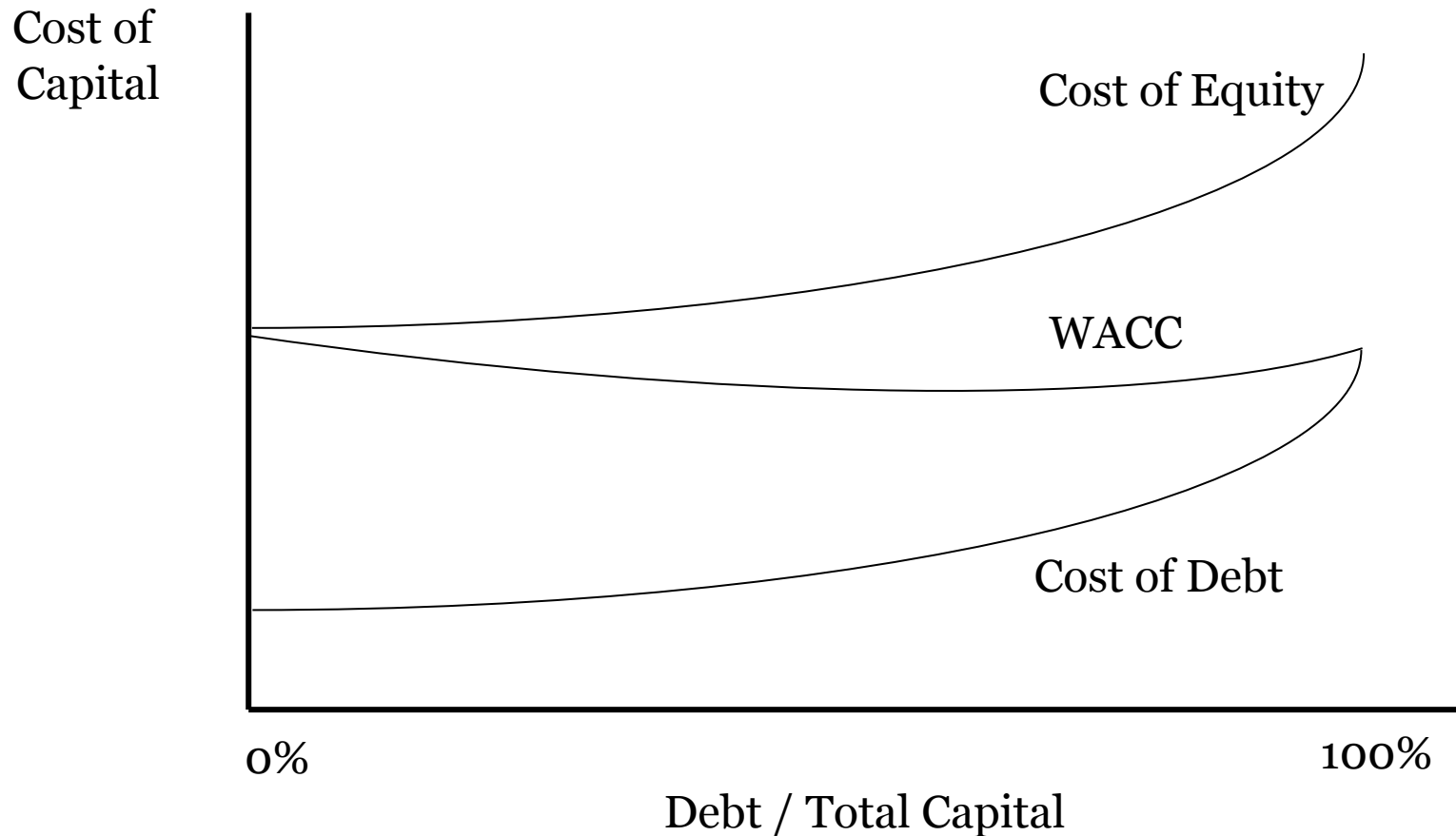


Optimal Capital Structure - Dividends

- Where a previously wholly equity capitalized firm starts to employ debt financing its WACC will typically decline
- As the debt/equity ratio increases beyond some level the cost of additional debt will eventually rise
- To optimize the value of the firm management should target a capital structure that will minimize WACC
- **Dividend policy** influenced by the target capital structure, cost of capital and investment opportunities



Capital Structure and Leverage



Weighted Average Cost of Capital

- Rationale for using Weighted Average Cost of Capital (WACC) as the appropriate discount rate/hurdle rate when assessing investments:
 - WACC is the firm's marginal cost of capital (MCC)
 - Appropriate for projects with firm's average risk profile
 - Appropriate rate for valuing firm
- Capital for computation of WACC should include:
 - Debt
 - Preferred Shares
 - Equity (ordinary or common shares)
 - Other forms of capital (including leases, convertible bonds)

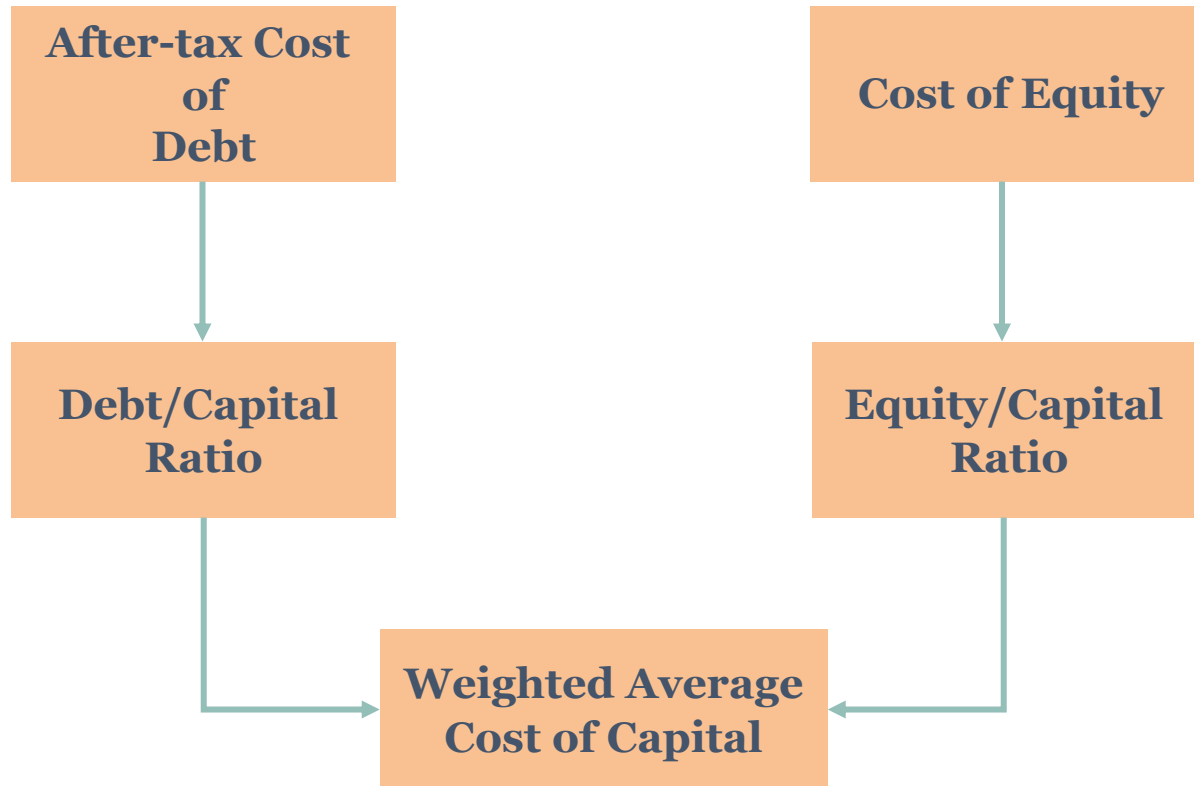


Weighted Average Cost of Capital

- After-tax (cash flows are forecast after-tax)
- Based on long-term equilibrium capital structure for this business (“target capital structure”)
- The rate of return expected by investors, reflecting future expectations not past performance



Weighted Average Cost of Capital



Weighted Average Cost of Capital

$$WACC = k_d (1 - t) \frac{D}{TC} + k_e \frac{E}{TC}$$

Where:

k_d = cost of debt

t = tax rate

D = total debt (market value, if available)

E = total equity (market value)

TC = total capital = debt + equity (at market values)

k_e = cost of equity

WACC - Example

- Exercise—Calculate the WACC:

Outstanding debt	\$2.0m
Book Value of Equity	\$1.5m
Market Value of Equity	1,000,000 shares @ \$3.00
Cost of debt	8%
Cost of equity	15%
Tax rate	21%



Module 5

Cost of Debt Capital





Cost of Debt

- The cost of debt is the marginal cost to the firm of raising new debt
- Since interest expense is tax deductible to the firm, the true marginal cost of debt to the firm should be net of taxes
- For a firm with many forms of debt (including capital leases), use a Weighted Average Cost of Debt (WACD)

Cost of Debt (WACD)

Basic formula for WACD is:

$$WACD = \frac{(stdi \times STD) + (ltdi \times LTD)}{(STD + LTD)}$$

Where:

- STD = Amount of short-term debt at book value
- LTD = Amount of long-term debt at market value
- stdi * = Interest rate on short-term debt
- ltdi* = Interest rate on long-term debt

**Should be adjusted for after tax rates*

Cost of Debt

- Interest rate used for publicly traded debt should be either:
 - Yield to maturity on outstanding debt
 - Rate at which the company could borrow today
- Interest rate used for non-public debt should be rate at which the company could borrow today
- Why use current yield to maturity
 - Why not historic (i.e., issuance) yield to maturity?
 - Why not forecast of future interest rates?



Cost of Debt

The Formula:

$$\text{After-tax Cost of Debt} = \text{Cost of Debt} \times (1 - \text{Corporate Tax Rate})$$

Which tax rate?

- Marginal statutory tax rate, or
- Effective tax rate

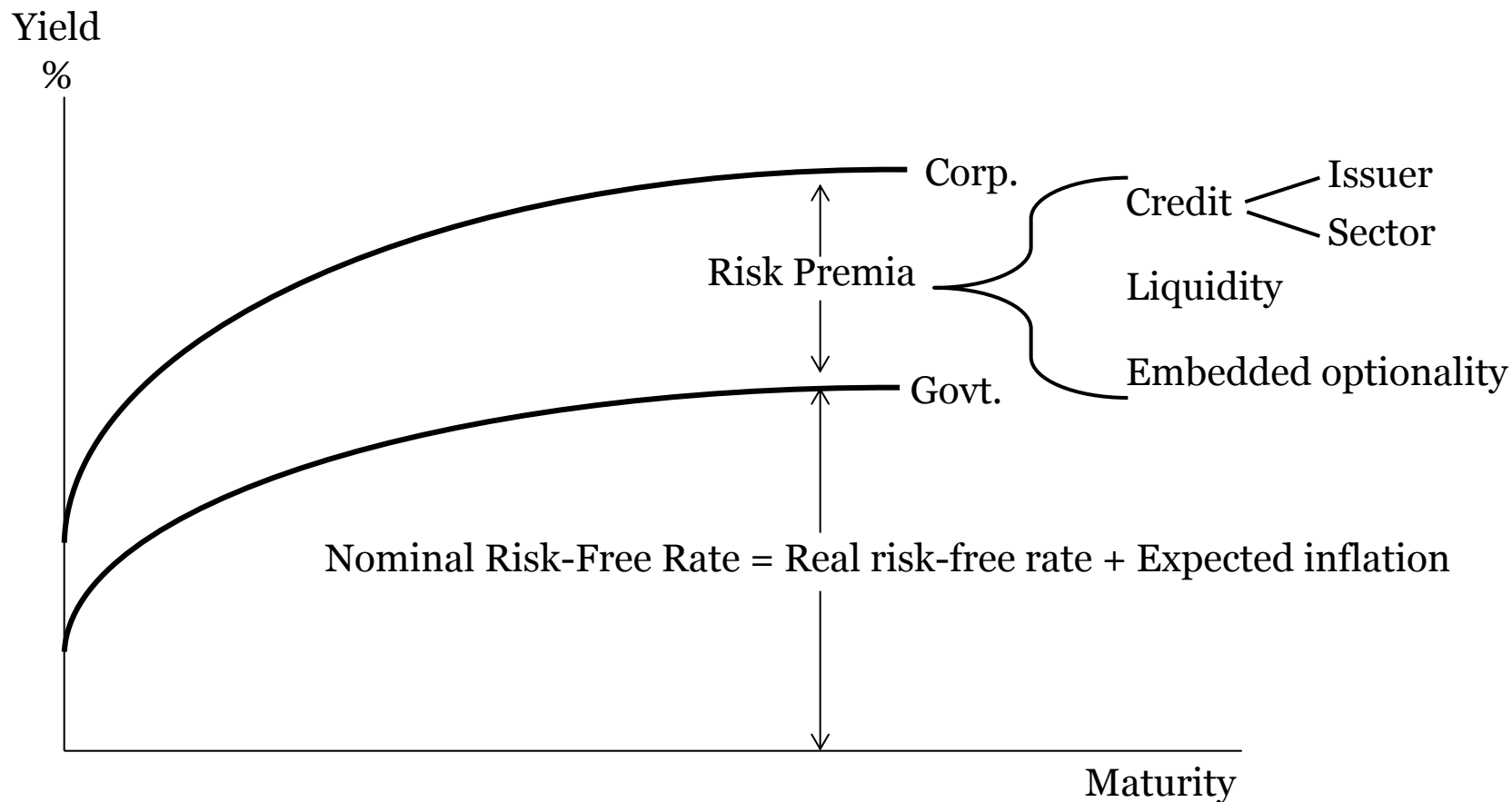
Cost of Debt – Spread Approach

$$k_d = (r_f + m) \times (1 - t)$$

Where:

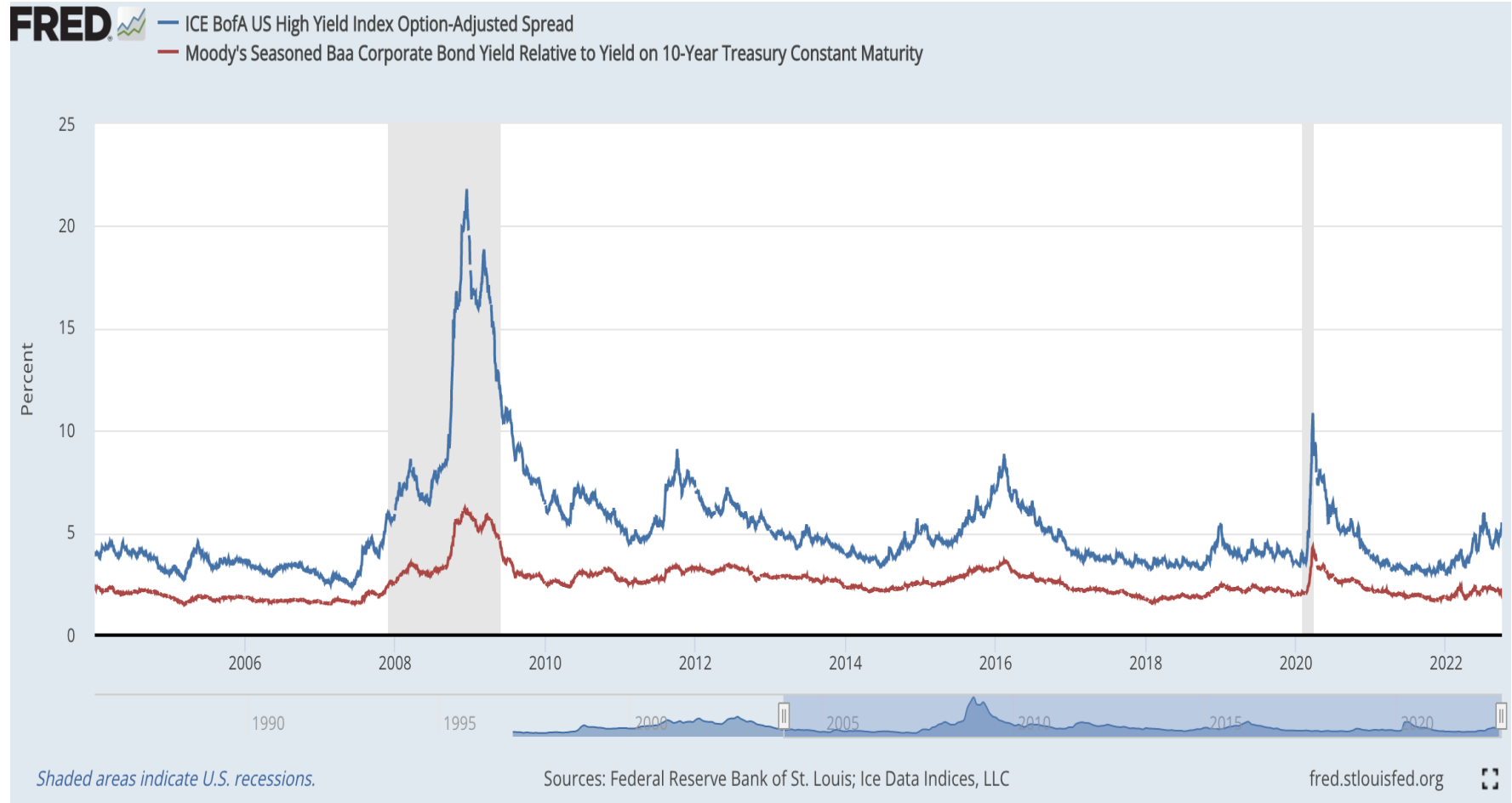
- k_d = Cost of debt (after tax)
- r_f = Risk-free rate (yield to maturity on same maturity government bond)
- m = Margin on debt (credit spread)
- t = Corporate tax rate

Yield Curves





U.S. Credit Spreads



Credit Spreads

- Credit spreads can be also be evaluated by looking at the credit default swap (CDS) market
 - May differ from fixed-income market credit spreads
- Debt should be market value. In the accounting footnotes, the book value of debt and the market value is usually stated
- The more that debt is tied to floating rates, the shorter the duration, the less likely is there a difference between book and market



Cost of Debt - Example

Metroset Production has a cost of raising new debt of 7.5% and a corporate tax rate of 25%.

What is their after-tax cost of debt?

Cost of Debt - Solution

Metroset Production has a cost of raising new debt of 7.5% and a corporate tax rate of 25%.

What is their after-tax cost of debt?

$$\begin{aligned} &= k_d (1 - T) \\ &= 0.075 \times (1 - 0.25) \\ &= 0.0563 \\ &= 5.63\% \end{aligned}$$

Floating Rate Debt

- Much bank debt and some capital market debt is issued at floating rates
- Loan interest rates or floating rate note coupon formulas are expressed as an index rate +/- a differential (spread)
 - For example, assume a company is paying an interest rate of LIBOR + 55bps (L+55). If LIBOR was currently 2.39%, the pre-tax cost of that debt would be 2.94%
 - The tenor of the index rate (e.g., 1-month, 3-month or 6-month) is usually consistent with the length of the reset period (i.e., rates resetting quarterly would usually be based on a 3-month rate)



Class Case Company - Cost of Debt

- Provided: AAPL cost of debt calculation
- Discussion issues
 - How would the inputs for actual calculation be obtained?
 - If company had previously issued debt that now has below market coupon rates, why use current YTM? Would AAPL not benefit by having below-market-rate debt as a source of its current capital structure?
 - What tax rate should be used to compute after-tax cost of debt?



Module 6

Cost of Equity



Types of Equity

- Preferred / Preference Shares
 - Senior securities (to common)
 - Junior to all debt holders
 - Dividend and asset preference
 - Limited equity
- Common / Ordinary Shares
 - Residual claim on firm
 - Elects board of directors/controls (?) firm



Preferred Stock = Preference Shares

Two Preferences

Dividend Preference

Must pay preferred
dividends first

Up to anticipated rate

Asset Preference

Junior to all debt
securities

Receive assets ahead of
common stockholders

3% Preferred Stock (\$50 Par)

Anticipated quarterly dividend: $\$50 \times .03 = \$1.50 \div 4 = \$0.375/\text{share}$

Redemption value: \$50/share

Dividend Discount Model

$$\text{Value} = \frac{d_1}{(1+k_1)^1} + \frac{d_2}{(1+k_2)^2} + \frac{d_3}{(1+k_3)^3} + \dots + \frac{d_\infty}{(1+k_\infty)^\infty}$$

d_N = Dividend paid at time N

k_N = Discount rate for time N. Equals the risk-free rate plus an equity risk premium.

Dividend Discount Model

No Growth Model

- Assumes k and d constant over time

$$\text{Value} = \frac{d_1}{K}$$

Example: \$4 per share annual dividend; 10% annual discount rate.

$$d_1 = \$4/\text{shr} \quad k = .1$$

$$\text{Value} = \frac{\$4.00 / \text{shr}}{0.1} = \$40.00 / \text{shr}$$

Cost of Preferred Stock

- Market discount rate inferred from the price and dividend of the preferred stock (treated as an annuity)

$$P_0 = \frac{d}{k_p}$$

$$k_p = \frac{d}{P_0}$$

Where:

k_p = cost of preferred (or preference) equity

d = annual dividend (typically fixed)

P_0 = price of preferred share

Cost of Preferred Stock - Example

Assume the following information:

- New preferred shares in Metroset were issued at \$75 par value
- Each share pays a 6% dividend (\$4.50) per year
- Currently the shares are trading at \$81.50
- What is the cost of preferred shares?



Cost of Preferred Stock - Solution

$$\begin{aligned}k_p &= \frac{d}{P_0} \\&= 4.50 / 81.50 \\&= 0.05521 \\&= 5.52\%\end{aligned}$$

Cost of Common Equity

Model-based methodologies:

- Dividend Discount Model
- Capital Asset Pricing Model

Less formal: add an equity risk premium (ERP) to the risk-free rate

- Equity risk premium usually estimated at 3-6%
- $k_e = r_f + \text{ERP}$
- Cost of equity assuming a 2% risk-free rate and an ERP at the midpoint of the historic range:

$$k_e = 2\% + 4.5\% = 6.5\%$$

Dividend Discount Model

Constant Growth Model (Gordon Growth Model)

- Assumes k constant and d growing at a constant rate of g .

$$d_{N+1} = d_N \times (1+g)$$

$$\text{Value} = \frac{d_0 \times (1 + g)}{k - g} = \frac{d_1}{k - g}$$

Example: \$4/share annual dividend (payable at year end), growing at an 8% rate, 12% annual discount rate.

$$d_0 = \$4 \qquad g = .08 \qquad k = .12$$

$$\text{Value} = \frac{4 \times 1.08}{.12 - .08} = \frac{\$4.32}{.04} = \$108.00 / \text{shr}$$

Dividend Discount Model Cost of Equity

$$k_e = \frac{d_1}{P_0} + g$$

Where:

k_e = cost of equity (retained earnings)

d_1 = dividend expected at the end of the period

P_0 = current stock price

g = constant perpetual dividend growth rate

Dividend Discount Model

Cost of equity capital

$$\text{Value} = \frac{d_0 (1+g)}{k-g} = \frac{d_1}{k-g}$$

$$P_0 = \frac{d_1}{k-g}$$

$$P_0 \times \frac{k-g}{P_0} = \frac{d_1}{k-g} \times \frac{k-g}{P_0}$$

$$k-g = \frac{d_1}{P_0}$$

$$k = \frac{d_1}{P_0} + g$$



Dividend Discount Model - Example

Assume the following for Metroset:

- Estimated dividend: \$2.25
- Current stock price: \$44.00
- Dividend growth rate: 9%

Dividend Discount Model - Solution

Assume the following for Metroset:

- Estimated dividend: \$2.25
- Current stock price: \$44.00
- Dividend growth rate: 9%

$$\begin{aligned}k_e &= \frac{d_1}{P_0} + g \\&= 2.25 / 44 + 0.09 \\&= 0.141\end{aligned}$$

Case Company Cost of Equity

Exercise One

Calculate AAPL's cost of equity capital using the appropriate variant of the dividend discount model (DDM).

In addition to obtaining a value prepare to discuss the following issues:

Does the cost of equity capital calculated this way most likely overstate or understate the true value?

What adjustments might be made to this method to arrive at a more accurate value?

Capital Asset Pricing Model

- CAPM required rate of return is cost of equity
 - Investors expect risk-free rate as minimum return
 - Equity investment is riskier than investing in a risk-free asset
 - Higher risk causes investors to require higher expected return
- Company systematic risk relative to the market expressed in the stock's beta (β)
 - Market $\beta = 1$
 - $\beta > 1$ implies greater volatility of return for stock versus market
 - $\beta < 1$ implies lower volatility of return for stock versus market

Risk and Expected Return

- The Capital Asset Pricing Model (CAPM) implies expected returns compensate investors only for non-diversifiable risk
- CAPM implies risk can be categorized into one of two types:



Specific

- Company specific or non-systematic
- Determined by factors unique to firm
- Investor not compensated for bearing company specific risk
- Managed via diversification



Market

- Market or asset class-related risk
- Risk that remains even when holding the most diversified portfolio possible (i.e., the “market portfolio”)
- Systemic or systematic risk

Specific Risk

- Also called unique, diversifiable or non-systemic risk
 - Managed via diversifying portfolios
 - Impact of diversification
 - Investible portfolios
- Examples of factors driving specific risk
 - Company managements
 - Type, location and quality of fixed assets
 - Experience, morale and motivation of workforce
 - Intensity of competition
 - Importance of product and process innovation
- Impact normally captured in cash flow projections or valuation multiples but not directly included in CAPM

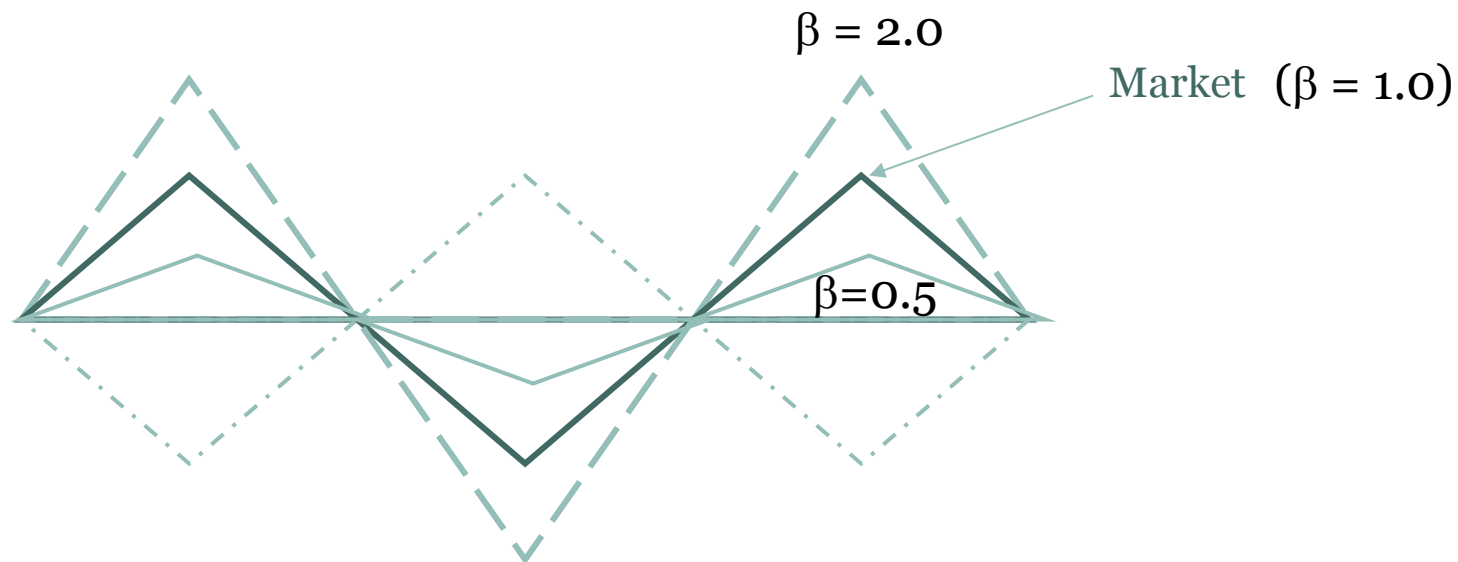
Market Risk

- Systematic or non-diversifiable risk
 - Co-movement within asset class reflecting common risks
 - The risk that would remain even if holding the “market portfolio”
 - Market risk is quantified by a security or portfolio beta
- Beta derived via statistical methodology
 - Computed by comparing historic returns of security versus market
 - Reflect volatility of security returns versus “market”
 - Can be used in computing cost of capital
- Potential problems
 - Betas are non-stationary
 - Impacted by changes in financial leverage
 - Impacted by changes in company operations

Beta

A stock's beta measures how its returns have varied relative to the market portfolio (i.e., universe of equities in the index being used to calculate beta).

- Often used as a measure of expected return volatility (i.e., risk)



HIGH BETA STOCKS ARE “RISKIER” THAN THE MARKET
LOW BETA STOCKS ARE “LESS RISKY” THAN THE MARKET
(Risk referring to volatility of returns relative to the market)

CAPM Required Rate of Return

$$k_e = r_f + (\beta \times R_M)$$

Where:

k_e = Cost of equity (required rate of return)

r_f = Risk-free rate of return

R_M = Market risk premium (expected return on the market in excess of the risk-free rate)

R_M = $r_M - r_f$ (expected return on the market minus the risk-free rate)

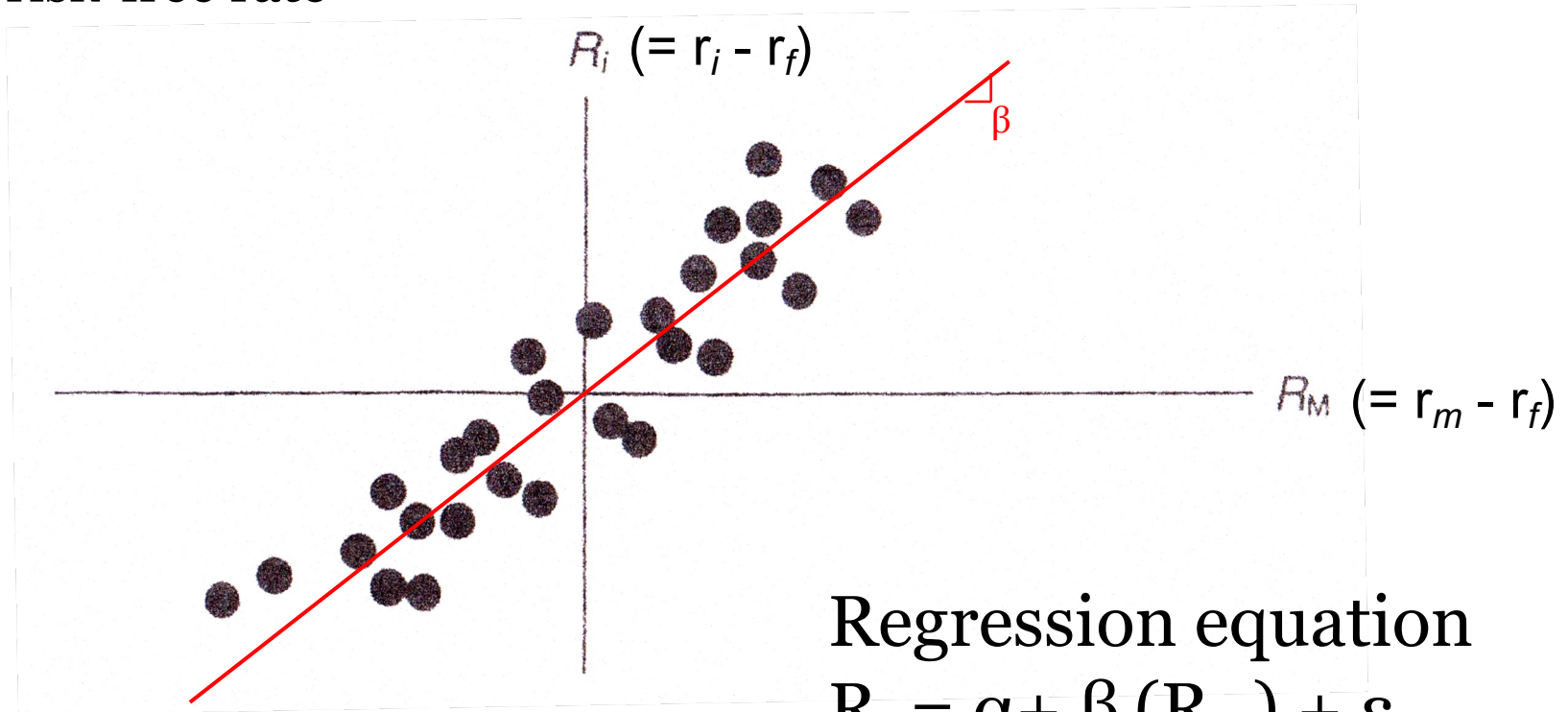
β = Equity beta (market-relative risk of security)

Scatter Plot of Excess Returns

r_m = actual return on market

r_i = actual return on Stock i

r_f = risk-free rate



Regression equation
 $R_i = \alpha + \beta_i(R_m) + \varepsilon_i$

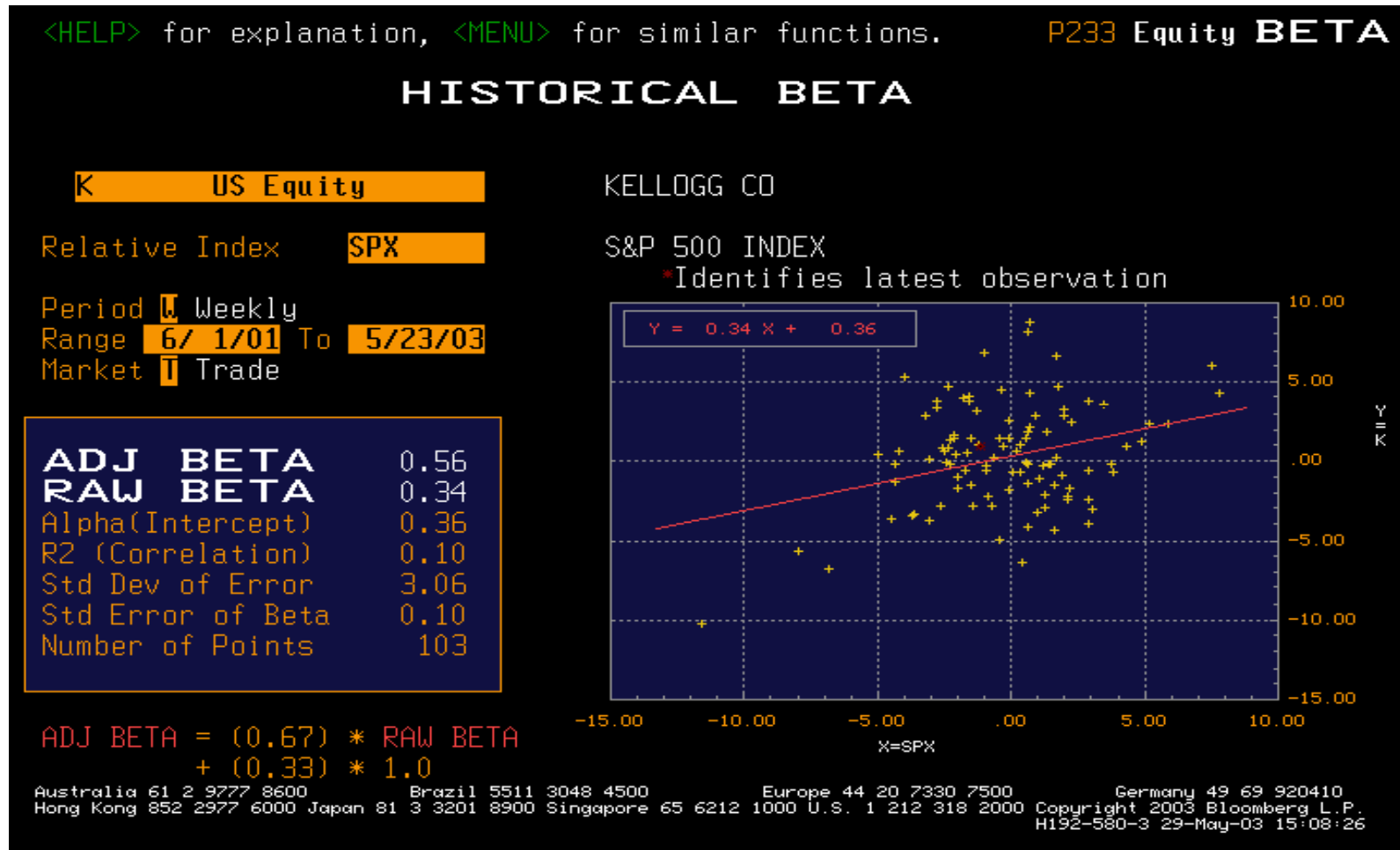
Capital Asset Pricing Model

- Use Index Model to compute systematic risk
- Regress excess returns (R) on security J versus excess returns on the market
 - Broad index such as S&P 500 typically used as proxy for market portfolio.
 - $R_{JT} = \alpha_{JT} + \beta(R_{IT}) + \varepsilon_J$
 - $r_{JT} - r_{fT} = \alpha_{JT} + \beta(r_{IT} - r_{fT}) + \varepsilon_J$
- Security i excess return computed by subtracting r_f from both asset and index returns
 - $\alpha_{JT} + \varepsilon_J$ are assumed to tend towards zero
 - $r_{JT} = r_{fT} + \beta(r_{IT} - r_{fT})$
 - The return investors demand on security J to be fairly compensated for its market risk

Using Bloomberg :

Type ACAT EQUITY (go) ----> OPTION 11 ---> OPTION 1

Bloomberg Screen



Capital Asset Pricing Model

Expected (required) return

$$E(r_i) = r_f + \beta_i [E(r_M) - r_f]$$

where

$E(r_i)$	=	expected rate of return of security i (required rate of return or cost of equity capital)
r_f	=	risk-free rate of return
β_i	=	beta of security i
$E(r_M)$	=	expected return of the market portfolio

Example: assume $r_f = 3.75\%$, $\beta_i = 1.26$, and $r_M = 6.50\%$, then

$$E(r_i) = r_f + \beta_i [E(r_M) - r_f]$$

$$E(r_i) = 3.75 + 1.26(6.50 - 3.75) = 3.75 + 3.465 = 7.215$$

- If an investor estimated a 10% return for the security there is an implied excess return, or Alpha, of 2.785% (10.0% - 7.215%). The projected return is above that rate of return that would be fair compensation for the amount of systematic risk entailed by holding security i.

Risk-Free Rate

- Risk-free rate in CAPM refers to asset that would generate a riskless (i.e., certain) return to investor
 - Recall earlier discussion of risk-free rates
 - Distinction between discounting risk-free cash flows and certain return
 - Potential complications of market risk impact on risk-free rate and consequence for estimated cost of capital
- For developed economies
 - Same currency government securities
 - Choice of short versus intermediate to long term rates



Market Risk Premium

- Measure of expected excess return on the market over risk-free investment required by investors to compensate them for the market portfolio
- Cannot be measured directly, only estimated from past data on stock market returns to actual returns or forward-looking estimates
- Factors impacting market risk premium

Market Risk Premium (MRP)

Using history to estimate MRP:

- Annual excess return measured by either arithmetic or geometric averages
- Arithmetic averages deviate from Geometric averages as holding period returns increase in volatility.
- Usually, 5-6% is used as MRP

Problems with MRP

- Historic MRP often used to estimate required returns
 - MRP changes over time and in different markets
 - Protracted out/under performance often followed by protracted periods varying from average returns in opposite direction
- Problem with using recent MRPs to estimate future equity market returns
 - Bias due to recent experience
 - Perceptions of relative riskiness of equities may have declined
 - Portfolio diversification not practiced until relatively recently
 - No index funds available until recently
 - Transaction costs not included and were relatively high in the past

Cost of Equity - Exercise

Find the cost of equity for Company XYZ using this information:

- $r_f = 5.25\%$
- $\beta = 1.3$
- $MRP = 5\%$

$$k_e = r_f + (\beta \times MRP)$$

Case Company Cost of Equity

Exercise Two

Calculate AAPL's cost of equity capital using a Capital Asset Pricing Model (CAPM) approach

In addition to performing the calculation, prepare to discuss the following issues

What is the appropriate benchmark for a risk-free rate?

Does value derived in this fashion likely overstate or understate AAPL's cost of equity? What is the rationale for whichever conclusion was arrived at?



Beta

- Betas are believed to be affected by three main factors:
 - Business sector of the company
 - Level of operational leverage
 - Level of financial leverage
- Beta needs to be adjusted for changes in leverage
 - Leverage directly related to volatility of earnings
 - Higher (lower) leverage results in more (less) volatile earnings
- Financial leverage - reliance on debt (discussed previously)
- Operating leverage of fixed versus fixed to variable costs.
 - High fixed/low variable costs lead to more volatility in earnings.
 - Results from higher change in ratio of $\Delta \text{operating income} / \Delta \text{sales}$

Beta

- Cross-check beta from several sources
- If there is a difference, consider averaging
- Reasons for the difference could be:
 - Different periods between data returns (i.e., daily, weekly, monthly or annual data)
 - Different periods over which data was measured (i.e., 1/2/5 years, etc.)
 - Different indexes used as market portfolio proxy (e.g., S&P 500, NASDAQ 100, etc.)

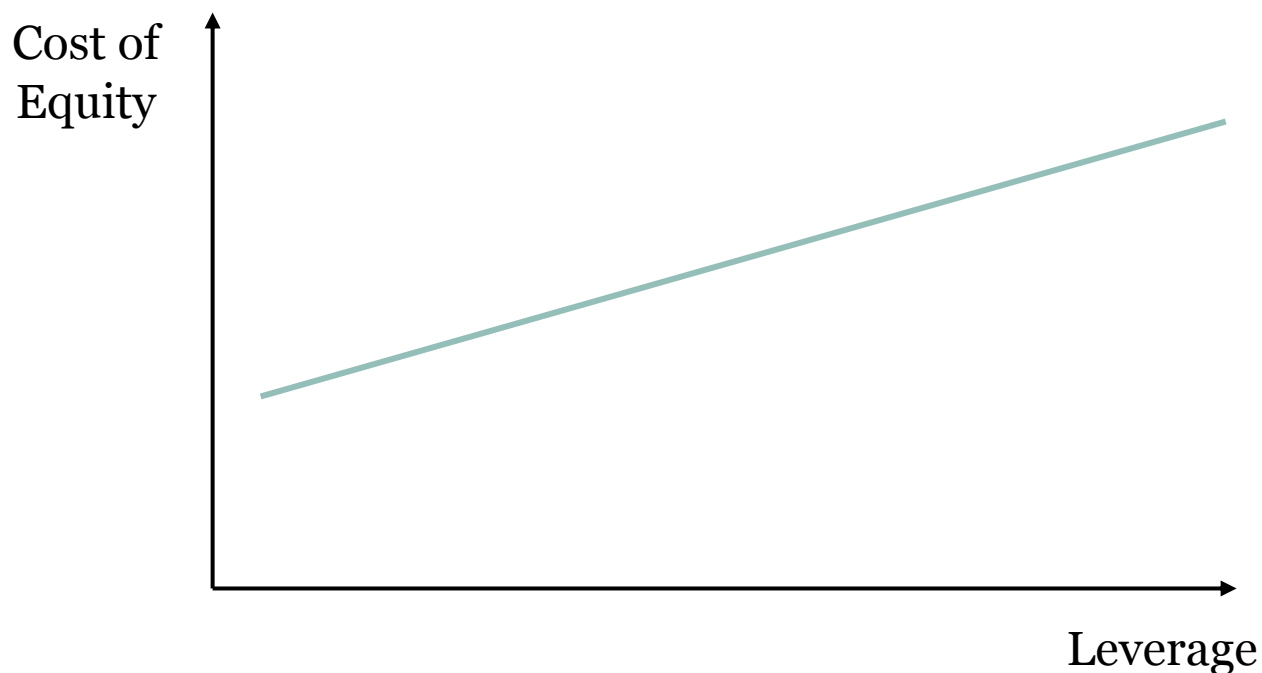
Issues Regarding Calculated Betas

- Calculation is based on historic returns
- Betas are not stationary over time
- Betas of stocks from different markets are not comparable – volatilities are based on different market portfolios
- Betas may understate systematic risk – U.S. stock betas are usually computed versus the S&P 500, not market portfolio
- Private companies have not traded and therefore cannot have Betas:
 - Use “proxy betas” from comparable companies, or
 - Use proxy betas from comparable companies, but make adjustment for different levels of financial leverage



Adjusting Beta for Leverage

Equity investors expect higher returns
for higher company leverage



Adjust Beta for Changes in Leverage

- Meaningful changes in a company's leverage require adjustment of historic beta
 - If leverage has increase, first de-lever the company (i.e., calculate beta as if 100% equity financed)
 - Then re-lever the company using new (or projected) debt/equity ratio to derive the adjusted beta
- Beta need to be adjusted any significant change in leverage
 - The same process is followed for a company that is deleveraging (i.e., reducing its debt/equity ratio)
 - Will result in an adjusted beta below company's historic beta

Adjusting Beta for Leverage

To un-lever β_e



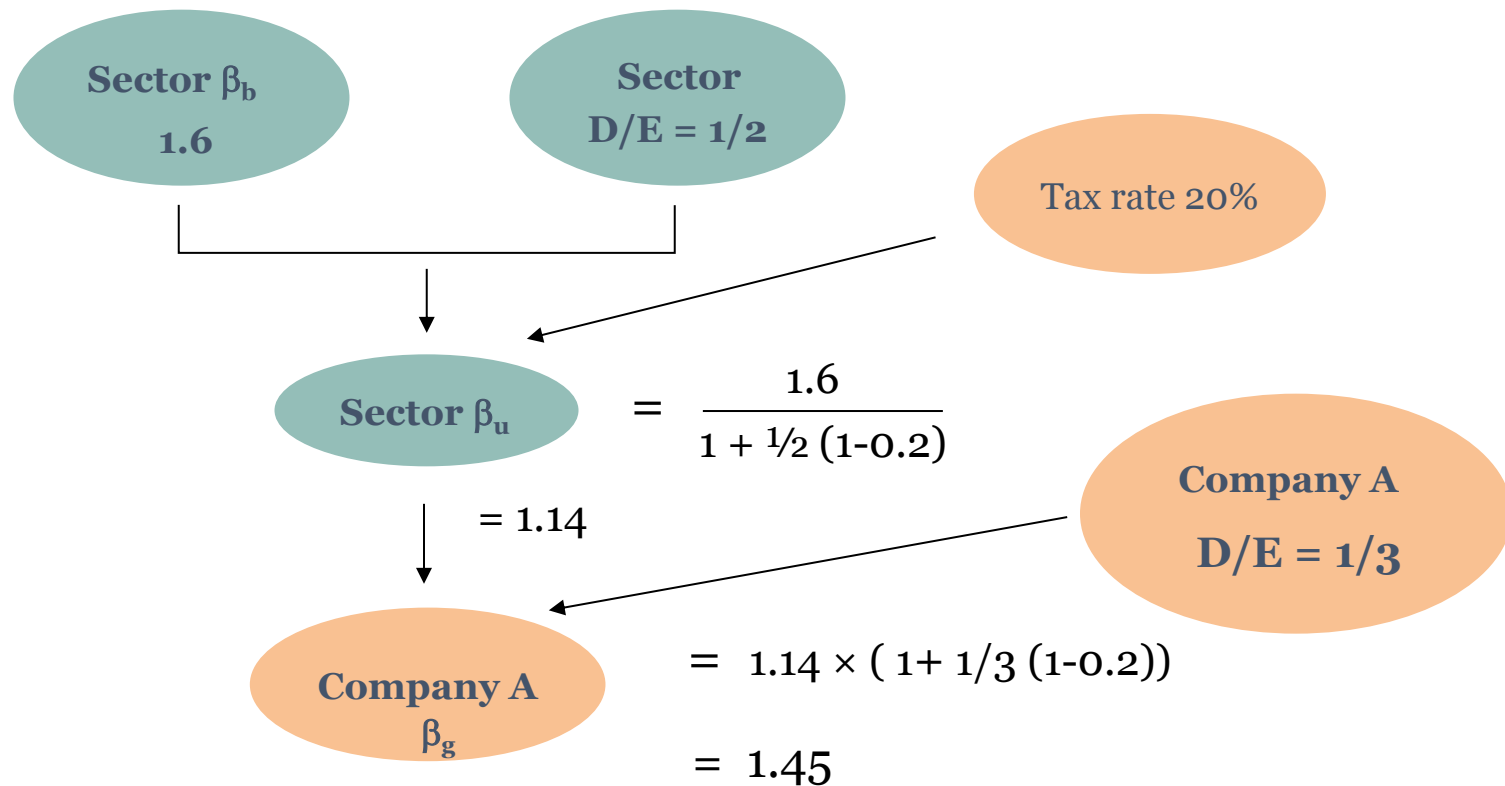
$$\beta_a = \frac{\beta_e}{1 + (1 - t)D / E}$$

To re-lever β_a



$$\beta_e = (1 + (1 - t)D / E) \times \beta_a$$

Adjusting Beta for Leverage



**So, un-lever the 1.6 Beta with a D/E of $\frac{1}{2}$ to 1.14.
Re-lever it to a lower D/E of $\frac{1}{3}$, and a lower Beta of 1.45 (compared to original 1.6)**

Cost of Capital vs Re-levered Beta

The XYZ Company, historic beta of 1.3, has recently issued additional debt securities to finance a share repurchase which will result in its debt/equity ratio changing from 60% to 80%.

Calculate XYZ's cost of equity prior to the debt issuance using the following information:

- $r_f = 5.25\%$
- $\beta = 1.3$
- $MRP = 5\%$

$$k_e = r_f + (\beta \times MRP)$$

$$\begin{aligned} k_e &= .0525 + (1.3 \times 0.05) \\ &= .0525 + .065 \\ &= .1175 \text{ or } 11.75\% \end{aligned}$$

Un-levering Beta

- $\beta = 1.3$
- Tax rate = 30%
- $D/E = .60$
- $r_f = 5.25\%$
- $MRP = 5\%$

$$\beta_a = \frac{\beta_e}{1 + (1 - t) D / E}$$

$$\begin{aligned}\beta_a &= 1.3 / (1 + (1 - .3) \times .6) \\ &= 1.3 / 1.42 \\ &= .92\end{aligned}$$

Re-levered Beta

- $\beta_a = .92$
- Tax rate = 30%
- $D/E = .80$
- $r_f = 5.25\%$
- $MRP = 5\%$

$$\beta_e = [(1 + (1 - t) D / E)] \times \beta_a$$

$$\begin{aligned}\beta_e &= [(1 + (1 - .3) \times .8)] \times .92 \\ &= 1.56 \times .92 \\ &= 1.44\end{aligned}$$

Cost of Equity at Target Debt/Equity

Find the cost of equity for Company XYZ using the re-leveraged Beta:

- $r_f = 5.25\%$
- $\beta = 1.44$
- $MRP = 5\%$

$$k_e = r_f + (\beta \times MRP)$$

$$\begin{aligned} k_e &= .0525 + (1.44 \times 0.05) \\ &= .0525 + .072 \\ &= .1245 \text{ or } 12.45\% \end{aligned}$$

Case Company Cost of Equity Exercise Three

Using AAPL's cost of equity based on the CAPM approach, calculate a relevered Beta assuming a D/E ratio of 1/3.

Assume current capital structure of:

Debt/Total capital = 5.0%

Equity/Total capital = 95.0%



Module 7

Implications of Cost of Capital for Corporate Funding Decisions



WACC (Time Varying)

- WACC likely vary over time
 - Capital structure usually changes over time
 - Life-cycle impacts (e.g., start ups, growth companies) are somewhat predictable
 - Changes for mature companies more dependent on situational factors (e.g., tax rates, investor or management preferences)
 - Unleveraged betas impacted by changes in business risk
- Different WACCs may be need for each year in the variable growth stage (prior to terminal value)
- Conventional valuation models often assume:
 - WACC is constant
 - Company capital structure will remain unchanged

Factors that Can Affect Cost of Capital

- Interest Rates

- Interest rates positively related to costs of debt and equity capital
 - Equity: higher risk-free rate → required rate of return (k_e)
 - Debt: higher interest rates → yield to maturity (k_d)

- Tax Rates

- Cost of debt varies inversely with tax rates
- Changes in tax rates might impact capital structure

Factors that Can Affect Cost of Capital

- Capital Structure

- By changing the leverage of the firm, can achieve different weightings in WACC

Dividend Policy

- Reducing or increasing retained earnings and changing the need for looking for outside financing

- Investment Policy

- Changes in a firm's capital expenditures can raise or lower the risks of a firm

Cost of Capital: Gearing

Factors that affect capital structure decisions:

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- Level of business risk
 - Tax position
 - Financial flexibility

Key Points when calculating WACC:

- Calculations should reflect target leverage in the medium-term rather than current leverage
- Leverage impacts equity beta and thus assumptions will affect the cost of equity



Case Company WACC Exercise

Evaluate AAPL's WACC

Calculate AAPL's WACC based on solutions to earlier exercises

Elements to consider :

- D/E ratio
- Tax rate