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Question 1

The Crammond Manufacturing Plc has a number of factories around the country and it needs to upgrade the water purification systems in its factories.

The company is looking at two possible systems: the first, the Titan, will cost £120 000 per installation and will have an operating cost of £11 000 annually; the other system, the Colossus, will cost £225 000 per installation and has an annual operating cost of £6000 per installation. Both systems will be depreciated straight line to zero over their working lives. The Titan will be replaced every 5 years and the Colossus will be replaced every 8 years. The company faces a tax rate of 30%.

This is a normal project for the company, which has an asset beta of 0.9 and an equity beta of 1.0875. The company is 80% funded by equity and has just paid an annual dividend of 23.4p and its share price is 260p. The risk free rate of interest is 4.35% and the stock market risk premium is 5.5%. Ignore inflation.

Required:

a. Calculate the cost of capital that would be used to evaluate this investment decision.
(5 marks)

b. Work out the equivalent annual cost for each machine and explain which system you would choose.
(7 marks)

c. Book values or market values? Indicate which one is used in calculating the WACC and why it is that one and not the other one.
(4 marks)

d. Describe the impact that inflation has on depreciation, salvage values, and their tax in capital budgeting.
(6 marks)

e. Explain what the main differences are between accounting figures and cash flows for use in capital budgeting. Describe how you would obtain a figure for free cash flows (FCF*) from an income statement and balance sheet.
(8 marks)

Case Solution 1

(a) **Calculate the cost of capital that would be used to evaluate this investment decision.**
(5 marks)

Cost of capital

	Beta	Weight	Weighted beta	
Equity	1.0875	0.8	0.87	
Debt	**0.15**	**0.2**	**0.03**	
Asset beta	0.9			
	Asset beta – Equity weighted beta =		0.03	
		Debt beta =	0.15	*(0.03/debt weight of 0.2)*
rf	0.0435			

Stock market risk premium	0.055	
		Weighted cost
re =	0.10331	0.08265
rd* =	0.03623	0.007245
	WACC =	**0.08990**

WACC = 8.99%

(b) **Work out the equivalent annual cost for each machine and explain which system you would choose.**

(7 marks)

	Titan	**Colos-sus**		**Annuity factor: 8.99%**	
Capital cost	–120	–225	1	0.9175	
Annual operating cost	–11	–6	2	0.8418	
Life of system (years)	5	8	3	0.7724	
WACC discount rate	8.99%		4	0.7087	
Tax	30%		**5**	0.6502	**3.8907**
Depreciation on each system	24	28.125	6	0.5966	
			7	0.5474	
EAC			**8**	0.5023	
After tax operating cash flow	–7.70	–4.20			
Depreciation tax shield	7.20	8.44			
Operating cash flow	–0.50	4.24			
PV of operating cash flow	–1.95	23.46			
Capital expenditure	–120	–225			
Total PV of all costs	–121.95	–201.54			
EAC =	**–31.343**	**–36.398**			

The equivalent annual cost of the Titan is **£31 343**, and **£36 398** for the Colossus. The Titan has the lower **annualised** running costs so it should be chosen. It also has the shorter life cycle which will be an advantage if there are continual improvements in the technology.

(c) **Book values or market values? Indicate which one is used in calculating the WACC and why it is that one and not the other one.**

(4 marks)

Market values are used for calculating the WACC. The market values reflect the market's estimation of the earning ability of the company and its assets in the future, which will reflect the time period for the project. Book values are historic; they do not reflect the potential of the company's investments. Book values may be used by debt suppliers in evaluating the company's capital structure decision; the book value is not as volatile as the market value.

(d) **Describe the impact that inflation has on depreciation, salvage values, and their tax in capital budgeting.**

(6 marks)

Inflation will affect the operating cash flows of a project, for example, wage costs might rise by 4% per annum, sale prices may rise by 3% per annum. When it comes to depreciation, the annual depreciation charge is fixed at the time of purchase, so a £200 000 machine with a 10 year life being depreciated straight line to zero will have £20 000 of depreciation in year 1 and £20 000 of depreciation in year 10. This applies even if inflation is say 10% per annum, which would greatly reduce the real value of the final year's depreciation. If inflation was 10% and the tax rate 30%, then the real value of the tax shield is not £6000 but £2313 (£6000/1.10^{10}).

With salvage values, these would tend to rise with inflation. Continuing the example from above, if the company expected a salvage value of £10 000 at the end of 10 years, they would pay £3000 tax on it (machine is fully depreciated, £10 000 taxed at 30%). If the salvage value rose by the rate of inflation during the 10 years, the final salvage value would be £25 937 and the tax due would be £7781.

So with depreciation and inflation, the company will lose out on the real value of the depreciation tax shield – the tax shield benefit will progressively fall in real terms. And with the salvage value the company will be penalised if it rises in value with inflation when they come to sell it; they will pay too much tax.

(e) **Explain what the main differences are between accounting figures and cash flows for use in capital budgeting. Describe how you would obtain a figure for free cash flows (FCF*) from an income statement and balance sheet.**

(8 marks)

Cash flows represent actual cash that the company generates or has to pay out. Accounting figures include non cash items, such as depreciation and overheads. In accounting overheads and fixed costs will be apportioned to different parts of the business, sometimes on an arbitrary basis. In capital budgeting, you only use the cash flows that arise as a direct result of a project being undertaken. In capital budgeting, capital expenditure is recognised immediately, but in the income statement, a yearly depreciation of the asset is taken, rather than an upfront cost. The cash flows will recognise the depreciation tax shield as that reduces the amount of tax the company will pay.

Another difference is in the treatment of sales receipts. With cash flow capital budgeting the sales cash flow is only recognised when the cash is paid, whereas with accounting figures companies will report sales on credit. Cash flows will only take the change in net working capital from period to period, as opposed to taking the total amounts in the balance sheet. Cash flow capital budgeting will build in opportunity costs to a project analysis; these will be absent in the accounts.

The accounting statement will include interest payments, but the cash flows exclude interest payments. The cash flows are presented as if the firm were financed entirely by equity.

To obtain FCF* from an income statement and balance sheet you would start with the operating profits (from the income statement) and add (or subtract) ± capital expenditure (asset sales), ± any change in net working capital (in calculating this figure, current assets are regarded as an outflow and current liabilities as an inflow), then subtract taxes. This will give you FCF, but you need to make one more adjustment. You need to work out the tax shield (if the company has borrowings), multiply the interest paid by the tax rate, this gives the annual tax shield. Subtract this figure from FCF to get FCF*. FCF* are the ungeared cash flows that would be used in capital budgeting.

Question 2

1. Identify and discuss four key factors in the company borrowing decision.
   (8 marks)
2. Explain why in a company that is in financial distress managers may favour a riskier project to a safe project?
   (6 marks)
3. Discuss the likely capital structure implications of the following two examples:
   a. A company earns very little profits and pays no tax.
   b. Managers at a company believe the shares to be undervalued.
   (6 marks)

Case Solution 2

1. **Identify and discuss four key factors in the company borrowing decision.**
   (8 marks)
   Among the most important factors are: 1) the ability of the company to generate cash flow to service the interest and principal requirements at the appropriate times; 2) the ability to fully utilise the tax shields that come with borrowing; 3) the asset backing the company has that can be offered as collateral in case of default; and 4) the ability to access the financial markets.
   Other considerations in the capital structure decision would be the likely costs of financial distress, building in flexibility into the capital structure so that the company can still take advantage of good projects (this follows from point 4 above).
   The theme underlying points 1 and 3 is the danger of financial distress. The company must have enough cash to service the debt and they must have assets that they can sell if they get into financial distress. Point 2 means the company must be profitable. If it is not profitable, then it cannot take advantage of the tax shield. Point 4 means that the company should have easy access to further capital if needs be. There is nothing about the company that would prevent it from accessing the financial markets.
2. **Explain why in a company that is in financial distress managers may favour a riskier project to a safe project?**
   (6 marks)
   If a company is in financial distress, there will already have been a large fall in the value of the equity. If the company were to be liquidated at that point most, if not all, of the value would probably go to the bondholders. The shareholders would be left with nothing. If the choice of projects arose at this point, the safe project may just earn enough money to further improve the bondholders position, leaving the shareholders no better off. The safe project may even have a higher expected NPV than the risky project, but there is a small chance that the risky project would payoff, in which case the shareholders would gain. Managers' aim is to maximise shareholders wealth, and since it is effectively the shareholders who pay the managers the managers would favour the riskier project in the hope of a payoff for the shareholders. This is an agency problem in the capital structure.
3. **Discuss the likely capital structure implications of the following two examples:**
   (a) **A company earns very little profits and pays no tax.**
   (b) **Managers at a company believe the shares to be undervalued.**
   (6 marks)
   (a) If the company is not making any profits and is paying no tax, then there are no benefits to borrowing to the company. The reason for borrowing is to take advantage of the tax shield. If you can't take advantage of it, there is no point in borrowing. The company should be equity financed.
   (b) If the managers at a firm believe that the shares are undervalued, then they are more likely to fund themselves with debt. Any new projects would be financed with debt as the markets do not recognise the actual worth of the company. The company may also borrow money to buy back shares, thus increasing the gearing element.