

SEAT NUMBER: ROOM:

FAMILY NAME.....

OTHER NAMES.....

STUDENT NUMBER.....

This question paper must be returned. Candidates are not permitted to remove any part of it from the examination room.



SESSION 2 EXAMINATIONS NOVEMBER 2012

Unit: AFIN253: Financial Management

Time Allowed: 2 hours plus 10 minutes reading time.

Total Number of Questions: 15 Multiple Choice Questions plus 6 full response questions.

Instructions:

- PART A (60 marks):** There are 15 multiple choice questions. Answers to these must be recorded on a red-coloured General Purpose Answer Sheet.
- PART B (60 marks):** There are 6 questions. Attempt all questions. Show all workings. Write answers in the spaces provided. Illegible handwriting risks loss of marks.

Materials Allowed:

- No dictionaries are permitted.
- A non-programmable calculator (no text retrieval capacity) is permitted.
- Financial calculators may be used.
- Students are allowed one A4, hand written, double sided sheet of notes.
- Mobile telephones must be turned off and left at the front of the room.

Question:	A	1	2	3	4	5	6	Total
Out of:	60	8	20	9	6	8	9	120
Mark:								

Question 6: The US firm Google operates in the online advertising business. Google recently bought Motorola which makes phone handsets.

Assume the following:

- Google had a 10% after-tax WACC before it bought Motorola.
- Motorola had a 20% after-tax WACC before it merged with Google.
- Google and Motorola have the same level of gearing.
- Both companies operate in a classical tax system.

You are a manager at Motorola. You must value a project for making phone handsets. Which method(s) will give the correct valuation of the phone handset project? Select the most correct answer.

(a) Discount the phone handset project's unlevered CFFA by Google's 10% WACC after tax.

(b) Discount the phone handset project's unlevered CFFA by Motorola's 20% WACC after tax.

(c) Discount the phone handset project's levered CFFA by Google's 10% WACC after tax.

(d) Discount the phone handset project's levered CFFA by Motorola's 20% WACC after tax.

(e) Discount the phone handset project's unlevered CFFA by 15%, the average of Google and Motorola's WACC after tax.

Question 7: A firm's WACC **before** tax would decrease due to:

(a) the firm's industry having more systematic risk, for example if it was a mining company and commodities prices became more volatile.

(b) the firm's industry having less systematic risk, for example if it was a child care centre and the government announced higher subsidies for parents using child care centres.

(c) the firm issuing more debt and using the proceeds to repurchase stock.

(d) the firm issuing more equity and using the proceeds to pay off debt holders.

(e) the firm beginning a new project of similar systematic risk to the firm's other projects and which is financed with debt only.

Question 8: A firm has a debt-to-assets ratio of 50%. The firm then issues a large amount of **debt** to raise money for new projects of similar risk to the company's existing projects. Assume a classical tax system. Which statement is correct?

- (a) The debt-to-assets (D/V) ratio will decrease.
- (b) The debt-to-equity ratio (D/E) will decrease.
- (c) The firm's cost of equity will decrease.
- (d) The company's after-tax WACC will decrease.
- (e) The company's before-tax WACC will decrease.

Question 9: A firm changes its capital structure by issuing a large amount of equity and using the funds to repay debt. Its assets are unchanged.

According to the Capital Asset Pricing Model (CAPM), which statement is correct?

- (a) The beta of the firm's assets will increase.
- (b) The beta of the firm's assets will decrease.
- (c) The beta of the firm's equity will increase.
- (d) The beta of the firm's equity will decrease.
- (e) The beta of the firm's equity will be unchanged.

Question 10: Your friend claims that by reading The Australian Financial Review newspaper, she can identify shares that will have positive abnormal expected returns over the next 2 years. Assuming that her claim is true, which statement(s) are correct?

- (i) Weak form market efficiency is broken.
- (ii) Semi-strong form market efficiency is broken.
- (iii) Strong form market efficiency is broken.
- (iv) The asset pricing model used to measure the abnormal returns (such as the CAPM) had mis-specification error so the returns may not be abnormal but rather fair for the level of risk.

Select the most correct response:

- (a) Only (i) is true.
- (b) Only (i) and (ii) are true.
- (c) Only (i), (ii) and (iii) are true.
- (d) Either (i) is true, or (iv) is true.
- (e) Either (i) and (ii) is true, or (iv) is true.

Question 11: A newly floated farming company is financed with senior bonds, junior bonds, cumulative non-voting preferred stock and common stock. The new company has no retained profits and due to floods it was unable to record any revenues this year, leading to a loss. The firm is not bankrupt yet since it still has substantial contributed equity (same as paid-up capital). On which securities must it pay interest and/or dividend payments in this terrible financial year?

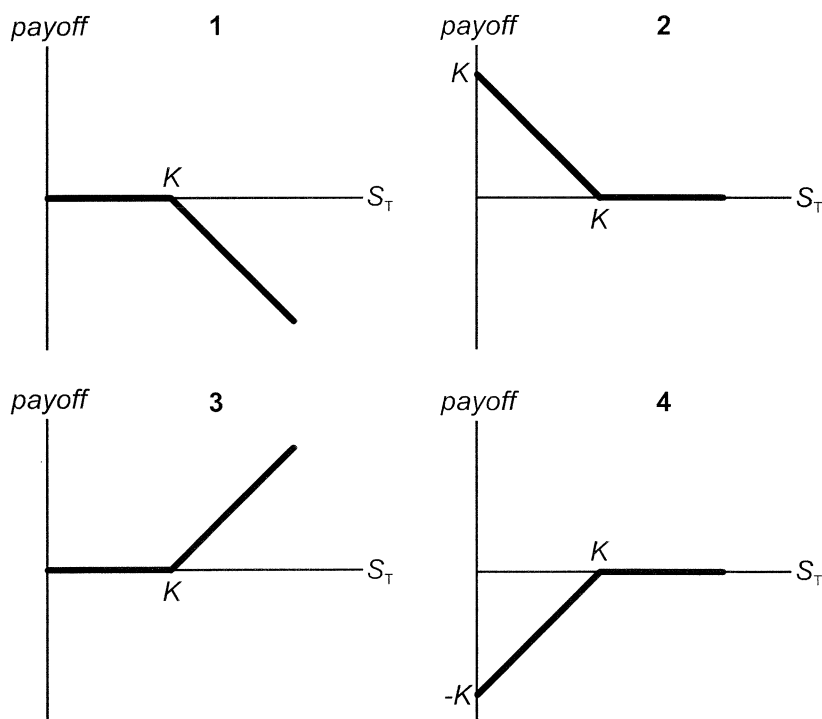
- (a) Preferred stock only.
- (b) The senior and junior bonds only.
- (c) Common stock only.
- (d) The senior and junior bonds and the preferred stock.
- (e) No payments on any security is required since the firm made a loss.

Question 12: You have just sold an 'in the money' 6 month European put option on the mining company BHP at an exercise price of \$40 for a premium of \$3.

Which of the following statements best describes your situation?

- (a) You have bought the right to buy a BHP share for \$40 in 6 months.
- (b) You have bought the right to sell a BHP share for \$40 in 6 months.
- (c) You have bought the obligation to sell a BHP share for \$40 in 6 months.
- (d) You have sold the right to buy a BHP share for \$40 in 6 months.
- (e) You have sold the right to sell a BHP share for \$40 in 6 months.

Question 13: Below are 4 option graphs. Note that the y-axis is payoff at maturity (T). What types of options do they depict? List them in the order that they are numbered.



- (a) 1: short call, 2: short put, 3: long call, 4: long put.
- (b) 1: long call, 2: long put, 3: short call, 4: short put.
- (c) 1: short put, 2: long put, 3: short call, 4: long call.
- (d) 1: long put, 2: short put, 3: long call, 4: short call.
- (e) 1: short call, 2: long put, 3: long call, 4: short put.

Question 14: You operate a cattle farm that supplies hamburger meat to the big fast food chains. You buy a lot of grain to feed your cattle, and you sell the fully grown cattle on the livestock market.

You're afraid of adverse movements in grain and livestock prices. What options should you buy to hedge your exposures in the grain and livestock markets?

Select the most correct response:

(a) Buy calls on grain, buy calls on livestock.

(b) Buy calls on grain, buy puts on livestock.

(c) Buy puts on grain, buy calls on livestock.

(d) Buy puts on grain, buy puts on livestock.

(e) Statements (a) and (d) are both correct.

Question 15: The US government recently announced that subsidies for fresh milk producers will be gradually phased out over the next year. Newspapers say that there are expectations of a 40% increase in the spot price of fresh milk over the next year.

Option prices on fresh milk trading on the Chicago Mercantile Exchange (CME) reflect expectations of this 40% increase in spot prices over the next year.

Similarly to the rest of the market, you believe that prices will rise by 40% over the next year. **What option trades are likely to be profitable?**

Assume that only the spot price is expected to increase and there is no change in expected volatility or other variables that affect option prices.

(a) Buy one year call options on fresh milk.

(b) Buy one year put options on fresh milk.

(c) Sell one year call options on fresh milk.

(d) All of the above option trades are likely to be profitable.

(e) None of the above option trades are likely to be profitable.

END OF PART A

PART B (60 Marks)

Answer each of the following questions in the space provided below the questions. Mark allocations are noted next to each question.

Question 1 (total of 8 marks): A stock is priced at \$2 and just paid its annual dividend of \$0.10. The dividend is expected to increase by 10% every year.

Question 1a (4 marks): What is the cost of equity using the Dividend Discount Model (or Gordon Growth Model)?

$$P_0 = \frac{d_1}{r_e - g}$$

$$2 = \frac{0.1(1+0.1)}{r_e - 0.1}$$

$$2(r_e - 0.1) = 0.1(1+0.1)$$

$$r_e - 0.1 = \frac{0.1(1+0.1)}{2}$$

$$r_e = \frac{0.1(1+0.1)}{2} + 0.1 = 0.155 = 15.5\%$$

Question 1b (4 marks): Some analysts might argue that the growth rate on this stock's dividend is too high. What is the highest real growth rate that should be used in perpetuity? Answer succinctly in one sentence.

Dividends and share prices shouldn't grow by more than the GDP growth rate of the economy, which in real terms is about 3 to 4% in Australia. If the growth rate was more than this, ~~if~~ the company would take over the world since it would grow by more than the average company in perpetuity.

Question 2 (total of 20 marks): A company has:

- A target debt-to-**equity** ratio of 1:1.
- A beta on levered equity of 0.5.
- Existing debt which pays a coupon of 4% and yields 6%.
- A corporate tax rate of 30%.
- The risk free rate is 5% and the market rate of return is 10%.

All rates are effective annual rates. Assume a classical tax system.

Question 2a (4 marks): Calculate the company's **levered cost of equity**.

$$\begin{aligned} r_E &= r_f + \beta_E (r_m - r_f) \\ &= 0.05 + 0.5(0.1 - 0.05) \\ &= 0.075 \end{aligned}$$

Question 2b (4 marks): Calculate the company's **pre-tax WACC** (sometimes called the opportunity cost of capital, or the required return on assets, r_A).

$$r_A = r_D \cdot \frac{D}{V} + r_E \cdot \frac{E}{V}$$

$$\frac{D}{E} = \frac{1}{1}, \quad \text{so } D \text{ could be } 1 \text{ \& } E \text{ could be } 1, \\ \text{so } V \text{ could be } 1+1 = 2.$$

$$\therefore \frac{D}{V} = \frac{1}{2} \quad \& \quad \frac{E}{V} = \frac{1}{2}.$$

$$\begin{aligned} r_A &= 0.06 \times \frac{1}{2} + 0.075 \times \frac{1}{2} \\ &= 0.0675 \end{aligned}$$

Question 2c (4 marks): Calculate the company's **after-tax WACC**.

$$\begin{aligned} r_{\text{WACC after tax}} &= r_D (1 - t_c) \cdot \frac{D}{V} + r_E \cdot \frac{E}{V} \\ &= 0.06(1 - 0.3) \times 0.5 + 0.075 \times 0.5 \\ &= 0.0585 \end{aligned}$$

Question 2d (4 marks): The company is considering investment in a project and has calculated the unlevered Cash Flow From Assets (CFFA) for each year in the project's life, so interest expense has been ignored.

The project is likely to be funded with equity only since the project is relatively small and will have a negligible impact on the firm's debt-to-equity ratio.

Considering this, which discount rate should the company use to discount its unlevered CFFA? Circle one of the following:

Cost of debt,

Levered cost of equity,

Levered pre-tax WACC,

Levered after-tax WACC.

Question 2e (4 marks): Circle **two** words from the options in bold to make the following sentence complete:

The project's cash flows should have the same level of

total / systematic / idiosyncratic risk as the cash flows from the company's

debt / equity / assets.

Make sure you have circled **2** words from the above options in bold.

Question 3 (total of 9 marks): For each of the following events, state the effect on the firm's market value of equity (E), market value of debt (D), and market value of the firm's assets (V). Draw an up arrow (↑) for an increase, a down arrow for a decrease (↓) and a blank space or dot for no change.

Assume that all events happen in isolation, that all transactions are done at a fair price, that there are no transaction costs, no asymmetric information (so ignore signalling effects) and that the firm is at its optimum debt-to-assets ratio so that any increase in tax shields is exactly offset by the increase in the costs of financial distress. Remember: $V = D + E$

	Market Value of Debt (D)	Market Value of Equity (E)	Market Value of the Firm's Assets (V)
Positive NPV project	(↑)	↑	↑
The sale of a large asset			
Rights issue	(↑)	↑	↑
On-market share buy-back	(↓)	↓	↓
Regular dividend	(↓)	↓	↓
Bonus share issue, which is the same as a 'stock dividend'			
Bonds issue	↑		↑
Coupon payment on debt	↓		↓
An increase in the yield of fixed coupon bonds	↓		↓

Note: The bracketed effects will only occur due to changes in credit risk. I should have¹² said "ignore changes in credit risk" but I overlooked it. Please mark these, or no change as correct. Thanks

Question 4 (total of 6 marks): Stock ABC has been trading on the ASX for the past 20 years and has had the following historical total returns:

Year	Return
2007	0.2
2008	0.3
2009	-0.1
2010	0.05

Question 4a (2 marks): What is ABC stock's average return?

$$\begin{aligned}\bar{r} = \mu &= \frac{0.2 + 0.3 + -0.1 + 0.05}{4} \\ &= \frac{0.45}{4} = 0.1125 = 11.25\%\end{aligned}$$

Question 4b (4 marks): What is ABC stock's standard deviation of returns?

$$\begin{aligned}\sigma^2 &= \frac{(0.2 - 0.1125)^2 + (0.3 - 0.1125)^2 + (-0.1 - 0.1125)^2 + (0.05 - 0.1125)^2}{4-1} \\ &= \frac{0.0919}{3} \\ &= 0.0306 \\ \sigma &= \sqrt{0.0306} \\ &= 0.175 = 17.5\%\end{aligned}$$

Question 5 (total of 8 marks): Your friend has a portfolio of two securities, stock XYZ and an exchange traded fund (ETF) that tracks the ASX200. Assume that the ASX200 ETF is the market portfolio. The following table summarises his holdings.

	XYZ	ASX200 ETF
Investment	\$50,000	\$150,000
Expected return	7.5% pa	10% pa
Total standard deviation	40% pa	20% pa
Beta	0.5	1
Correlation of returns between XYZ and ASX200	0.25	

Question 5a (4 marks): What is the beta of the portfolio?

$$\begin{aligned}
 \beta_p &= x_1 \cdot \beta_1 + x_2 \cdot \beta_2 \\
 &= \frac{50}{200} \times 0.5 + \frac{150}{200} \times 1 \\
 &= 0.875 \checkmark
 \end{aligned}$$

Question 5b (4 marks): What is the **total variance** of the portfolio?

$$\begin{aligned}
 \sigma^2 &= x_1^2 \sigma_1^2 + x_2^2 \sigma_2^2 + 2x_1 x_2 \sigma_1 \sigma_2 \rho_{12} \\
 &= \left(\frac{50}{200}\right)^2 \times 0.4^2 + \left(\frac{150}{200}\right)^2 \times 0.2^2 + \\
 &\quad 2 \times \frac{50}{200} \times \frac{150}{200} \times 0.4 \times 0.2 \times 0.25 \\
 &= 0.01 + 0.0225 + 0.0075 \\
 &= 0.04 \checkmark \\
 \sigma &= 0.2
 \end{aligned}$$

Question 6 (total of 9 marks):

Project Data	
Project life	1 yr
Initial investment in equipment	\$5m
Depreciation of equipment per year for tax purposes	\$1m
Unit sales per year	3m
Sale price per unit	\$20
Variable cost per unit	\$12
Fixed costs per year, paid at the end of each year	\$2m
Tax rate	30%

Note 1: The equipment will have a book value of \$4m at the end of the project for tax purposes. However, the equipment is expected to fetch \$4.5m when it is sold at $t=1$.

Note 2: Due to the project, the firm will have to purchase \$15m of inventory initially (at $t=0$). But the firm will be able to delay payment to its inventory suppliers (trade creditors) for one year with no interest charges. At the end of the project ($t=1$) there will be no inventory left since it will all be sold. At this time the trade creditors will be paid (at $t=1$).

Note 3: Six months ago an external team of consultants was employed to estimate the above figures. They have just finished their work and demand payment of \$0.5m now ($t=0$). They must be paid whether or not we go ahead with the project. The cost is tax-deductible.

Question 6a (4 marks): Find the project's unlevered Cash Flow From Assets (CFFA) at time $t = 0$. You do not need to find the NPV.

$$NI_0 = 0$$

$$\begin{aligned} CFFA_0 &= NI + Depr - CapEx - \Delta NWC + IntExp \\ &= 0 + 0 - 5m - 0 + 0 \\ &= -5m \checkmark \end{aligned}$$

Question 6b (5 marks): Find the project's unlevered CFFA at time $t = 1$. You do not need to find the NPV.

$$\begin{aligned} NI_1 &= (Rev - COGS - FC - Depr - IntExp)(1 - t_c) \\ &= ((3m \times 20 + 4.5m) - (3m \times 12 + 4m) - 2m - 1m - 0)(1 - 0.3) \\ &= 15.05m \end{aligned}$$

$$\begin{aligned} CFFA_1 &= NI + Depr - CapEx - \Delta NWC + IntExp \\ &= 15.05m + 1m - (-4m) - 0 + 0 \\ &= 20.05m \checkmark \end{aligned}$$

END OF PART B

Spare Scribble Sheet

Formulas

$$PV(\text{single cash flow}) = V_0 = \frac{C_t}{(1 + r_{eff})^t}$$

$$PV(\text{annuity}) = V_0 = \frac{C_1}{r_{eff}} \left(1 - \frac{1}{(1 + r_{eff})^T} \right)$$

$$PV(\text{perpetuity}) = V_0 = \frac{C_1}{r_{eff} - g_{eff}}$$

$$r_{eff,annual} = (1 + r_{eff,monthly})^{12} - 1$$

$$r_{eff,monthly} = \frac{r_{APR,comp\ monthly}}{12}$$

$$Price_{bill} = V_0 = \frac{F_t}{\left(1 + r_{simple} \times \frac{t}{365}\right)}$$

$$Price_{bond} = PV(\text{annuity of coupons}) + PV(\text{principal})$$

$$= \frac{C_1}{r_{eff}} \left(1 - \frac{1}{(1 + r_{eff})^T} \right) + \frac{Face}{(1 + r_{eff})^T}$$

$$CapEx = NFA_{now} - NFA_{before} + Depreciation$$

$$\uparrow NWC = (CA_{now} - CL_{now}) - (CA_{before} - CL_{before})$$

$$CFFA = NI + Depr - CapEx - \uparrow NWC + IntExp$$

$$CFFA = \quad CF \text{ to equity holders} \quad + CF \text{ to creditors}$$

$$r_{0-1} = \frac{p_1 - p_0}{p_0} = \frac{p_1}{p_0} - 1$$

$$\bar{r} = \frac{\sum_{i=1}^n (r_i)}{n} = \frac{r_1 + r_2 + \dots + r_n}{n}$$

$$var(r) = \sigma^2 = \frac{\sum_{i=1}^n [(r_i - \bar{r})^2]}{n - 1}$$

$$cov(r_1, r_2) = \sigma_{1,2} = \frac{\sum_{i=1}^n [(r_{1,i} - \bar{r}_1)(r_{2,i} - \bar{r}_2)]}{n - 1}$$

$$correl(r_1, r_2) = \rho_{1,2} = \frac{cov(r_1, r_2)}{sd(r_1) \cdot sd(r_2)} = \frac{\sigma_{1,2}}{\sigma_1 \cdot \sigma_2}$$

$$\bar{r} = \sum_{i=1}^n (p_i \cdot r_i) = p_1 \cdot r_1 + p_2 \cdot r_2 + \dots + p_n \cdot r_n$$

$$var(r) = \sigma^2 = \sum_{i=1}^n [p_i (r_i - \bar{r})^2]$$

$$cov(r_1, r_2) = \sigma_{1,2} = \sum_{i=1}^n [p_i (r_{1,i} - \bar{r}_1)(r_{2,i} - \bar{r}_2)]$$

$$r_P = x_1 \cdot r_1 + x_2 \cdot r_2 + \dots + x_n \cdot r_n = \sum_{i=1}^n (x_i \cdot r_i)$$

$$x_1 + x_2 + \dots + x_n = 1$$

$$\sigma_P^2 = x_1^2 \cdot \sigma_1^2 + x_2^2 \cdot \sigma_2^2 + 2 \cdot x_1 \cdot x_2 \cdot \sigma_{1,2}$$

$$\sigma_{1,2} = \rho_{1,2} \cdot \sigma_1 \cdot \sigma_2$$

$$\mu_i = r_f + \beta_i (\mu_M - r_f)$$

$$\beta_i = \frac{\sigma_{i,M}}{\sigma_M^2} = \frac{cov(r_i, r_M)}{var(r_M)}$$

$$\sigma_{i,total}^2 = \beta_i^2 \cdot \sigma_M^2 + \sigma_{i,\varepsilon}^2$$

$$\beta_P = x_1 \beta_1 + x_2 \beta_2 + \dots + x_n \beta_n$$

$$r_{WACC \text{ after tax}} = \frac{D}{V} \cdot r_D (1 - t_c) + \frac{E}{V} \cdot r_E$$

$$r_{WACC \text{ before tax}} = r_A = \frac{D}{V} \cdot r_D + \frac{E}{V} \cdot r_E$$

$$V = D + E$$

$$r_{total} = r_{capital} + r_{income}$$

$$r_{0-T} = \left((1 + r_{0-1})(1 + r_{1-2})(1 + r_{2-3}) \dots (1 + r_{(T-1)-T}) \right)^{\frac{1}{T}} - 1$$

$$(1 + r_{0-T})^T = (1 + r_{0-1})(1 + r_{1-2})(1 + r_{2-3}) \dots (1 + r_{(T-1)-T})$$

$$P_{ex-rights} = \frac{n \times P_{cum-rights} + P_{subscription}}{n + 1}$$