MIDTERM EXAM SOLUTIONS

Finance 40610 – Security Analysis

Mendoza College of Business
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INSTRUCTIONS:

1. You have 75 minutes to complete the exam.
2. The exam is worth a total of 100 points.
3. Allocate your time wisely. Use the number of points assigned to each problem as your guide.
4. In order to get full credit on the problems, you must show ALL your work!
5. You may use a calculator and a formula sheet. Please put your name on your formula sheet and hand it in with your exam.

Multiple Choice (32 points)
Choose the best answer for each of the following questions. The questions are worth 4 points each.

1. Yahoo! is considering the acquisition of Facebook for a total value of $1 billion. Assume that the net value of Facebook's tangible and intangible assets is $375 million. Which of the following statements correctly describes the treatment of this acquisition on the firm's reported financial statements under current GAAP accounting rules.

   a) The firm will record no goodwill on its balance sheet
   b) The firm will record $625 million in goodwill and amortize it over 40 years
   c) The firm will record $625 million in goodwill and amortize it over 15 years
   d) The firm will record $625 million in goodwill and test it annually for impairment

2. You are analyzing a firm that earned a Return on Equity (ROE) of 12% last year. During the next year, you expect the firm's Return on Capital (ROC), profit margins, turnover ratios, cost of debt, and tax rate to stay the same. However, you expect the firm's debt-to-equity ratio to increase from 25% to 40%. Which of the following statements correctly describes your future forecast of ROE (assume that ROC is greater than the after-tax cost of debt)?

   a) The firm's ROE will be greater than 12%
   b) The firm's ROE will be equal to 12%
   c) The firm's ROE will be less than 12%
   d) The firm's ROE will be equal to its Return on Capital (ROC)

3. Chipotle Mexican Grill, Inc. has future operating lease commitments totaling $778.7 million. In your valuation of the company, you make adjustments to the financial statements to treat operating leases as debt. Which of the following correctly describes the effects of these adjustments on Net Income?

   a) Net income will increase
   b) Net income will decrease
   c) Net income will stay the same
   d) The effect on Net Income cannot be determined from the information provided

4. In your valuation of Chipotle International Grill, Inc., you plan to use an industry Beta to estimate the firm's cost of equity. The average levered (equity) Beta of comparable firms in the industry is 1.32 and the average debt-to-equity ratio among these firms is 25%. Chipotle has no debt. In addition, the marginal tax rate of both Chipotle and the comparable firms is 40%. Based on this information, what is the appropriate Beta to use in the CAPM equation for Chipotle?

   a) 0.871
   b) 1.148 $1.32/(1+.25(1-.4)) = 1.148$
   c) 1.320
   d) 1.518

5. You are valuing an Italian firm based on nominal Euro cash flows. Which of the following Government Security yields would be the most appropriate choice for the risk-free rate in your valuation?

a) 5.0% yield on 10-year U.S. Government Treasury Bonds
b) 4.4% yield on 10-year German Government Euro Bonds
c) 4.5% yield on 10-year Italian Government Euro Bonds
d) 2.1% yield on 10-year Italian Government inflation-indexed Euro Bonds

6. As an input into the cost of capital calculation, you need to estimate the implied equity risk premium. You make the following assumptions. The risk-free rate is 5%. The U.S. market has a long-term growth rate of 5%, a ROE of 12%, and a P/E ratio of 19. Based on this information, what is the implied equity risk premium on the U.S. market?

a) 8.07%
b) 5.00%
c) 4.26%
d) 3.07% $R = .05 + (1/19)(1 - .05/.12)$ $R - R_f = 3.07\%$

7. You are analyzing past returns on an emerging stock market. Using the annual returns listed below, calculate the arithmetic average and geometric average of returns on this market over the past five years.

Year	Return
2001	25.0%
2002	13.0%
2003	-8.0%
2004	19.0%
2005	-11.0%

a) arithmetic average = 7.6%, geometric average = 6.6%
b) arithmetic average = 7.6%, geometric average = 7.6%
c) arithmetic average = 6.6%, geometric average = 7.6%
d) arithmetic average = 7.6%, geometric average = 37.6%

8. Chipotle International Grill's Income Statement and Balance sheet are provided on the last page of the exam. Based on this information, what was Chipotle's Return on Equity in 2005?

a) 10.02%
b) 11.80%
c) 12.19%
d) 14.36% ROE = 37696/262566 = 14.36%

Problems (68 points)
Answer each of the questions below completely. You must show ALL your work to get full credit.

9. **Discounted Cash Flows (20 points)**

You are performing a valuation of a pharmaceutical firm based on free cash flow to equity (FCFE). FCFE in the most recent year (year 0) was $210 million. You expect these cash flows to grow at an annual rate of 21% for the next three years as the firm continues to expand and develop new drugs. You then expect growth to stabilize at a long run rate of 6% (in perpetuity). The firm's weighted average cost of capital is 9% and its cost of equity is 11%.

a) (16 points) What is the value of the firm's equity based on the discounted value of FCFE?

$$TV = \frac{CF_4}{R - g_{stable}} = \frac{210(1.21)^3(1.06)}{.11 - .06} = 7886.99$$

$$PV_{TerminalValue} = \frac{7886.99}{(1.11)^3} = \$5766.90$$

$$PV_{HighGrowth} = CF_1\left(\frac{1-\left(\frac{1+g}{1+R}\right)^N}{R-g}\right) = 210(1.21)\left(\frac{1-\left(\frac{1.21}{1.11}\right)^3}{.11-.21}\right) = 254.10(2.9535) = \$750.48$$

$$EquityValue = 750.48 + 5766.90 = \$6{,}517.38$$

b) (4 points) The firm has 100 million shares outstanding and a current market price of $56. Based on your valuation in part (a), should you buy or sell the stock?

Estimated value per share = 6517.38/100 = $65.17

The stock is undervalued at $56 per share, so you should BUY it.

10. **Convertible Debt and WACC (16 points)**
You are calculating the cost of capital for ABC corp. The firm has common stock with a market value of $100 million. The only debt in the firm's capital structure is a convertible zero-coupon bond. The bond has a face value (i.e., principal payment at maturity) of $100 million and a maturity of 10 years. The bond has a market value of $82.03 million, resulting in a yield of 2%. You estimate the firm's cost of debt to be 7%.

a) (8 points) Use the information provided to estimate the value of the equity and debt components of the convertible bond.

$$DebtValue = \frac{100}{1.07^{10}} = \$50.83m$$

$$EquityValue = 82.03 - 50.83 = \$31.20m$$

b) (8 points) Based on your answer to part (a), calculate the firm's weighted average cost of capital (WACC). Assume a cost of equity of 10% and a tax rate of 40%. (Note: if you can't answer part (a), make an assumption about the value of debt and equity to answer this question.)

$$TotalEquity = 100 + 31.20 = 131.20$$

$$WACC = \left(\frac{131.20}{50.83 + 131.20}\right)10\% + \left(\frac{50.83}{50.83 + 131.20}\right)7\%(1 - .4) = 8.38\%$$

11. **Country Risk (12 points)**

You are valuing a company from an emerging market and have converted all cash flows to $U.S. You assume a risk-free rate of 5% and a U.S. market risk premium of 4%. You estimate the default spread on Government bonds from the country to be 2.5%. You also estimate the volatility of the country's stock market to be 36% and the volatility of the U.S. stock market to be 18%.

a) (6 points) Estimate the country risk premium for this emerging market (Note: there are alternative methods for answering this question - choose one).

$$Country\ \Pr emium = DefaultSpread = 2.5\%$$

or

$$Country\ \Pr emium = U.S.\ \Pr emium\left(\frac{\sigma_{country} - \sigma_{U.S.}}{\sigma_{U.S.}}\right) = 4\%\left(\frac{.36 - .18}{.18}\right) = 4\%$$

or

$$Country\ \Pr emium = DefaultSpread\left(\frac{\sigma_{CountryEquity}}{\sigma_{CountryDebt}}\right) = 2.5\%(1.5) = 3.75\%$$

b) (6 points) The company you are valuing has an equity Beta of 1.3. Calculate the firm's cost of equity incorporating the country risk premium you calculated in part (a). Explain any additional assumptions necessary to compute your answer.

$K_e = R_f + \beta_{equity}(\text{Equity Premium}) + \beta_{country}(\text{Country Premium})$

If we assume that all firms in the country have the same country risk, we have $\beta_{country} = 1$. Using a country premium of 4% (we could also use 2.5% or 3.75% from above), we get:

$K_e = .05 + 1.3(.04) + 1.0(.04) = 14.2\%$

If we assume that the firm has the same sensitivity to country risk that it has to equity risk, we have $\beta_{country} = \beta_{equity} = 1.3$. Using a country premium of 4% (we could also use 2.5% or 3.75% from above), we get:

$K_e = .05 + 1.3(.04 + .04) = 15.4\%$

12. **Operating Lease Adjustments (20 points)**

Future operating lease commitments for Chipotle International Grill, Inc. are shown below. In 2005, the firm had operating income of $30.994 million and operating lease expenses of $40.867 million. The firm currently has no debt, but their estimated cost of debt is 7%.

Year	Operating Lease Commitments ($ millions)
2006	45.158
2007	45.039
2008	44.241
2009	44.471
2010	44.366
>2010	555.464
Total	778.739

a) (14 points) What is the adjusted value of debt for Chipotle as of 2005 after accounting for operating lease commitments?

$$AvgLeasePayment_{2006-2010} = 44.655$$

$$555.464 / 44.655 = 12.44 years$$

$$DebtValue = \frac{45.158}{1.07} + \frac{45.039}{1.07^2} + \frac{44.241}{1.07^3} + \frac{44.471}{1.07^4} + \frac{44.366}{1.07^5} + \frac{44.655\left(\frac{1-(1.07)^{-12.44}}{.07}\right)}{1.07^5} = 442.01m$$

b) (6 points) What is the adjusted value of operating income for Chipotle in 2005 after accounting for operating lease commitments?

$$St.Line.Depreciation = \frac{442.01}{17.44} = 25.35 / yr$$

$$Adj.Oper.Income = 30.994 + 40.867 - 25.35 = \$46.511m$$

or

$$Adj.Oper.Income = 30.994 + (442.01)(.07) = 30.994 + 30.94 = \$61.935m$$

Chipotle Mexican Grill, Inc. Consolidated Statement of Operations (in thousands, except per share data)		
	2005	**2004**
Total revenue	627,695	470,721
Operating Costs	511,621	394,106
General and administrative expenses	51,964	44,837
Depreciation and amortization	28,026	21,802
Other Costs	5,090	3,870
Total Costs	596,701	464,615
Income (loss) from operations	30,994	6,106
Interest income	36	211
Interest expense	(790)	(191)
Income (loss) before income taxes	30,240	6,126
Benefit for income taxes	7,456	—
Net income (loss)	37,696	6,126
Earnings (loss) per common share—basic	1.43	0.24

Chipotle Mexican Grill, Inc. Consolidated Balance Sheet (in thousands, except per share data)		
	2005	**2004**
Assets:		
Cash	61	—
Accounts receivable	1,933	2,490
Notes receivable—McDonald's Corp.	2,248	732
Inventory	2,625	2,256
Current deferred tax assets	2,346	—
Prepaid expenses	8,611	4,854
Total current assets	17,824	10,332
Net property and equipment	340,694	289,873
Other assets	2,653	3,205
Long-term deferred tax assets	13,586	—
Goodwill	17,738	26,243
Total assets	392,495	329,653
Liabilities and shareholders' equity:		
Cash overdraft	—	4,431
Accounts payable	13,188	11,803
Accrued expenses	27,223	20,738
Current portion of deemed landlord financing	57	—
Due to McDonald's Corp.	1,514	1,691
Total current liabilities	41,982	38,663
Deferred rent	37,106	28,231
Deemed landlord financing	3,476	—
Other liabilities	577	193
Total liabilities	83,141	67,087
Total shareholders' equity	309,354	262,566
Total liabilities and shareholders' equity	392,495	329,653