

**Quiz 3: Spring 1998****This quiz is worth 10% and you have 30 minutes.**

1. You have been provided the information on the after-tax cost of debt and cost of capital that a company will have at a 10% debt ratio, and asked to estimate the after-tax cost of debt and cost of capital at 20%. The long term treasury bond rate is 7%. ( 5 points)

<i>Debt Ratio</i>	<i>10%</i>	<i>20%</i>	<i>Extra Column</i>
\$ Debt	\$ 1,500		
EBIT	\$ 1,000		
Interest Expenses	\$ 120		
Interest Coverage Ratio	8.33		
Bond Rating	AA		
Interest Rate	8.00%		
After-tax Cost of Debt	4.80%		
Beta	1.06		
Cost of Equity	12.83%		
Cost of Capital	11.78%		

The interest coverage ratios, ratings and spreads are as follows:

<i>Coverage Ratio</i>	<i>Rating</i>	<i>Spread over Treasury</i>
> 10	AAA	0.30%
7 - 10	AA	1.00%
5 - 7	A	1.50%
3 - 5	BBB	2.00%
2- 3	BB	2.50%
1.25 - 2	B	3.00%
0.75 - 1.25	CCC	5.00%
0.50 - 0.75	CC	6.50%
0.25 - 0.50	C	8.00%
< 0.25	D	10.00%

2. CSL Corporation is a mid-sized transportation firm with 10 million shares outstanding, trading at \$ 25 per share and debt outstanding of \$ 50 million. It is estimated that the cost of capital, which is currently 11%, will drop to 10%, if the firm borrows \$ 100 million and buys back stock. Estimate the expected change in the stock price if the expected growth rate in operating earnings over time is 5%.

3. You have run a regression of changes in firm value against changes in long term bond rates and arrived at the following regression:

$$\text{Change in Firm Value} = 0.16 - 5.00 \text{ Change in Long Term Bond Rate}$$

The firm has \$ 100 million in zero-coupon two-year notes outstanding, and plans to borrow another \$ 150 million using zero-coupon securities. If your objective is to match the duration of the financing to those of the assets, what should the maturity of these zero-coupon notes be?

**Quiz 3: Spring 1999**

**This quiz is worth 10% and you have 30 minutes.**

1. You have been asked to assess the cost of capital and return on capital for CVX

Corporation. The following information is provided to you:

- The firm has 15 million shares outstanding, trading at \$ 10 per share. The book value of equity is \$ 50million.
  - The firm has \$ 50 million bond offering outstanding, with a coupon rate of 7%, trading at par. In addition, the firm has an old bank loan on its books, with 5 years left to maturity, an 8% stated interest rate, and a face value of \$ 50 million.
  - The firm also had operating lease expenses of \$ 10 million for the current year, and has commitments to make these same lease payments for the next 7 years.
  - The firm's current beta is 1.20, the treasury bond rate is 6% and the market risk premium is 5.5%
  - The firm also reported earnings before interest and taxes of \$ 40 million (after operating lease expenses), and has a marginal tax rate of 40%.
- a. Estimate the market value of the outstanding debt.
  - b. Estimate the cost of capital for the firm.
  - c. Estimate the return on capital for the firm

2. Duagen Inc, is a small steel firm, which recently borrowed money and bought back stock. Prior to the transaction, the firm had 10 million shares outstanding, trading at \$ 20 per share, and \$ 50 million in debt outstanding (with a pre-tax cost of debt of 8%). After the transaction, the stock price jumped \$ 3 per share. If the firm's tax rate is 40%, the expected growth in value over time is 5%, and the cost of capital after the transaction is 10%, estimate the cost of equity prior to the transaction occurring. (You can assume rational investors, where all investors, including those selling back stock, get a fair share of the increase in value).

3. You have run a regression of firm value changes against interest rate changes for Steel Products Inc, an office supplies manufacturer.

$$\text{Change in Firm Value} = 0.06 - 7.5 (\text{Change in Interest Rates})$$

The firm has two types of debt outstanding – a one-year \$ 200 million bond issue (with a duration of 1 year), and a five-year \$ 100 million bank loan (with a duration of 4 years), and 70 million shares outstanding at \$ 10 per share. It is planning a \$ 250 billion bond issue to finance expansion into the internet retailing business. If the duration of assets of firms in this sector is only 1 year, what should the duration of the bond issue be?

**Quiz 3A: Spring 1999**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. B & N is a book retailer, that earned \$ 1 billion before interest and taxes, but after \$ 300 million in operating lease expenses last year; the firm has commitments to make \$ 300 million in lease payments for the next 6 years. The firm had interest expenses of \$ 100 million on 5 –year convertible debt with a face value (book value) of \$ 2 billion; the bonds trade at a market value of \$ 2.5 billion. Assume that B&N is rated BBB, and that the default spread on BBB rated bonds is 2% over the treasury bond rate. Finally, the firm also had 300 million shares outstanding, trading at \$ 10 per share. The stock has a beta of 1.25, the tax rate is 40% and the treasury bond rate is 5.5% (Market risk premium = 6.3%).

a. Estimate the market value of the debt in this firm. ( 2 points)

b. Estimate the cost of capital for this firm. ( 2 points)

2. You are analyzing the optimal debt ratio for Borders. Border’s current debt ratio (including operating leases) is 30% and its current cost of capital is 10%. If the firm moves to the optimal, it is anticipated that Border’s firm value will increase from \$ 5 billion to \$ 5.5 billion. Assume no growth in cost savings, and that Border’s beta at its optimal debt ratio is 1.00 and that its after-tax cost of borrowing at the optimal will be 5%, estimate Border’s optimal debt to capital ratio. (The treasury bond rate is still 5.5%, and the risk premium is still 6.3%) ( 4 points)

3. You have analyzed the sensitivity of firm value and operating income, for two firms, to change in interest rates and inflation. The coefficients from the regressions are reported below:

<i>Firm</i>	<i>Interest rates</i>	<i>Inflation</i>
Cody's	$\Delta FV = 2.2 - 7.0 \Delta \text{Interest rate}$	$\Delta OI = 1.5 - 2.5 \Delta \text{Inflation}$
BAM	$\Delta FV = 4.4 + 7.0 \Delta \text{Interest rate}$	$\Delta OI = 3.4 + 2.5 \Delta \text{Inflation}$

a. Which of these two firms should be using long-term debt? ( 1 point)

Cody's

BAM

b. Which of these two firms should be using floating-rate debt? ( 1 point)

Cody's

BAM

**Quiz 3: Spring 2000**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

**1. Short Questions (True or False) (1/2 point each)**

- The cost of equity is generally much higher than the after-tax cost of debt. Therefore, increasing the debt ratio will always lower the cost of capital.

True

False

- If dividend payments to stockholders are tax deductible to corporations, the optimal debt ratios of these firms will decrease.

True

False

- Firms with large tax loss carry-forwards will get a smaller benefit from borrowing than firms without these tax loss carry-forwards. (Tax-loss carry-forwards are losses in prior periods that are accumulated and can be offset against income in future periods to reduce taxes)

True

False

- Firms with more uncertainty about future investment needs (both in terms of magnitude and type) should generally borrow more money than firms with less uncertainty.

True

False

2. CG Technologies has 800 million shares outstanding, trading at \$ 10 per share, and no debt outstanding. The firm currently has a cost of equity of 9.20%. With the assumption of perpetual savings but no growth, the firm has computed that at its optimal debt to capital ratio, its firm value will be 13.75% higher than it is currently. If the cost of equity at the optimal debt ratio is 10.48% and the pre-tax cost of debt

at the optimal debt ratio is 7.5%, estimate the optimal debt ratio. (The tax rate is 40%) ( 4 points)

3. Regina Pharmaceuticals has \$ 1 billion in 4-year zero-coupon bonds outstanding. It is considering a plan to increase its debt to \$ 4 billion, and anticipates a combination of 2-year and 10-year zero-coupon bonds. A regression of firm value against changes in interest rates yields the following:

$$\text{Change in Firm Value} = 2.35\% - 7.00 (\text{Change in interest rates})$$

If Regina wants to match the duration of its total debt to the duration of its assets after this transaction, what proportion of the new bonds should be 2-year zero-coupon bonds?



**Quiz 3: Spring 2001**

1. You have been asked to analyze the capital structure of Stevens Steel, a small steel company. The company has supplied you with the following information:

- There are 100 million shares outstanding, trading at \$ 10 a share
- The firm has debt outstanding of \$ 500 million, in market value terms.
- The beta for the firm currently is 1.04, the riskfree rate is 5% and the market risk premium is 5.5%.
- The firm's current bond rating is A; the default spread for A rated bonds is 1.5%.
- The effective tax rate is 20%, but the marginal tax rate is 40%.

a. Estimate the current cost of capital for Stevens Steel. (2 points)

b. Now assume that you have computed the optimal debt to capital ratio to be 50%. If the pre-tax cost of debt will rise by 0.25% if it moves to the optimal, estimate the new cost of capital at 50%. (2 points)

c. Estimate the change in stock price from moving to the optimal debt ratio, assuming that you are planning to borrow money and buy back stock, and that you can buy the stock back at an average price of \$ 11.50. (3 points)

2. Amherst Autos, a firm that manufactures automobile stereos, has \$ 1 billion in market value debt outstanding and a market debt to capital ratio of 50%. A regression of changes in firm value at Harmony Autos against changes in interest rates yields the following:

$$\text{Change in firm value}_{\text{Harmony}} = 0.06 - 7.00 \text{ Change in long term bond rate}$$

Your analysis suggests that Harmony's optimal debt to capital ratio is 25% and that the firm should pay off some of its debt. Harmony's existing debt is in the form of 2 bonds - \$ 400 million of 5-year bonds (with a four-year duration) and \$ 600 million of 10-year bonds (with an eight-year duration). If your objective is to match the duration of your debt to the duration of your assets, how much of each bond would you choose to retire? (3 points)

**Quiz 3: Corporate Finance (Spring 2002)**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam. In cases of ambiguity, make your assumptions clear.

1. You are trying to estimate whether Loomis Textiles, a textile manufacturing firm, should recapitalize itself. You know that the firm has \$ 100 million in debt outstanding (in market value terms) and 90 million shares, trading at \$ 10 per share. The current beta (levered) for the stock is 1.15 and the current pre-tax cost of debt is 6%. The riskless rate is 5.25% and the market risk premium is 4%. The corporate tax rate is 40%.

a. Estimate the current cost of capital. (1 point)

b. Now assume that the firm will be borrowing \$ 200 million and buying back stock. If it does so, it is expected that the pre-tax cost of debt will rise to 7%. Estimate the cost of capital if it does move to the optimal. (2 points)

c. Now assume that the firm is closely held and that its stock has outperformed the market for the last 5 years. In addition, the firm has earned (and expects to continue earning) a return on capital of 8% on its investments. The firm has also paid large dividends every year for the last decade. Which of the following actions would you advise the firm to take? (1 pt)

- a. Borrow \$ 200 million and buy back stock today
- b. Borrow money over the next 5 years and invest in new projects
- c. Borrow money over the next 5 years and pay higher dividends
- d. Borrow money over the next 5 years and buy back stock

Explain (very briefly):

2. NorthFace Inc. is a firm that manufactures skis. The firm has no debt outstanding, 50 million shares trading at \$ 80 per share and a beta of 1.00. The firm is planning to increase its debt to capital ratio to 25% and believes that its cost of capital will drop to 8% at this debt ratio. The current riskfree rate is 5% and the risk premium is 4%. Assuming that they can borrow the money today and are able to buy the shares back at the current stock price, estimate the value per share after the repurchase. (You can assume 3% growth in firm value forever) (3 points)

3. Assuming that your objective is to design the perfect bond for each of these firms, choose the bond that you would use to fund each of the following companies. Pick one of each of the following choices (Circle the right answer): (1 point each)

- Maturity: Short term or Longterm
- Currency: Dollar or Mixed Currency
- Fixed or Floating: Fixed rate or Floating rate
- Straight or Convertible: Straight or Convertible

a. A steel company with heavy infrastructure investments, no pricing power and stable earnings, with all of its operating earnings in the United States.

Maturity:	Short Term	Long Term
Currency:	Dollar	Mixed-Currency
Fixed or Floating:	Fixed	Floating
Straight or Convertible:	Straight	Convertible

b. A mature consumer product company whose primary asset is its brand name, with substantial pricing power and revenues spread over all parts of the globe.

Maturity:	Short Term	Long Term
Currency:	Dollar	Mixed-Currency
Fixed or Floating:	Fixed	Floating
Straight or Convertible:	Straight	Convertible

c. A technology company with products that become obsolete quickly, U.S. dollar cashflows, with a high expected growth rate, in a very competitive industry.

Maturity:	Short Term	Long Term
Currency:	Dollar	Mixed-Currency
Fixed or Floating:	Fixed	Floating
Straight or Convertible:	Straight	Convertible

### Quiz 3: Corporate Finance (Spring 2003)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You are assessing the optimal capital structure for Totem Holdings, a large publicly traded chemical company with 100 million shares trading at \$ 30 per share and \$ 1 billion in debt outstanding. The firm currently has a pre-tax cost of debt of 6% and you have correctly estimated the current cost of capital to be 9%. The firm is planning to borrow an additional \$ 2 billion (which will push up the pre-tax cost of debt to 7%) and use the proceeds to buy back \$ 1 billion in stock and invest \$1 billion in its existing business. The firm's tax rate is 40%, the current riskfree rate is 5% and the market risk premium is 4%.
  - a. Estimate the new cost of equity for this firm after the transaction. (3 points)
  - b. Estimate the new cost of capital after the transaction. (1 point)
  - c. Estimate the change in the value per share if the firm moves to its optimal by buying back shares at \$ 33 per share. (You can ignore the NPV of the investment in the existing business) (3 points)

2. Totem has also asked you to examine whether they have the right kind of debt. Their existing debt of \$ 1 billion is composed of

Type of debt	Amount of debt
Commercial paper (due in 6 months)	\$ 0.4 billion
Zero coupon bond (due in 3 years)	\$ 0.6 billion

Your assessment is that the duration of Totem's assets is 5 years and that a third of Totem's cashflows are in Euros.

- a. Estimate the duration of the new debt (\$ 2 billion) that Totem is planning to issue, assuming that you want to have debt of the right duration after the issue. (2 points)
- b. Estimate the currency break down on the new debt (\$ 2 billion) that Totem is planning to issue, assuming you want debt with the right currency mix after the issue. ( 1 point)

**Quiz 3: Corporate Finance (Spring 2004)**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. DuraMax Inc. manufactures car radios and reported \$ 75 million in operating income last year on revenues of \$ 1 billion last year. The firm is all equity funded and you have computed a bottom-up beta for the firm of 0.80. You have estimated the optimal debt ratio for the firm to be 40% debt, and you expect the firm to have \$ 20 million in interest expenses at that debt ratio. Using the interest coverage ratio table below, estimate the cost of capital for DuraMax at the optimal debt ratio. The riskfree rate is 4%, the tax rate is 40% and the equity market risk premium is 4.82%.

<i>Interest Coverage Ratio</i>	<i>Rating</i>	<i>Typical default spread</i>
> 12.5	AAA	0.35%
9.50 - 12.50	AA	0.50%
7.50 - 9.50	A+	0.70%
6.00 - 7.50	A	0.85%
4.50 - 6.00	A-	1.00%
4.00 - 4.50	BBB	1.50%
3.50 - 4.00	BB+	2.00%
3.00 - 3.50	BB	2.50%
2.50 - 3.00	B+	3.25%
2.00 - 2.50	B	4.00%
1.50 - 2.00	B-	6.00%
1.25 - 1.50	CCC	8.00%
0.80 - 1.25	CC	10.00%
0.50 - 0.80	C	12.00%
< 0.65	D	20.00%

(3 points)

2. Barclay's Couches Inc. has 80 million shares trading at \$ 10 a share and \$ 250 million in debt outstanding; the firm's current cost of capital is 10% and it generated \$ 50 million in cashflows (after taxes and capital expenditures) last year. The firm is planning to borrow \$ 250 million and to buy back stock, which it believes will lower the cost of capital to 9%.
- What is the growth rate implied in the current market value? (1 point)
  - How much will the value of the firm increase after the recapitalization, assuming that the implied growth rate computed in part (a) is correct. (1 point)

- c. Assuming that shareholders are rational, how many shares will be outstanding in Barclay's after the stock buyback. ( 2 points)
3. Barclay's existing debt of \$ 250 million is composed of a 6- year zero coupon bond with a market value of \$ 150 million and a 10-year coupon bond with a duration of 8 years and a market value of \$ 100 million. After the new bond issue of \$ 250 million, Barclay's would like to be at its optimal duration of 10 years.
- a. Estimate the duration of the new bond issue (to get the weighted average duration of all debt up to 10 years). ( 2 points)
- b. Barclay's is in a competitive business where firms have little pricing power and gets 50% of its revenues from the EU region. If all of Barclay's existing debt is US dollar debt, which of the following would you recommend for the new debt issue?
- i. 100% Fixed rate, US dollar debt
  - ii. 100% Floating rate, US dollar debt
  - iii. 100% Fixed rate, Euro debt
  - iv. 100% Floating rate, Euro debt
  - v. 50% Fixed rate, US dollar debt and 50% Fixed rate, Euro debt
  - vi. 50% Floating rate, US dollar debt and 50% Floating rate, Euro debt
- ( 1 point)

**Quiz 3: Corporate Finance (Spring 2005)**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Rivera Inc. is a publicly traded firm with 100 million shares trading at \$ 10 a share and no debt outstanding. The firm announces that it will be borrowing \$ 250 million and buying back its own stock. On the announcement, the stock price increases to \$ 10.25 a share. If the tax rate for the firm is 40% and the cost of bankruptcy is estimated to be 30% of the unlevered firm value, estimate the probability of bankruptcy with the additional debt. (You can assume that the market is efficiently assessing the effect of the additional debt on firm value) (3 point)

2. Limitas Inc. is a publicly traded chemical company with 200 million shares trading at \$ 20 a share and \$ 1 billion in outstanding debt; the market interest rate on the debt is 7%. The firm has a cost of capital of 10.44% and the marginal tax rate is 40%. The firm is considering issuing new equity and retiring all of its debt. Estimate the new value for the firm if it goes through with this transaction? (The riskfree rate is 5% and the market risk premium is 4%. You can also assume no growth in perpetuity) ( 4 points)

3. Avanti Corporation is in two businesses – transportation and tourism, deriving 75% of its revenues from the former and 25% from the latter. Projects in the transportation business typically have long durations (with an average duration of 10 years), whereas projects in the tourism business have shorter durations (with an average duration of 5 years). The firm currently has a debt to capital ratio of 50% and the debt has an average duration of 6 years.

- a. Estimate the duration of Avanti's assets (based on its current business mix). (1 point)
- b. Now assume that Avanti plans to borrow money to fund a doubling of its tourist business while holding its transportation business at its existing value. If the objective is to match the debt duration to asset duration for the firm after the new debt issue, estimate the duration of the new debt issue. (2 points)

### Quiz 3: Corporate Finance (Spring 2007)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You are helping the CFO of a steel company assess whether the firm should embark on a plan to reduce its financial leverage. The firm currently has equity with a market value of \$ 400 million and debt outstanding (in market value terms) of \$ 600 million. The cost of equity currently is 13% and the pre-tax cost of borrowing is 9%. (The riskfree rate is 5% , the tax rate is 40% and the equity risk premium is 4%)
  - a. Estimate the current cost of capital for the firm. (1 point)
  - b. The firm plans to issue new stock and retire half of its existing debt. If the pre-tax cost of borrowing will drop to 6% as a consequence, estimate the cost of capital after the recapitalization. (2 points)
  
2. Torre Inc. is a small, sporting goods firm, with 20 million shares outstanding, trading at \$ 4 a share, and \$ 20 million in debt (market value); the firm's current cost of capital is 10%. The firm is planning to recapitalize by borrowing an additional \$30 million and buying back shares, thus lowering its cost of capital to 9%.
  - a. Assuming no growth in savings over time, estimate the change in firm value from moving to the new debt ratio. (1 point)
  - b. Now assume that the firm does buy back shares at \$5/share. Estimate the increase in value per share for the remaining shares. (3 points)
  
3. Drew Enterprises is a manufacturing firm in two businesses - technology and telecommunications, with very different characteristics:
 

Business	Estimated value	Typical asset duration
Technology	\$ 5 billion	2 years
Telecommunication	\$ 15 billion	10 years

The firm currently has \$ 5 billion in debt with a duration matched up the existing asset duration. The firm is considering a management-led buyout, where it will

  - i. Sell half of the telecommunications business for \$7.5 billion
  - ii. Borrow an additional \$5 billion in zero-coupon bonds
  - iii. Buy back stock with the proceeds (from the asset sale and the bond issue)

If Drew plans to match up the duration of its assets to that of its debt after this transaction, estimate the maturity of the new zero coupon bonds. (3 points)



### Quiz 3: Corporate Finance (Spring 2008)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Cowan Industries is an all equity funded chemical company, with 200 million shares trading at \$ 10 a share; the cost of equity is 9%. The firm is considering borrowing \$ 600 million at an interest rate of 6% and buying back shares. If the marginal tax rate is 40%, estimate the new cost of capital for the firm. (The riskfree rate is 5% and the equity risk premium is 4%) (3 points)

2. Liberty Media is a telecom company that is coming off several years of a borrowing binge. The firm currently has \$ 800 million in debt outstanding, 10 million shares trading at \$ 20 a share and faces a cost of capital of 12%. The firm is considering issuing \$ 300 million of new equity and repaying debt and believes that doing so will lower the cost of capital to 10%. The firm's operations are in stable growth, growing at 4% a year.

a. Estimate the increase in firm value from this transaction. (2 points)

b. Assuming that Liberty Media issued 20 million shares, in a private placement, to raise the \$ 300 million (to retire debt), estimate the value of equity per share after the transaction. (2 points)

3. Venezia Inc. is a small publicly traded hotel company with a market value for equity of \$ 75 million and debt outstanding of \$ 25 million; the debt is in the form of 5- year zero coupon bonds and a regression of changes in firm value against interest rates yields the following:

$$\text{Change in firm value} = 0.50 - 7.50 (\text{Change in interest rates})$$

The firm is considering starting a travel agency arm to extend its reach in the tourism business and borrowing \$ 50 million to fund that entire expansion. If the duration of travel agency business is 3 years, and Venezia wants the duration of its overall debt to match its consolidated assets, what should the duration of the new debt be? (3 points)

### Quiz 3: Corporate Finance (Spring 2009)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Delgado Enterprises is an auto parts company that has accumulated considerable debt. The firm has 50 million shares, trading at \$ 8 a share, and \$ 600 million in debt outstanding (in market value terms). The current levered beta for the firm is 2.28 and the firm has a BB rating, with a default spread of 6% over the riskfree rate. The riskfree rate is 4% and the equity risk premium is 6%. The marginal tax rate is 40%.

a. Estimate the current cost of capital for the firm. (1 point )

b. Now assume that the firm is considering issuing equity, with the intent of halving its debt to capital ratio. If this action will improve the rating of the firm to A, with a default spread of 2.5% over the risk free rate, estimate the new cost of capital for the firm. (3 points)

2. Limora Inc. has 100 million shares outstanding, trading at \$ 10 a share, and no debt outstanding. The beta for the stock is 1.00; the riskfree rate is 4% and the equity risk premium is 6%; the marginal tax rate is 40%. The firm is considering borrowing \$ 400 million and buying back shares. If investors are rational, and the stock price on the buy back is \$11.00, estimate the pre-tax cost of debt on the borrowing. (You can assume no growth in the savings in perpetuity) (3 points)

3. Tremont Corp. is a company with only US operations and in two businesses – hotels, and travel services. The estimated duration and the value of the assets in each business are listed below, as well as the current cash balance of the firm:

Asset	Value (\$ million)	Duration (in years)
Hotels	1200	12
Travel Services	800	3
Cash	200	0

The firm currently has \$ 300 million in very short-term (duration=0) debt and \$1,200 million (in market value terms) in a 10-year zero coupon bond outstanding. If the firm is considering using its entire cash balance to retire debt, and it wants to have the duration of its assets match the duration of its debt after the transaction, how much of each type of debt would you retire? (3 points)

**Quiz 3: Corporate Finance (Spring 2010)**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Beltran Enterprises is a publicly traded transportation firm with 80 million shares outstanding, trading at \$25 a share and \$ 500 million in debt. The firm has \$120 million in operating income (EBIT), its current cost of equity is 10% and its current rating is A (with a default spread of 2% over the riskfree rate). The current riskfree rate is 4%, the marginal tax rate is 40% and the equity risk premium is 5%.

a. Estimate the current cost of capital for the firm. (1 point)

b. Now assume that the firm is considering tripling its dollar debt and buying back stock. If this action will lower the bond rating to B and increase the default spread to 6%, estimate the interest expenses at the new debt level and the tax rate to use to compute the after-tax cost of debt. (1 point)

c. If the firm does triple its dollar debt and buys back stock, estimate the new cost of capital for the firm. (2 points)

2. Beltran is modeling its increase debt/buyback strategy on Civitas Inc., another firm in the same sector. Civitas was an all equity funded firm with 100 million shares outstanding trading at \$ 10 a share, a cost of equity of 9% and expected growth rate forever of 3%. The firm borrowed \$ 600 million and bought back shares at \$10.50 apiece. Assuming investors are rational, estimate the cost of capital for Civitas after the transaction. (3 points)

3. Loriad Enterprises is a transportation firm that has two bond issues outstanding – a 4-year zero coupon bond with a market value of \$ 1 billion and a 10-year zero coupon bond with a market value of \$ 2 billion; the market value of equity is \$ 2 billion. The firm has a manufacturing division with an estimated value of \$ 4 billion and duration of 9 years and a financial service division, which accounts for the rest of the firm's current market value. Assuming that the duration of the firm's businesses is equal to the duration of its debt currently, estimate the duration of the financial service division. (3 points)

### Quiz 3: Corporate Finance (Spring 2011)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Loman Enterprises is a public traded company, with 60 million shares outstanding, trading at \$10/share and \$ 400 million in debt outstanding (book and market value). The firm currently has a pre-tax cost of debt of 8% and a cost of capital of 9.72%. The riskfree rate is 3%, the equity risk premium is 5% and the marginal tax rate is 40%. Shaken by the financial crisis, the firm is planning on issuing new shares and retiring all of its debt. If it does so, what will its cost of capital be after the transaction? (3 points)
  
2. Ostea Inc. is a publicly traded beverage company with 10 million shares, trading at \$40 a share, and \$200 million in debt; the current cost of capital is 10.5%. Ostea plans to borrow \$ 200 million and buy back stock, and it expects its cost of capital to drop to 10%, if it does so. Assuming that investors are rational and that savings from the lower cost of capital will grow 2% a year in perpetuity, how many shares will Ostea be able to buy back with \$ 200 million. (4 points)
  
3. You have be asked to analyze how best Castoff Inc, a manufacturing firm, should finance its acquisitions of LMV Inc, and have been provided with the following information on the two firms:
 

<i>Firm</i>	<i>Market value of Equity</i>	<i>Market value of Debt</i>
Castoff	\$ 200 million	\$ 200 million (all 4-year zero coupon debt)
LMV	\$ 300 million	\$ 100 million (all 6-year zero coupon debt)

You have also run regressions of changes in firm value against changes in interest rates for both companies:  
 Change in Value<sub>Castoff</sub> = 0.08 – 4.00 Change in T. Bond rate  
 Change in Value<sub>LMV</sub> = 0.12 – 7.00 Change in T. Bond rate  
 Castoff plans to assume<sup>1</sup> all of LMV’s debt and plans to acquire the equity in LMV using all debt. If its objective is have the weighted duration of the combined firm’s debt be equal to the weighted duration of the combined firm’s assets, what should the maturity of the “new” debt issued be? (3 points)

<sup>1</sup> All of LMV’s existing debt will become Castoff debt. Castoff will therefore have to come up with only the equity portion of LMV for the acquisition.

### Quiz 3: Corporate Finance (Spring 2012)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. James Sporting Goods is a small, publicly traded company that has 10 million shares outstanding, trading at \$ 2/share and \$ 80 million in debt (book and market) outstanding. The current (levered) beta for the company is 2.72 and the current pre-tax cost of debt is 9%. The riskfree rate is 3%, the equity risk premium is 6% and the marginal tax rate is 40%.
  - a. Estimate the current cost of capital for the firm. (1 point)
  - b. Now assume that you believe reducing your debt to capital ratio to 30% is the right choice to make and that doing so will reduce your default spread by half. Estimate the cost of capital at a 30% debt ratio. (3 points)
  
2. Goodell Media is a publicly traded firm with 80 million shares outstanding, trading at \$ 10/share, and \$ 200 million in debt outstanding. Goodell is considering borrowing \$ 440 million and buying back shares at \$11/share; the cost of capital will drop from 8.25% to 8% as a consequence. Assuming no growth in perpetuity, estimate the value per share for the remaining shares, after the buyback. (3 points)
  
3. Ulysses Tel is a telecom company with 50 million shares, trading at \$40/share and \$ 500 million in debt outstanding; half the debt is 3-year zero coupon debt and the rest is a balloon payment bank loan, with principal and interest due in one year. You are considering borrowing money and acquiring Sylvan Films, a media business, for \$1.5 billion and you have run regressions of firm value changes against interest changes for both firms:
  - ⊗ Firm Value<sub>Ulysses</sub> = 0.50 – 8.00 ⊗ T.Bond Rate
  - ⊗ Firm Value<sub>Sylvan</sub> = 0.50 – 2.00 ⊗ T.Bond Rate
 If you want the duration of your total debt to be matched up to the duration of your assets, post-acquisition, estimate the duration of the debt you would use in funding the acquisition. (3 points)

### Quiz 3: Corporate Finance (Spring 2013)

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1. Clavell Inc. is an all-equity funded publicly traded firm, with 100 million shares outstanding, trading at \$10/share. Its current cost of capital is 7.5% and it expects to generate pre-tax operating income of \$ 45 million next year. The company is planning on borrowing \$ 800 million at an interest rate of 7.5% and buying back shares. If the risk free rate is 3%, the equity risk premium is 6% and the marginal tax rate for all companies is 40%, estimate the cost of capital for the firm next year (after the share buyback). (3 points)
2. Robusto Inc. is a publicly traded firm that produces and sells gourmet coffee beans. The firm has a current cost of capital of 9% but it is significantly under levered; it has \$ 100 million in debt and 16 million shares trading at \$25/share. The company is planning on borrowing \$150 million in additional debt and buying back shares at a price of \$30/share. If the remaining shares in the company trade at \$27/share, after the buyback, estimate the cost of capital after the buyback. (You can assume that there is no growth in perpetuity) (3 points)
3. Diablo Inc. is a publicly traded company that operates in two businesses: a beverage business with an estimated value of \$6 billion and an asset duration of 8 years and a bottling business with an estimated value of \$ 4 billion and a duration of 5 years. The company currently has two classes of debt with the following characteristics:

Debt issue	Market value	Estimated duration
Bank loans	\$ 3 billion	4.00 years
Corporate bonds	\$ 2 billion	10.00 years

- a. Estimate the duration of Diablo's existing businesses (assets). (1 point)
- b. Estimate the duration of Diablo's existing debt. (1 point)
- c. Diablo is considering acquiring another beverage company with an estimated value of \$ 6 billion, and using corporate bonds (with the same duration as its existing bonds) to fund at least part of the acquisition (with the rest coming from a new stock issue). If Diablo wants to match the duration of its debt to the duration of its assets, after the acquisition, how much debt should Diablo use to fund the acquisition? (2 points)

**Quiz 3: Corporate Finance**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Lister Inc. is a small, publicly traded data processing company that has \$200 million in debt outstanding, in both book value and market value terms. The book value of equity in the company is \$400 million and there are 40 million shares outstanding, trading at \$20/share. The current levered beta for the company is 1.15 and the company's pre-tax cost of borrowing is 5%. The current risk free rate in US \$ is 3%, the equity risk premium is 5% and the marginal tax rate is 40%.
  - a. Estimate the current cost of capital for the company. (1 point)
  - b. Now assume that the company plans to triple its debt to capital ratio (through a recapitalization), which will raise the pre-tax cost of debt to 8%. If the expected pre-tax operating income of the firm is \$36 million, estimate the new cost of capital. (2 points)
  
2. Novalis Inc. was a firm with 100 million shares trading at \$18/share, debt outstanding of \$ 600 million and a cost of capital of 10%, prior to a recapitalization. It has just borrowed \$920 million and completed a buyback of 40 million shares at \$23/share. If the remaining shares trade at \$28 after the buyback, estimate the cost of capital after the buyback. (You can assume that the company is in stable growth, growing 2% a year in perpetuity) (3 points)
  
3. LuxStay Inc. is a company in the hotel and travel businesses, deriving 60% of its value from the former and 40% from the latter. The hotel business requires investment in long-term assets that have a duration of 20 years, whereas the travel business has assets with a shorter duration of 2 years. The company has 80 million shares outstanding, trading at \$10/share, and \$200 million in debt in market value terms; 50% of this debt is in the form 15-year zero-coupon bonds and 50% is in bank loans (with a duration of one year).
  - a. Estimate the duration of the company's assets today. (1 point)
  - b. Estimate the duration of the company's debt today. (1 point)
  - c. LuxStay is planning to borrow \$200 million and expand its travel business. Assuming that the company would like the duration of its collective debt to match up to that of its assets after the borrowing, estimate the duration of the new debt issue. (2 points)

### Quiz 3: Corporate Finance

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. You have been asked to review the restructuring plan put together by Marcin Inc., a publicly traded firm that is having trouble with its debt burden. You are provided with the current numbers and the numbers that the company would expect to have after the restructuring in the table below (in \$ millions)

	<i>Before restructuring</i>	<i>After restructuring</i>
Market Value of Debt	\$800.00	\$400.00
Market Value of Equity	\$200.00	\$800.00
Interest Expense	\$100.00	\$30.00
Operating Income (EBIT)	\$75.00	\$100.00

The risk free rate is 2%, the equity risk premium is 5% and the marginal statutory tax rate is 40%. (*Since you have the market value of debt, you can assume that the interest rate you are paying on it is the pre-tax cost of debt at that level of debt*).

- a. If the equity (levered) beta before the restructuring is 3.04, estimate the cost of capital for the company before the restructuring. (2 points)
  - b. If the firm carries through the restructuring, estimate the cost of capital after the restructuring. (2 points)
2. Novina Inc. is an all-equity funded firm with 100 million shares trading at \$20/share, with a cost of equity (and capital) of 11.5%. The firm is considering borrowing \$1.2 billion and using the entire proceeds to buy back shares, an action that it believes will lower its cost of capital to 10%. Assuming that the firm is right in its belief and that it is a mature firm with no growth expected in the future, estimate the price at which shares were bought back, if the price per share for the remaining shares after the buyback is \$25/share. (3 points)

3. Sylvan Inc. is planning on doing an acquisition of Vista Inc. and you have been given the following information on the two companies (\$ values in millions):

	<i>Sylvan (Acquiring firm)</i>	<i>Vista (Target firm)</i>
Market value of Equity (\$ mil)	\$1,000	\$500
Debt outstanding (\$ mil)	\$400	\$100
Duration of assets (years)	4.00	10.00
Duration of debt (years)	2.00	15.00

Sylvan is planning on assuming all of Vista's existing debt and it will finance the acquisition of all of Vista's shares with new debt. If the objective is to have the duration of the combined firm's debt be equal to the duration of its assets after the acquisition, estimate the duration of the new debt offering. (3 points)



**Quiz 3: Corporate Finance (Spring 2014)**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Lister Inc. is a small, publicly traded data processing company that has \$200 million in debt outstanding, in both book value and market value terms. The book value of equity in the company is \$400 million and there are 40 million shares outstanding, trading at \$20/share. The current levered beta for the company is 1.15 and the company's pre-tax cost of borrowing is 5%. The current risk free rate in US \$ is 3%, the equity risk premium is 5% and the marginal tax rate is 40%.
  - a. Estimate the current cost of capital for the company. (1 point)
  - b. Now assume that the company plans to triple its debt to capital ratio (through a recapitalization), which will raise the pre-tax cost of debt to 8%. If the expected pre-tax operating income of the firm is \$36 million, estimate the new cost of capital. (2 points)
  
2. Novalis Inc. was a firm with 100 million shares trading at \$18/share, debt outstanding of \$ 600 million and a cost of capital of 10%, prior to a recapitalization. It has just borrowed \$920 million and completed a buyback of 40 million shares at \$23/share. If the remaining shares trade at \$28 after the buyback, estimate the cost of capital after the buyback. (You can assume that the company is in stable growth, growing 2% a year in perpetuity) (3 points)
  
3. LuxStay Inc. is a company in the hotel and travel businesses, deriving 60% of its value from the former and 40% from the latter. The hotel business requires investment in long-term assets that have a duration of 20 years, whereas the travel business has assets with a shorter duration of 2 years. The company has 80 million shares outstanding, trading at \$10/share, and \$200 million in debt in market value terms; 50% of this debt is in the form 15-year zero-coupon bonds and 50% is in bank loans (with a duration of one year).
  - a. Estimate the duration of the company's assets today. (1 point)
  
  - b. Estimate the duration of the company's debt today. (1 point)
  
  - c. LuxStay is planning to borrow \$200 million and expand its travel business. Assuming that the company would like the duration of its collective debt to match up to that of its assets after the borrowing, estimate the duration of the new debt issue. (2 points)

**Quiz 3: Corporate Finance (Spring 2016)**

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Severino Enterprises is a chemical company that has 10 million shares outstanding, trading at \$15 a share **and no debt**; its **current cost of capital is 7.4%**. The firm is has announced that it is borrowing \$50 million and will be paying a special dividend with that money. If the risk free rate is 2%, the equity risk premium is 6% and the marginal tax rate is 40%, estimate how high the pre-tax cost of borrowing has to be for the company's cost of capital to remain unchanged. (4 points)
  
2. Dixie Oil is a small, publicly traded oil company that has been hard hit by the drop in oil prices. It has 20 million shares outstanding, trading at \$10/share, and has debt outstanding of \$800 million. The company's rating has dropped to CCC and its cost of capital is 10%. The firm has reached a deal with debt holders to exchange \$300 million in debt for 30 million new shares, an action which it believes will raise the bond rating to BBB and reduce the cost of capital to 9%.
  - a. Assuming that the savings (from a lower cost of capital) last forever (with no growth), estimate the change in firm value as a result of the recapitalization. (1 point)
  - b. Estimate the value per share after the recapitalization. (2 points)
  
3. Drexel Inc. is a furniture manufacturer with a market capitalization (market value of equity) of \$1 billion and \$500 million in debt outstanding (with a duration of 5 years). It is considering acquiring Robert Stores, a furniture retailer, for \$1 billion and plans to fund this acquisition entirely with debt. Your research has led you to conclude that the duration of furniture manufacturers is 10 years and that of furniture retailers is 4 years.
  - a. What will the duration of Drexel be, after the merger? (1 point)
  - b. If your objective is to end up with total debt of roughly the same duration, estimate the duration of your new debt issue?

### Quiz 3: Corporate Finance (Spring 2017)

Answer all questions and show necessary work. Please be brief. This is an open books, open notes exam.

1. Zeina Inc. has 100 million shares outstanding, trading at \$10/share, no debt and a cost of capital of 9%. It is considering borrowing money to get to a 20% debt to capital ratio. At what pre-tax interest rate would the company need to be able to borrow the money for the cost of capital to drop to 8.64%? (The marginal tax rate is 40%, the risk free rate is 3% and the equity risk premium is 5%). (4 points)
2. You are considering using the APV approach to evaluate the effect on value of having debt at Systech, a technology company. The company currently has a market capitalization (market value of equity) of \$900 million and \$100 million in debt outstanding (market and book value). If the marginal tax rate is 40%, the current probability of bankruptcy is 10% and the cost of bankruptcy is 30% of overall firm value (equity plus debt), estimate the value of the firm with no debt. (3 points)
3. You are advising Gelo Vision, a company that operates in two business, technology and retailing and have collected the following information (Dollar values in millions).

	<i>Value</i>	<i>Duration</i>		<i>Value</i>	<i>Duration</i>
Technology	\$500	6	Debt	\$250	6.00
Retailing	\$500	15	Equity	\$750	NA

Gelo is planning on borrowing money and doubling the size of its technology business (in value). If the objective is to match the duration of its total debt to that of all of its assets after the transaction, estimate the duration of the new debt. (3 points)

### Quiz 3: Corporate Finance

Answer all questions and show necessary work. Please be brief. This is an open book, open notes exam.

1. Corinthian Corporation, a firm that is currently over levered with a debt to capital ratio of 80% and a pre-tax cost of debt of 8%, is considering a restructuring that will reduce its debt to capital ratio to 40% and its pre-tax cost of debt to 6%.

	Current	Recapitalized
Debt/(Debt + Equity)	80%	40%
Cost of debt (Pre-tax)	8%	6%
Cost of equity	24.10%	

If the marginal tax rate is 25%, the risk free rate is 2.5% and the equity risk premium is 6%, estimate the cost of capital after the restructuring. (3 points)

2. Nestor Media is an entertainment company with 75 million shares trading at \$10/share and \$250 million in debt outstanding. The firm is considering borrowing money to buy back 25 million shares at \$11/share, and believes that this recapitalization will lower its cost of capital from 8% to 7.50%. Assuming a 2.5% growth rate in perpetuity, estimate the value per share after the recapitalization. (3 points)

3. Lenox Inc. is a company that operates in two businesses, hotels and technology, and its current financial balance sheet (in market value terms) is below:

<i>Business</i>	<i>Value (\$ mil)</i>	<i>Duration</i>		<i>Value (\$ mil)</i>	<i>Duration</i>
Hotels	\$ 800.00	11	Debt	\$ 200.00	4
Technology	\$ 400.00	2	Equity	\$ 1,000.00	

Lenox is considering borrowing \$800 million, using a combination of 8-year and 3-year zero coupon bonds, and invest in its technology business. If it wants its total debt to have the same duration as all of its assets after the expansion, how much of the new debt should be 8-year zero coupon debt? (4 points)