

FINAL EXAM SOLUTIONS

Finance 40610 – Security Analysis

Mendoza College of Business
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Fall Semester 2005

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INSTRUCTIONS:

1. You have 2 hours to complete the exam.
2. The exam is worth a total of 200 points.
3. You may use a calculator and a formula sheet. You must hand in the formula sheet with your exam (put your name on it).
4. Allocate your time wisely. Use the number of points assigned to each problem as your guide.
5. In order to get full credit on the problems, you must show ALL your work!

Multiple Choice (60 points)

Choose the best answer for each of the following questions. The questions are worth 5 points each.

1. Which of the following would NOT be a component of working capital?
 - a) Wages payable
 - b) Accounts receivable
 - c) Deferred Taxes
 - d) Inventory

2. Which of the following would result in a decrease in Return on Equity (ROE), assuming all other things are held constant?
 - a) An increase in Return on Capital (ROC)
 - b) A decrease in leverage
 - c) A decrease in the after-tax cost of debt
 - d) An increase in net income

3. ABC corp. has equity with a market value of \$750 million, debt with a market value of \$330 million, and future operating lease commitments with a present value of \$400 million. The firm also has a Beta of 1.2, a pre-tax cost of debt of 8%, and a marginal tax rate of 38%. What is the firm's weighted average cost of capital if the long-term treasury rate is 4.5% and the market risk premium is 4%?
 - a) 7.16%
 - b) 8.66%
 - c) 7.97%
 - d) 9.30%

4. Which of the following statements related to the Price-to-Earnings ratio is NOT correct?
 - a) All else constant, the PE ratio will decrease as the risk of the firm increases
 - b) All else constant, the PE ratio will decrease as the growth rate decreases
 - c) All else constant, the PE ratio will decrease as the ROE decreases
 - d) All else constant, the PE ratio will decrease as the market risk premium decreases

5. (True or False) The dividend discount model will overvalue stocks that do not tend to pay out all of their FCFE as dividends.
 - a) True
 - b) False

6. You are valuing a firm that has a PE ratio of 9.0, an expected long-term growth rate of 4.5%, an ROE of 10.1%, and a Beta of 1.4. Using all firms in the S&P 500, you estimate a regression of PE ratios on firm characteristics and get the results shown below. Based on these regression results and the firm's characteristics, which of the following conclusions is most appropriate?

$$PE = 13.5 + 16.9(g) + 29.4(ROE) - 3.2(\beta)$$

- a) The firm is overvalued
b) The firm is undervalued
c) The firm is correctly valued
7. You are performing a relative valuation of a firm during a period when earnings are increasing. Which of the following statements related to PE ratios is correct?
- a) The PE ratio based on earnings from the most recent financial year will be lower than the PE ratio calculated from TTM earnings.
b) The PE ratio calculated from TTM earnings will be lower than the PE ratio calculated from forecasted future earnings.
c) The PE ratio calculated from forecasted future earnings will be lower than the PE ratio calculated from the most recent financial year's earnings.
d) The PE ratio will be the same regardless of which earnings measure is used in the denominator.
8. You are valuing a division that is about to be spun off into a public company. The average levered Beta of firm's in the same industry is 1.24 and the average debt-to-equity ratio of firms in the industry is 65%. The marginal tax rate is 40% for both the new firm and the industry. What is your estimate of the levered Beta for this firm if the firm has no debt?
- a) 0.89
b) 1.24
c) 1.37
d) 1.56
9. The current level of the Russell 3000 Index is 736.99 and the long-term Treasury yield is 4.5%. The aggregate dividend yield (plus stock repurchases) on the Russell Index during the next year is expected to be 3.1% (of the current index value) and this payout is expected to grow at a rate of 5% in perpetuity. Based on this information, what is the implied equity risk premium for the U.S. market?
- a) 8.1%
b) 5.4%
c) 4.2%
d) 3.6%

10. Using a FCF model, you estimate that the present value of operating cash flows for Buckeye Corp. is \$2.5 billion. The firm also reports a 35% minority stake in Big Ten International and a 90% stake in BCS Inc. Buckeye Corp's consolidated balance sheet reports a minority interest of \$14.5 million related to the holding in BCS Inc. You estimate the market value of Big Ten to be \$400 million and the market value of BCS to be \$200 million. What is the total firm value of Buckeye Corp. after accounting for holdings in other firms?

- a) \$2.62 billion
- b) \$2.66 billion
- c) \$2.64 billion
- d) \$2.18 billion

The table below shows Net Income for Taser International from 2001 through 2004. Use this information to answer questions 11 and 12.

Year	Net Income
2001	515,000
2002	209,000
2003	4,454,000
2004	19,125,000

11. What is the annual growth rate in Taser's Net Income from 2003 to 2004?

- a) 329.4%
- b) 233.6%
- c) 524.2%
- d) 767.0%

12. What is the geometric average annual growth rate in Taser's Net Income from 2001 to 2004?

- a) 329.4%
- b) 233.6%
- c) 524.2%
- d) 767.0%

Problems (140 points)

Answer each of the questions below completely. You must show ALL your work to get full credit.

Please note that questions 14 through 18 are all related to the valuation of Taser International. While some of the questions are linked, an error made on one question will not be compounded on subsequent problems. In other words, I will count a number wrong only once. If you are unable to answer any one of these questions, just make any assumptions necessary to complete the remaining questions.

13. (14 points) Valuation Assumptions:

You are reading an analyst report suggesting that Coca Cola stock is substantially undervalued. The analyst is using a two-stage FCFE model, with high growth at 10% for 7 years and stable growth at 4% thereafter. The analyst assumes that net capital expenditures and changes in working capital increase at the same rate as earnings during the high growth period and drop to zero during stable growth. The analyst also assumes that the firm's cost of equity equals 8.3% during the high growth period and drops to the Treasury Bond rate of 4.5% once the firm reaches stable growth.

Briefly describe the two most significant flaws in this analyst's reasoning and (in one sentence) how you would fix them.

Growth cannot be 4% in stable growth with zero reinvestment. Either set growth to zero, or allow for some reinvestment.

You cannot discount risky cash flows at the risk-free rate of 4.5%. Use CAPM to determine the cost of equity

14. **(20 points) Valuation of Taser International – Part I (R&D Adjustment):**

The table below shows annual R&D expenses for Taser International from 2000 through 2004.

Year	R&D Expense
2000	0
2001	43,000
2002	137,000
2003	498,000
2004	824,000

- a) (10 points) Calculate the R&D Amortization amount for 2004, assuming a three-year amortizable life for R&D.

$$1/3(43) + 1/3(137) + 1/3(498) = \$226,000$$

- b) (10 points) Calculate the unamortized amount of R&D on the balance sheet as of year-end 2004.

$$100\%(824) + 66.67\%(498) + 33.33\%(137) = \$1,201,667$$

15. (22 points) Valuation of Taser International – Part II (FCFE):

Information from Taser's 2004 financial statements is shown below. Use this information and the R&D adjustments you estimated in the previous question to address the questions below.

	2004
Net Income	19,125,000
Expenditures on PP&E	11,322,000
Depreciation	552,000
Change in Working Capital	6,926,000
Expenditures on Acquisitions	100,000

- a) (8 points) Calculate the adjusted Net Income for Taser in 2004 (after adjusting for the capitalization of R&D).

$$\begin{aligned} & \$19,125,000 \\ & + 824,000 \\ & - 226,000 \\ & = \$19,723,000 \end{aligned}$$

- b) (14 points) Calculate the Free Cash Flow to Equity (FCFE) for Taser in 2004 (including any necessary adjustments). Assume Taser has no debt.

$$\begin{aligned} & 19,723,000 \\ & - (11,322,000 - 552,000) \\ & - (824,000 - 226,000) \\ & - 6,926,000 \\ & - 100,000 \\ & = \$1,329,000 \end{aligned}$$

16. (24 points) Valuation of Taser International – Part III (Fundamental Growth):

Use the information provided below and your answers to questions (14) and (15) to address the following questions.

- a) (8 points) The book value of equity for Taser was \$27,427,000 as of year-end 2003 and \$97,122,000 as of year-end 2004. Calculate the Return on Equity (ROE) for Taser in 2004, including any necessary adjustments. (For simplicity, assume that the R&D adjustments for 2003 are the same as those you calculated for 2004.)

$$\begin{aligned} BkEquity_{2003} &= 27,427,000 + 1,201,667 = 28,628,667 \\ BkEquity_{2004} &= 97,122,000 + 1,201,667 = 98,323,667 \\ AvgBkEquity &= (28,628,667 + 98,323,667) / 2 = 63,476,167 \end{aligned}$$

$$ROE = \frac{NetIncome}{BkEquity_{2003}} = \frac{19,723,000}{28,628,667} = 68.89\%$$

or

$$ROE = \frac{NetIncome}{AvgBkEquity} = \frac{19,723,000}{63,476,167} = 31.07\%$$

- b) (8 points) Calculate the Equity Reinvestment Rate for Taser in 2004, including any necessary adjustments. Again, assume the firm has no debt.

$$\begin{aligned} EquityReinvestmentRate \\ = \frac{(11,322,000 - 552,000) + (824,000 - 2226,000) + 6,926,000 + 100,000}{19,723,000} = 93.26\% \end{aligned}$$

- c) (8 points) Based on your answers to parts (a) and (b), estimate the expected fundamental growth rate in Net Income. Assume that ROE is not expected to change in the future.

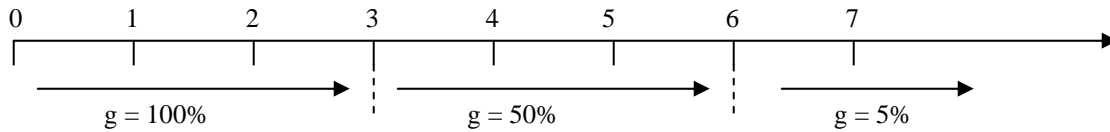
$$Growth = .6889 \times .9326 = 64.2\%$$

or

$$Growth = .3107 \times .9326 = 28.98\%$$

17. (40 points) Valuation of Taser International – Part IV (Discounted Cash Flows):

You decide to value Taser using a three-stage FCFE model. During the first stage, you expect FCFE to grow at the extraordinary rate of 100% per year. You expect this stage to last for three years. This will be followed by a second stage of more moderate growth of 50% per year. This second stage will also last for three years. After these two high-growth stages, you expect the firm to reach stable growth, with FCFE growing at a stable rate of 5% in perpetuity.



Enter your FCFE estimate from question (15b) here (or assume a value): \$1,329,000

Using this value as your year 0 cash flow, estimate the present value of Taser's equity cash flows. Assume that Taser's cost of equity is 12.2% and is not expected to change.

$$CF_1 = 1329000(1 + 1) = 2658000$$

$$PV_{HighGrowth} = 2658000 \left(\frac{1 - \left(\frac{1+1}{1+.122} \right)^3}{.122 - 1} \right) = 14,119,000$$

$$CF_4 = 1329000(1 + 1)^3 (1 + .5) = 15,948,000$$

$$PV_{Stage2} = 15948000 \left(\frac{1 - \left(\frac{1.5}{1.122} \right)^3}{.122 - .5} \right) \div (1.122)^3 = 41,503,000$$

$$CF_7 = 1329000(1 + 1)^3 (1 + .5)^3 (1 + .05) = 37,677,150$$

$$TV_6 = \frac{37677150}{.122 - .05} = 523,293,000$$

$$PV_{TV} = \frac{523293000}{(1.122)^6} = 262,294,000$$

$$TotalValue = 14,119,000 + 41,503,000 + 262,294,000 = \$317,916,000$$

18. **(16 points) Valuation of Taser International – Part V (Price Per Share):**

Taser has no debt and has 57,200,000 shares outstanding. The firm also has a total of 5,645,000 employee options outstanding, with an average exercise price of \$3.19. The firm's tax rate is 39%.

- a) (8 points) Estimate the price per share for Taser using the "Fully-Diluted" method to incorporate employee stock options.

$$\frac{317,916,000}{(5,645,000 + 57,200,000)} = \$5.059$$

- b) (8 points) Using the Black-Scholes model, you estimate that each employee option is worth \$5.20. Estimate the price per share for Taser based on this estimate of option value.

$$\frac{317,916,000 - (5,645,000)(5.20)(1 - .39)}{57,200,000} = \$5.245$$