

## **SAMPLE MIDTERM EXAM SOLUTIONS**

Finance 40610 – Security Analysis

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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.

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**Multiple Choice (32 points)**

Choose the best answer for each of the following questions. The questions are worth 4 points each.

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1. Which of the following would NOT be a component of non-cash working capital?
  - a) Wages payable
  - b) Accounts receivable
  - c) Current portion of long-term debt
  - d) Inventory
  
2. You are valuing a U.S. manufacturing firm that generates 50% of its revenues in \$US and 50% of its revenues in Euros. To complete the valuation, you have decided to convert all of the cash flows to either \$U.S. or Euros. The yield on long-term U.S. Government Treasury Bonds is 4.9% and the yield on long-term Euro-denominated Government Bonds issued by Germany is 4.7%. You assume both rates are free of default risk. Which of the following statements is most accurate?
  - a) You cannot convert cash flows to a different currency in a valuation
  - b) You should use a risk-free rate of 4.7% regardless of what currency you use
  - c) You should use a risk-free rate of 4.9% regardless of what currency you use
  - d) Converting cash flows to Euros will give a higher valuation due to the lower risk-free rate
  - e) None of the above are accurate
  
3. Which of the following should NOT be excluded from past cash flow estimates when developing forecasts of future cash flows?
  - a) Income from cash and marketable securities
  - b) Income from holdings in other firms
  - c) Non-recurring and one-time expenses
  - d) Expenses associated with executive compensation
  - e) All of the above items should be excluded
  
4. Which of the following would result in an increase Return on Equity (ROE), assuming all other things are held constant?
  - a) An decrease in Return on Capital (ROC)
  - b) An decrease in leverage
  - c) A decrease in the interest expense associated with debt
  - d) A decrease in profit margin
  - e) None of the above
  
5. Which of the following is NOT an advantage of relative valuation as compared to discounted cash flow valuation?
  - a) Relative valuation is unaffected by assumptions such as growth and ROE
  - b) Relative valuation can be used even when cash flows are negative
  - c) Relative valuation will incorporate current market perceptions
  - d) Relative valuation will always identify at least some securities as under and over-valued relative to each other.

6. The Balance Sheet for Microsoft is shown on the next page. Based on this information, what is the quick ratio for Microsoft?

- a) 0.458
- b) 0.299
- c) 2.184
- d) 1.885
- e) 1.522 (this is the correct answer and was not provided on the original exam)

7. You are valuing several U.S. firms using discounted cash flow (DCF) analysis. Analysts at your firm have provided you with the following historical data for the U.S. equity market during the period from 1928-2006. If you use only this information to determine the market risk premium for use in your valuation model, which estimate would be most appropriate?

Average Risk Premium	Arithmetic Average	Geometric Average
Relative to 30-day T-Bills	7.87%	6.01%
Relative to 10-year T-Bonds	6.57%	4.91%

- a) 7.87%
- b) 6.57%
- c) 6.01%
- d) 4.91%

8. You are estimating the cost of equity for an emerging market firm incorporating country risk. You are using a risk-free rate of 5.0% and the U.S. equity market risk premium of 4.5%. The equity Beta for the firm is 1.6 and you estimate a country risk premium for the country of 2.5%. What is the cost of equity for this firm after incorporating country risk, if you assume that all firms in the country have equal sensitivity to country risk?

- a) 12.2%
- b) 14.7%  $5\% + 1.6(4.5\%) + 1.0(2.5\%)$
- c) 11.2%
- d) 16.2%

## Balance Sheet for Microsoft as of 6/30/2006

Assets	
Current assets:	
Cash and equivalents	\$ 6,714
Short-term investments (including securities pledged as collateral of \$3,065 and \$-)	27,447
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Total cash and short-term investments	34,161
Accounts receivable, net of allowance for doubtful accounts of \$142 and \$171	9,316
Inventories, net	1,478
Deferred income taxes	1,940
Other	2,115
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Total current assets	49,010
Property and equipment, net	3,044
Equity and other investments	9,232
Goodwill	3,866
Intangible assets, net	539
Deferred income taxes	2,611
Other long-term assets	1,295
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Total assets	\$ 69,597
Liabilities and stockholders' equity	
Current liabilities:	
Accounts payable	\$ 2,909
Accrued compensation	1,938
Income taxes	1,557
Short-term unearned revenue	9,138
Securities lending payable	3,117
Other	3,783
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Total current liabilities	22,442
Long-term unearned revenue	1,764
Other long-term liabilities	5,287
Commitments and contingencies	
Stockholders' equity:	
Common stock and paid-in capital – shares authorized 24,000; outstanding 10,062 and 10,710	59,005
Retained earnings (deficit), including accumulated other comprehensive income of \$1,229 and \$1,426	(18,901)
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Total stockholders' equity	40,104
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Total liabilities and stockholders' equity	\$ 69,597

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**Problems (68 points)**

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

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**9. Industry Beta (8 points):**

You are valuing an IPO firm using a discounted cash flow analysis. In order to calculate the cost of capital for the firm, you have estimate the levered and unlevered Betas for the other firms in the same industry. This information is provided below.

	Beta <sub>L</sub>	Debt/Equity	Beta <sub>U</sub>
Firm 1	1.30	0.25	1.12
Firm 2	1.10	0.40	0.87
Firm 3	1.50	0.60	1.08
Firm 4	0.90	0.00	0.90
Average	1.20	0.31	0.99

Based on this information, calculate the Beta for your IPO firm. Assume that you firm has a debt to equity ratio of 0.5 and a marginal tax rate of 35% (the same marginal tax rate as other industry firms).

$$\beta_L = 0.99(1 + .5(1 - .35)) = 1.312$$

OR

$$\beta_u = 1.20 \left( \frac{1}{1 + 0.31(1 - .35)} \right) = 0.999$$

$$\beta_L = 0.999(1 + 0.5(1 - .35)) = 1.323$$

**10. Implied Equity Premium (8 points):**

The current level of the Russell 3000 Index is 905.67 and the long-term Treasury yield is 5.0%. The aggregate dividend yield (plus stock repurchases) on the Russell Index last year was 3.5% (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?

$$R = g + \frac{Div_1}{P} = .05 + \frac{905.67(.035)(1.05)}{905.67} = 8.675\%$$

$$R - R_f = 8.675\% - 5.0\% = 3.675\%$$

11. **Discounted Cash Flows (24 points):**

You are performing a valuation of a retail firm based on free cash flow to the firm (FCFF). FCFF in the most recent 12 months (year 0) was \$365 million. The firm is in a declining industry. As a result, you expect cash flows to grow at an annual rate of 4% for the next five years and then decrease at 1% per year in perpetuity thereafter. The firm's cost of equity is 10% and its weighted average cost of capital is 8%. The firm also has debt with a book value of \$700 million and a market value of \$600 million.

- a) (18 points) What is the value of this firm based on the discounted value of FCFF?

$$\begin{aligned}FCFF_1 &= 365(1.04) = 379.60 \\PV_{HighGrowth} &= 379.60 \left( \frac{1 - \left(\frac{1.04}{1.08}\right)^5}{.08 - .04} \right) = 1631.96 \\FCFF_6 &= 365(1.04)^5(.99) = 439.638 \\TV_5 &= \frac{439.638}{.08 - (-.01)} = 4884.861 \\PV_{TV} &= \frac{4884.861}{(1.08)^5} = 3324.554 \\FirmValue &= 1631.96 + 3324.554 = \$4956.514\end{aligned}$$

- b) (6 points) If the firm has 100 million shares outstanding, what is your estimate of the equity value per share? If the current market price of \$36 per share, should you buy or sell the stock?

$$\begin{aligned}EquityValue &= 4956.514 - 600 \\P &= \frac{4956.514 - 600}{100} = \$43.57 \\BUY &\text{ (because your estimated price is higher than the current market price, or } 43.57 > 36)\end{aligned}$$

12. **Cost of Capital (28 points):**

You are calculating the cost of capital for ABC corp. The firm's equity has a book value of \$600 million and a market value of \$1 billion. The firm's debt consists of operating leases with a debt value of \$500 million and two bonds. The first bond is a straight 30-year bond with book value equal to \$200 million and market value equal to \$125 million. The second bond is a zero-coupon convertible bond with 10-years to maturity, a face value of \$500 million, and a market value of \$400 million. The firm has a debt rating of BBB+ and has a marginal tax rate of 35%. You assume a market risk premium of 4.5% and estimate the Beta of the firm to be 1.8.

- a) (6 points) Based on the 10-year Treasury Bond yield, you assume a risk-free rate of 5.0%. Using the default spreads described on the last page of the exam, calculate the cost of debt for this firm.

Given the debt rating of BBB+, the table on the next page suggests that the default spread is 1.341%.

$$K_d = R_f + \text{Default Spread} = 5.0\% + 1.341\% = 6.341\%$$

- b) (8 points) Using the cost of debt you estimated above, estimate the value of the equity and debt components of the convertible bond. (Note: if you can't answer part (a), make an assumption about the cost of debt in order to answer this question.)

$$\text{Debt Value} = \frac{500}{(1.06341)^{10}} = 270.373$$

$$\text{Equity Value} = 400 - 270.373 = 129.627$$

- c) (14 points) Using your answers to parts (a) and (b) along with the other information provided, estimate the weighted average cost of capital (WACC) for this firm. (Note: if you can't answer parts (a) or (b), make any assumptions necessary in order to answer this question.)

$$\text{Debt} = 500 + 125 + 270.373 = 895.373$$

$$\text{Equity} = 1000 + 129.627 = 1129.627$$

$$\text{Debt} + \text{Equity} = 895.373 + 1129.627 = 2025$$

$$K_e = 5.0\% + 1.8(4.5\%) = 13.1\%$$

$$\text{WACC} = \left(\frac{1129.627}{2025}\right)13.1\% + \left(\frac{895.373}{2025}\right)(6.341\%)(1 - .35) = 9.13\%$$

<b>Debt Rating</b>	<b>10-year Yield Spread</b>
AAA	0.866%
AA	0.893%
A+	0.953%
A	1.044%
A-	1.183%
BBB+	1.341%
BBB	1.472%
BBB-	1.838%
BB+	2.716%
BB	3.508%
BB-	3.533%
B+	3.775%
B	4.418%
B-	4.953%