FINANCE

ECO-7008A

Time allowed: 2 hours

Answer THREE questions, ONE from Section A and TWO from Section B.

The question in Section A is worth 34% of the final mark. Each question in Section B is worth 33% of the final mark.

Notes are not permitted in this examination.

Do not turn over until you are told to do so by the Invigilator.
SECTION A (Answer ONE question from this section)

1. At January 2016 a company’s sources of debt and equity finance are summarised as follows:

<table>
<thead>
<tr>
<th>Debt and Equity Finance</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>7% preference shares (par value £1)</td>
<td>400,000</td>
</tr>
<tr>
<td>8% bonds (redeemable January 2025, par [P] £100)</td>
<td>6,000</td>
</tr>
<tr>
<td>Ordinary shares (par value £1)</td>
<td>400,000</td>
</tr>
<tr>
<td>Bank loan</td>
<td>£500,000</td>
</tr>
</tbody>
</table>

The company also has a £500,000 bank loan outstanding, at an interest rate of 9%.

<table>
<thead>
<tr>
<th>Current ex-div ordinary share price</th>
<th>£1.80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last 5 years’ dividends (most recent last)</td>
<td>16p, 17p, 18p, 19p, 20p</td>
</tr>
<tr>
<td>Current ex-div preference share price ($P_0$)</td>
<td>£0.82</td>
</tr>
<tr>
<td>Current ex-interest bond market value ($NPD$)</td>
<td>£105</td>
</tr>
<tr>
<td>Corporate tax rate</td>
<td>20%</td>
</tr>
</tbody>
</table>

[Hint: remember the ‘tax-shield’.]

The before tax cost of debt for a coupon paying bond may be estimated using the Hawawini and Vora (1982) bond yield approximation formula,

\[
K_d = \frac{I + \left(\frac{(P - NPD)}{n}\right)}{(P + 0.6 \times (NPD - P))}
\]

Here,

- $K_d$ = before tax cost of debt finance
- $I$ = annual interest payment
- $P$ = par value
- $NPD$ = net proceeds from disposal (market price of bond)
- $n$ = number of years to redemption

The Dividend Growth model is

\[
P_0 = \frac{D_0(1 + g)}{(r - g)}
\]

Here,

- $P_0$ = ex-dividend ordinary share price
- $D_0$ = the most recent dividend
- $g$ = expected future growth rate of dividends
- $r$ = shareholders’ required rate of return

a) Calculate the company’s cost of equity capital. [6 marks]
b) Calculate the company's cost of preference share capital. [6 marks]

c) Calculate the company's cost of debt for (i) bonds, and (ii) bank loan. [8 marks]

d) Using the information provided, and your answers to parts (a), (b) and (c), calculate the company's weighted average cost of capital (WACC) at market prices. [14 marks]

2. ABC plc and XYZ plc are considering a merger. Financial data for the two companies is as follows:

<table>
<thead>
<tr>
<th></th>
<th>ABC</th>
<th>XYZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of shares issued</td>
<td>3m</td>
<td>6m</td>
</tr>
<tr>
<td>Profit after tax</td>
<td>£1.8m</td>
<td>£0.5m</td>
</tr>
<tr>
<td>Price/earnings ratio</td>
<td>12.0</td>
<td>10.3</td>
</tr>
</tbody>
</table>

The two companies have estimated that, due to economies of scale, the newly merged company would generate cost savings of £200,000 per year. [You may assume that the cost savings translate into a direct increase in the after-tax profit of the new joint company.]

a) It is suggested initially that 100% of XYZ's shares would be exchanged for shares in ABC at a rate of one share in ABC for every three shares in XYZ. What would be the expected reduction of earnings per share (EPS) from the point of view of ABC's shareholders? Would you recommend this suggestion? [12 marks]

b) An alternative to this is for ABC's shares to be valued at £7.20 and for the total share capital of XYZ to be valued at £10.5m for the merger purposes. A certain percentage of XYZ's shares would be exchanged for shares in ABC, while the remaining shares of XYZ would be exchanged for 6.5% bonds (issued at £100 nominal value) in the new company. Given that the corporate tax rate is 30%, how much would have to be raised from the bond issue in order for there to be no dilution of EPS from ABC's existing shareholders' point of view? [22 marks]

TURN OVER
SECTION B (Answer TWO questions from this section)

3 How satisfactory is the Capital Asset Pricing Model (CAPM) as an asset pricing theory? [33 marks]

4 “Dividend theory is irrelevant. Dividend policy is simply determined by the preferences of investors.” Discuss these ideas. [33 marks]

5 Why does the capital structure of a company matter? [33 marks]

6 Discuss the implications of the three forms of market efficiency. [33 marks]

7 “Diversification decreases risk.” Is this statement always true, only sometimes true, or never true? Carefully justify your answer. [33 marks]

END OF PAPER
ECO-7008A Finance – 2017-18 Final Exam answer guidance and general feedback

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Section 1 – General Feedback page 1
Section 2 – Exam paper with limited answer guidance page 3

Section 1 – General Feedback

60 students sat the exam this year.

Provisional Marks Breakdown

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Mark</td>
<td>84%</td>
</tr>
<tr>
<td>Average mark</td>
<td>63%</td>
</tr>
<tr>
<td>Section A</td>
<td>Most students answered question 1</td>
</tr>
<tr>
<td>Section B</td>
<td>Most common answers were questions 6 (efficient markets) and 7 (portfolio theory)</td>
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</table>

Performance on the final exam this year was broadly good.

Section A (Technical questions):

Students were asked to attempt one technical question from a choice of two, each worth 34 marks. Most students attempted question 1. This question was similar to a question from the week-5 WACC seminar. Question 1 was typically answered very well, demonstrating a pleasing amount of effort in preparation for Section A. Fewer students attempted question 2 (Mergers & Acquisitions), which was answered less well on average than question 1.

While the revision guidance provided for Section A was clear, it also involved a considerable amount of effort in order to be reasonably sure of a successful outcome. The cohort should be congratulated for the effort put into preparing for Section A.

Section B (essay-type questions):

Students were asked to attempt two essay-type questions from choice of five (each worth 33 marks). Most students attempted question 6 (efficient market hypothesis) and question 7 (portfolio theory). Remaining answers were spread across questions on: CAPM, Capital Structure, and Dividend policy.

Needless to say it is harder to get (close to) full marks on these essay-type questions, although we saw some very good essays. The difference between good and very good essays came down to the extent to which students went beyond the lecture material. This criticism applied equally to the questions answered, with all Section B questions being answered, on average, equally

Contact: Dr James Watson, ECO
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Version 1
well. Answers from students who provided discussion demonstrating preparation beyond the basic lecture material really stood out, recognised by higher Section B marks.
Section 2 – Exam paper and answer guidance

UNIVERSITY OF EAST ANGLIA
School of Economics
Main Series PG Examination 2017-2018

[With SECTION A ANSWERS]

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| 8% bonds (redeemable January 2025, par [P] £100) | 6,000  
| Ordinary shares (par value £1) | 400,000  

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| Current ex-div ordinary share price | £1.80  
| Last 5 years’ dividends (most recent last) | 16p, 17p, 18p, 19p, 20p  
| Current ex-div preference share price (P_0) | £0.82  
| Current ex-interest bond market value (NPD) | £105  
| Corporate tax rate | 20%  

[Hint: remember the ‘tax-shield’.]

The before tax cost of debt for a coupon paying bond may be estimated using the Hawawini and Vora (1982) bond yield approximation formula,

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TURN OVER
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The two companies have estimated that, due to economies of scale, the newly merged company would generate cost savings of £200,000 per year. [You may assume that the cost savings translate into a direct increase in the after-tax profit of the new joint company.]

a) It is suggested initially that 100% of XYZ’s shares would be exchanged for shares in ABC at a rate of one share in ABC for every three shares in XYZ. What would be the expected reduction of earnings per share (EPS) from the point of view of ABC’s shareholders? [12 marks]

b) An alternative to this is for ABC’s shares to be valued at £7.20 and for the total share capital of XYZ to be valued at £10.5m for the merger purposes. A certain percentage of XYZ’s shares would be exchanged for shares in ABC, while the remaining shares of XYZ would be exchanged for 6.5% bonds (issued at £100 nominal value) in the new company. Given that the corporate tax rate is 30%, how much would have to be raised from the bond issue in order for there to be no dilution of EPS from ABC’s existing shareholders’ point of view? [22 marks]
Question 1 Answers

(a) For the cost of capital for ordinary equity,

The dividend has grown from 16p to 20p over the last 5 years.

An approximation for the annual growth rate ($g$) can be found by solving,

$$20 = 16(1 + g)^4$$

$$\Rightarrow g = (1.25)^{\frac{1}{4}} - 1 = 0.057 \sim 5.74\%$$

And, using the dividend growth model formula,

$$K_e = r = \frac{D_0}{P_0} + g = \frac{0.20(1.0574)}{1.80} + 0.0574 = 0.175 = 17.5\%$$

(b) For the cost of capital for preference shares,

$$K_p = \frac{D_p}{P_0} = \frac{7}{82} = 8.5\%$$

(c) (i) For the cost of debt for bonds, $K_d$, using the Hawawini-Vora bond approximation model:

$$K_d = \left[ l + \left( \frac{P - NPD}{n} \right) \right] \left( \frac{P + 0.6 \times (NPD - P)}{n} \right)$$  (see Week 4 lecture or WH page 283.)

$$n = \text{jan2025} - \text{jan2016} = 9\text{yr} \quad K_d = \left[ 8 + \left( \frac{100 - 105}{9} \right) \right] \left( \frac{100 + 0.6 \times (105 - 100)}{9} \right) \frac{7.44}{103} = 7.22\%$$

So $K_d$ after tax, $7.22 \times (1 - 0.20) = 5.8\%$

(ii) For the bank loan, $K_{bl}$ after tax $= 9 \times (1 - 0.20) = 7.2\%$

(d) A market-based weighting is preferred to one using book values:
Market value of equity, \( E = 400,000 \times £1.80 \) = 720
Market value of preference shares, \( P = 400,000 \times £0.82 \) = 328
Market value of bonds, \( D = 6,000 \times £105 \) = 630
Book value of bank loans (no market value) = 500
Total weighting = 2178

\[
WACC = \frac{[(17.5 \times 720) + (8.5 \times 328) + (5.8 \times 630) + (7.2 \times 500)]}{2,178}
= \frac{[12,600 + 2,788 + 3,654 + 3,600]}{2,178} \sim 10.4\%
\]

**Question 2 Answers**

a) The original EPS of ABC = £1.8m/3m = £0.60

Number of new shares of ABC to be issued = 6m/3 = 2m

Post-merger earnings of the new company = 1.8 + 0.5 + 0.2 = £2.5m

Merged company's EPS = (£1.8m + £0.5m + £0.2m)/5m = £0.50

The expected EPS dilution from ABC's shareholders' point of view is (0.60-0.50=)£0.10.

(b) The intuition here is that the new company needs to raise enough debt such that the EPS remains at the required level of £0.60.

Let \( P = \) the number of new shares in ABC to be issued, and \( Q = \) the amount of debt finance in the new company to be issued.

The distributable earnings of the new company of £2.5m will be reduced by the after-tax cost of the interest on the 6.5 per cent loan stock. The EPS of the new company must remain at 60p (calculated in part (a)), however, and so:

\[
\frac{2,500,000 - (0.7 \times 0.065 \times Q)}{(3,000,000 + P)} = £0.60 \quad (A)
\]

[Here the numerator is an expression for the distributable earnings of the new company; and the]
denominator is an expression for the total number of shares in the new company. i.e. The LHS of equation (A) is an expression for the EPS of the new company, which is required to remain at 60p.]

Rearranging (A):

\[0.0455Q + 0.6P = 700,000\]  

Also, we know that:

\[10,500,000 = Q + 7.2P\]  

[i.e. The amount of debt and equity provided to XYZ shareholders must be equal to the valuation of XYZ for the purposes of the merger.]

Rearranging (2):

\[Q = (10,500,000 - 7.2P)\]  

Inserting (2a) into (1):

\[0.0455 \times (10,500,000 - 7.2P) + 0.6P = 700,000\]

Solving for P:

\[P = 222,250 / 0.2724 = 815,896\]

From (2a), substituting for P we have:

\[Q = 10,500,000 - (7.2 \times 815,896) = £4,625,549\]

Hence XYZ shareholders receive **815,896** shares in ABC and **£4,625,549** of 6.5% loan stock.
SECTION B (Answer TWO questions from this section)

Marking to reflect the transparency of the types of questions that can come up, versus degree and depth of preparation a student’s answer implies.

3 How satisfactory is the Capital Asset Pricing Model (CAPM) as an asset pricing theory?
CAPM (Week-9) lecture and associated reading.

4 “Dividend theory is irrelevant. Dividend policy is simply determined by the preferences of investors.” Discuss.
Dividend Policy (Week-5) lecture and associated reading.

5 Does the capital structure of a company matter?
Capital Structure (Week-4) lecture and associated reading.

6 Discuss the implications of the three forms of market efficiency.
EMH (Week-10 (plus week-2)) lecture(s) and associated reading.

7 “Diversification decreases risk.” Is this statement always true, only sometimes true, or never true? Carefully justify your answer.
Portfolio Theory (Weeks 8&9) lectures and associated reading.

END OF PAPER