UCLA
Finance for Engineers and Scientists

E111   Midterm Exam   Winter 2009   Prof. Bristow Version A Solutions

Q1.(5 pts) Draft a common-size income statement for a hypothetical firm using the following information: The tax rate is 33% of IBT. Net income is $1/5^{th}$ of sales. Opex is twice ROS. Costs of goods sold are 1.5x ROS.

ROS = NI/sales = 0.20= 20%
OPEX = 40%
COGS = 30%

sales	100%
COGS	30%

Gross	70%
OPEX	40%

IBT	30%
tax	10%

Net Income	20%

Q2.(5 pts) Draft a common-sized balance sheet for a hypothetical firm using the following information: A/R = A/P, Notes Payable = cash, Net Fixed Assets = 30% and long term debt is half of net fixed assets. Current assets = 70% and cash is 20%. A/R is 1/4th of Inventory.

cash	20%	A/P	10%
A/R	10%	Notes Payable	20%
Inventory	40%	Current liability	30%
Current Assets	70%		
fixed assets	30%	long term debt	15%
Total assets	100%	total liabilities	45%
		total equity	55%
		total liabilities and equity	100%

Q3.(4 pts) What is the NPV of a $1 million investment made on Jan. 1, 2009 which produces $300,000 per year beginning Jan 1, 2010, and growing at 6% per year forever if the project has a 12% cost of capital?

$$P_o = \frac{D_1}{R-g} = \frac{300,000}{0.12-0.06} = 5 million$$

NPV = 5 – 1 = 4 million

Q4.(3 pts) Write the DuPont formula (identity) and state three things that the DuPont formula tells you for a given firm?

Dupont formula:
ROS x TO x LEV = ROE

1. operating efficiency: measured by profit margin—how much profit it takes per dollar of sales.
2. asset use efficiency: measured by the total asset turnover—how much sales are generated per dollar of assets.
3. financial leverage: measured by equity multiplier—how many assets can be supported by each dollar of equity.

Q5.(3 pts) In two or three sentences state what are agency problems, and why do they exist within a corporation? How can they be reduced?

Agency problems are caused by a misalignment of interests between principals and agents. Agency problems exit when agents (financial managers) and principals (shareholders) do not share the same interest for the company. They can be reduced if the principals design compensation and contracts for agents to align their interests, such as stock options or profit sharing plans. The threat of a takeover of the company helps minimize agent costs as well.

Q6.(3 pts) In one or two sentences define the difference between a primary market and a secondary market?

Primary market—securities are initially sold from the firm (or their investment bank) to the public, such as IPO.
Secondary market—one where trades occur between investors.

Q7.(4 pts) The 2008 COGS (cost of goods sold) are $10 million and revenues are $50 million and $2 million is the 12/31/2008 inventory. Based on year end data, what are Days Sales in Inventory?

$$TO = \frac{COGS}{inventory} = \frac{10 million}{2 million} = 5$$

$$DSI = \frac{365}{TO} = \frac{365}{5} = 73 days$$

Q8.(5 pts) Bruin Manufacturing, a very successful UCLA start-up, had 4 million shares of stock outstanding at the end of 2008. During 2008, the company reported ROA of 15%, Equity Multiplier or Leverage of 1.2x, ROE of 18%, the addition to retained earnings was $15 million and $5 million in dividends were paid. What are the earnings per share?

$$NI = 15 million + 5 million = \$20 million$$

$$EPS = \frac{NI}{shares} = \frac{20 million}{4 million} = \$5.00 / share$$

Q9.(4 pts) What are Bruin Manufacturing's internal growth and sustainable growth rates?

Internal growth rate:

$$\frac{b(ROA)}{1 - b(ROA)} = \frac{\frac{15}{20} * (0.15)}{1 - \frac{15}{20} * (0.15)} = 0.1268 = 12.7\%$$

Sustainable growth rate:

$$\frac{b(ROE)}{1 - b(ROE)} = \frac{\frac{15}{20} * (0.18)}{1 - \frac{15}{20} * (0.18)} = 0.1561 = 15.6\%$$

Q10.(2 pts) Assume the central bank has increased interest rates by ¼ point 17 times in the past few years. This action is most likely to cause
A. The country's currency to fall.
B. Inflation to increase.
C. Increased new investment by highly leveraged firms.
D. A slow down in the economy.
E. An increase in economic activity.

Q11.(2 pts) Assume GM's interest coverage ratio (measured by times interest earned) is 1.5x and the industry is 10x. These facts imply that compared to the typical automaker
A. GM is less likely to go bankrupt in a recession.
B. GM is more likely to go bankrupt in a recession.
C. GM is more likely to issue additional debt.
D. GM is more likely to build new automotive production plants.
E. None of the above.

Q12.(2 pts) One primary advantage of a corporation is
A. unlimited liability.
B. limited liability.
C. it is not a legal person.
D. it has no rights, duties or privileges.
E. it is exempt from the Sarbanes-Oxley Act.

Q13.(6 pts) Prepare a balance sheet for Bruin Corp. as of December 31, 2008, based on the following information: cash = $234,000; patents and copyrights = $818,000; accounts payable = $627,000; accounts receivable = $241,000; tangible net fixed assets = $4,700,000; inventory = $498,000; notes payable = $176,000; accumulated retained earnings = $4,210,000; long-term debt = $913,000. The following is true about Trojan
A. This balance sheet will not balance without a figure for revenues.
B. Common stock must be $565,000.
C. Revenues must have been $545,000 during 2005.
D. Net Working Capital is $386,000. (627,000 – 241,000)
E. Interest coverage is 3.90x (913,000 divided by 234,000)

234+241+498+4700+818 = 6491

627+176+913+4210 = 5926

6491-5926 = 565

Q14.(2 pts) The simplest form of business organization to establish is
A. an LLC.
B. a partnership.
C. a corporation.
D. a sole proprietorship.
E. an LLP.

Q15.(2 pts) The relationship between stockholders and management is
A. called a principal and agent or agency relationship.
B. called a separation of ownership and control.
C. governed by the board of directors.
D. all of the above.
E. none of the above.

Q16.(2 pts) The main disadvantage of a corporation is
A. unlimited life.
B. limited liability.
C. double taxation of distributed earnings.
D. double entry accounting required by Sarbanes-Oxley.
E. transferability of ownership interests.

Q17.(2 pts) Give an example of standard terms of sale?
2% 10, net 30

Q18.(4 pts) You will receive a $500,000 inheritance in 50 years. You can invest today at 6% annual rate, compounded annually. What is the present value of your inheritance?

$$PV = \frac{FV}{(1+r)^t} = \frac{500,000}{(1.06)^{50}} = \$27,144$$

Q19.(2 pts) In class, we discussed the Federal Reserve, also known as the Fed. The Fed sets targets for -
A. Exchange rates
B. Overnight interest rates
C. Mortgage rates
D. Federal Treasury Bond rates
E. The Prime rate

Q20.(4 pts) You wish to retire a millionaire in 40 years. You invest in small cap stock expecting to earn 16% annual rate compounded monthly? What amount must you invest per month to reach one million dollars in 40 years?

$$1,000,000 = C\left[\frac{\left[1+0.16/12\right]^{12*40}-1}{0.16/12}\right]$$

Solve for C
C = **$23.15**

Q21.(2 pts) What is EPS and how does it relate to the P/E?
EPS means earnings per share
$$EPS = \frac{stock\ price}{P/E}$$
or P/E=stock price/EPS

Q22.(3 pts) At 2% per month, approximately what is effective annual yield?
$(1+0.02)^{12} - 1 = 27\%$

Q23.(3 pts) What is the current ratio and how might you use it?
$$CR = \frac{CA}{CL} = \frac{current\ assets}{current\ liability}$$

The current ratio tells the likelihood of being able to pay their bills over the next year.

Q24.(6 pts) Calculating EFN. Given the most recent financial statements for Bradley, Inc. Assume assets and costs are proportional to sales. Assume debt will not change. No dividends are paid. Next year's sales are projected to be 120. (1) Construct its pro forma balance sheet and income statement. (2) What is the external financing needed?

(1)
Pro Forma

Income Statement		**Balance Sheet**				
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sales	120	assets	240		debt	120
costs	96				equity	104
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net income	24	total assets	240		total D+E	224

(2)
EFN + 240-224 = $16

Q25.(4 pts)The Bruin Manufacture Company has the following information: Asset=31; Sales=38; Debt=8; Profit Margin=0.0787; Payout Ratio=0.4. It also forecasts 20% growth in sales for the next year. Compute its external financing needed for the next year.
$$EFN = \left(\frac{31}{38}\right)7.6 - \left(\frac{8}{38}\right)7.6 - (0.0787x45.6)*(1-0.4) = \$2.45$$

Q26.(3 pts) What is current unemployment rate? What unemployment rate is considered full employment?

Current unemployment rate = 7% or 8%
Unemployment considered to be full employment = 6.0%

Q27.(3 pts) What is the current crude oil price (USD per barrel)? Roughly, what was the peak crude oil price in the past year?

Current $40/bbl
Last year high $135/bbl (140 ok)

Q28.(2 pts) What is current Dow Jones Industrial Average? What was high in the past two years? Please give an approximate numbers.

Current 8000
High 14,000

Q29.(4 pts) Draw the current yield curve? Please clearly mark the vertical and horizontal axis. Is it normal or inverted?

It's normal.
(Source: http://stockcharts.com/charts/yieldcurve.html)
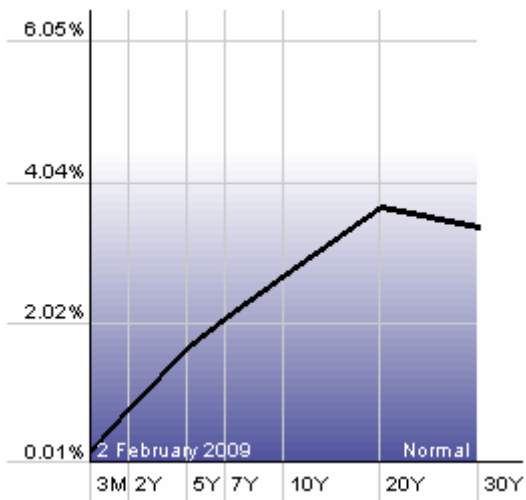
Q30.(2 pts) What is current Fed Fund(Overnight) Rate?

0-0.25%

<div align="center">End of exam</div>