December 2009

Question 1

Duoline Energy is a company that develops wind farms and harnesses wave energy off the West Coast of Scotland. The Scottish Parliament is prepared to grant the company a licence to develop this energy for the next 5 years. Duoline will have to pay an annual licence fee to the Parliament of £500 000.

Duoline effectively has first option and must act quickly otherwise other energy companies will take up the licence.

The first year will see Duoline operating at 50% of capacity. For the rest of the project the company will be operating at full capacity.

The equipment will cost Duoline £15 million; the company has also had a survey done on the suitability of the West Coast of Scotland for this particular equipment. The survey cost £300 000 and will be paid in year 1 of the project.

The company has made an estimate of the expected revenues and costs and has produced the following set of accounts for the five years of the project.

Year ('£000s)	**2010**	**2011**	**2012**	**2013**	**2014**
Sales	3 000	6 500	7 200	8 100	7 500
Wages and salaries	520	560	600	630	600
Materials	300	500	500	500	500
Licence fee	500	500	500	500	500
Overheads	340	340	340	340	340
Depreciation	2 400	2 400	2 400	2 400	2 400
Survey cost	300				
Interest charges	390	390	390	390	390
Operating income	–1 750	1 810	2 470	3 340	2 770

The firm faces a tax rate of 30%; and it also has other similar operations in the UK. The company is profitable, so assume any losses can be offset against other profits.

The company will need to borrow some specialist equipment and personnel from the parent company in year three. The company costs these inter-company transfers at market rates. Here the cost will be £350 000. However, these resources are actually needed in the company at that time, so they will have to seek temporary cover while they are being used in the West Coast.

Company overheads in the accounts contain an apportionment of £190 000 per annum for head office costs, the remainder of the costs relate to the project.

The equipment will be depreciated straight line down to an expected salvage value of £3 000 000 over the life of the project. Initial working capital of £800 000 will be required at the start of the project and a further £300 000 of additional working capital will be required in year one. The working capital will be maintained at that level through the project and then run down in the final year.

The firm has taken on £6 million in debt to help finance the project. The project has the same risk as the parent company and is financed in the same proportions as the parent company. The company has an ungeared beta of 1.05 and a debt beta of 0.25. The debt makes up 20% of the capital structure. The risk free rate of interest is 5% and the equity risk premium is 6%. The company has been successful in this sector and has been able to grow its dividends at a rate of 8% per annum for the past four years.

Required:

a. Layout the cash flows for the wind farm project and justify your inclusion or exclusion of the different items.
(10 marks)

b. Calculate the WACC and calculate the NPV. Should the company go ahead with the project?
(7 marks)

c. The company may have the opportunity of extending this project and the firm is able to test and research new equipment on site. The finance director says the project NPV is actually higher because there is a real option attached to the project. Explain what a real option is and how it works. Give two examples of situations where you could use real options.
(7 marks)

d. Explain the concept of investment inter-relatedness and give a non-textbook example of how it works.
(6 marks)

Case Solution 1

(a) **Layout the cash flows for the wind farm project and justify your inclusion or exclusion of the different items.**
(10 marks)

The cash flows need to be extracted from the profit and loss and from the additional notes. The tax payable is not shown in the accounts so that has to be calculated.

Year ('£000s)	2010	2011	2012	2013	2014
Sales	3 000	6 500	7 200	8 100	7 500
Wages and salaries	520	560	600	630	600
Materials	300	500	500	500	500
Licence fee	500	500	500	500	500
Overheads	150	150	150	150	150
Depreciation	2 400	2 400	2 400	2 400	2 400
Equipment opportunity cost			350		
Operating income	–870	2 390	2 700	3 920	3 350
Tax	261	–717	–810	–1 176	–1 005

Having calculated the tax cash flow, we can now layout the cash flows:

				Cost of capital:	10.91%	
Cash Flows:	**Year 0**	**1**	**2**	**3**	**4**	**5**
Sales		3 000	6 500	7 200	8 100	7 500
Equipment	–15 000					3 000
Working capital	–800	–300				1 100
Licence fee		–500	–500	–500	–500	–500
Wages		–520	–560	–600	–630	–600
Materials		–300	–500	–500	–500	–500

Overheads		–150	–150	–150	–150	–150
Hire of equipment				–350		
Tax		261	–717	–810	–1 176	–1 005
Cash flows	–15 800	1 491	4 073	4 290	5 144	8 845

There are certain items in the accounts that need to be adjusted or excluded from the cash flow. Depreciation is not a cash flow and it has been used to calculate the tax cash flow so it is not included in the cash flow. Only £150 000 of the overheads are directly applicable to the project, and the survey has been carried out before the project go-ahead decision has been made so this is a sunk cost and not relevant to the project. The interest charges are a financing cost so they too are excluded from the cash flow. There is a tax credit in the first year as the company has made a loss, but this tax loss will be used to reduce taxes in the rest of the company, so this is shown as a tax credit.

Of the items not in the accounts we need to include the working capital figures; initially these are £800 000 then increasing in the next year by £300 000. These need to be shown as outflows. Working capital remains at this level until the end of the project, so there are no further entries until the final year when £1 100 000 is returned to the company. There is one further item, the opportunity cost of the equipment and staff needed in year 3. The company incurs expenditure to cover for them while they are working on the project, so this is a cash outflow.

(b) **Calculate the WACC and calculate the NPV. Should the company go ahead with the project? (7 marks)**

For the cost of capital calculation we need to work out the equity beta value. The ungeared beta is simply the weighted average of the debt and equity betas, so we can solve for the equity beta.

$$1.05 = 0.8\beta e + (0.2 \times 0.25)$$
$$\beta e = 1.25$$

From there we can work out the WACC.

Cost of capital calculation

Equity	80%	Debt cost	6.5%
Debt tax	20%	Tax	30%
Risk free	5%	After tax	4.55%
Ungeared beta	1.05	Equity cost	12.50%
Debt beta	0.25		
Equity beta	**1.25**	**WACC**	**10.91%**
Equity risk premium	6%		

The WACC is 10.91%, but in calculating the NPV it is acceptable to use 11%.

The NPV calculation is shown below:

Cash flows	–15 800	1 491	4 073	4 290	5 144	8 845	
Discount factor @ 10.91%	1	0.902	0.813	0.733	0.661	0.596	**NPV**
Discounted cash flows	–15 800	1 344.3	3 311.1	3 144.5	3 399.5	5 270.4	**£669.8**

The project has a positive NPV so should be undertaken. This will increase shareholder wealth.

(c) **The company may have the opportunity of extending this project and the firm is able to test and research new equipment on site. The finance director says the project NPV is actually higher because there is a real option attached to the project. Explain what a real option is and how it works. Give two examples of situations where you could use real options. (7 marks)**

The discounted cash flow (DCF) analysis is in a way quite rigid. It cannot adapt to build in changing information of the ability of managers to alter their minds as the business environment evolves. A company will have options to make strategic changes to a project during its life. This might be a decision to abandon the project, or to delay the project, to expand the project, to alter the levels of production, or to suspend a project. These options are ignored in traditional discounted cash flow analysis. DCF will produce a figure for the NPV; if that is negative the project will usually be rejected. However, that project may contain one or more of these real options. In doing a real options analysis it allows you to reject the unfavourable course of action and avoid the losses that are associated with that action. So a real options analysis can uncover extra value in a project and maybe make a negative NPV project into a worthwhile project.

(d) **Explain the concept of investment inter-relatedness and give a non-textbook example of how it works.**

(6 marks)

Investment interrelatedness is where there is an overlap between projects. If one project is accepted, it has an impact on the cash flows of another project. This can be a positive or a negative effect. A company may have a project to develop a shopping centre site and has adjacent to that a further development site. What is the best use of the other site? The firm may have alternatives that it is considering: a cinema multiplex, an office development, a sports centre, a swimming pool, a mini industrial park. Each of these alternatives will have an impact on the original shopping centre, either making it a more attractive destination (positive interrelatedness) or a less attractive destination (negative interrelatedness). It may be that the cinema multiplex is the best option with a connecting walkway to the shopping centre. The industrial park may be the worst, lessening the attraction of the overall site. The NPVs of each combination would be estimated and the best chosen.

Question 2

1. Explain clearly what is meant by 'dividend irrelevancy'.
   (6 marks)
2. Discuss the ways in which taxation will impact on the company's dividend decision.
   (7 marks)
3. What are the agency concerns surrounding the dividend payment and the share repurchase?
   (7 marks)

Case Solution 2

1. **Explain clearly what is meant by 'dividend irrelevancy'.**

   (6 marks)

   Modigliani and Miller outlined conditions under which dividend policy would become irrelevant. There would be no taxes, transaction costs, or flotation costs, information would be freely available and investors could borrow or lend at the same rate. If a company had positive NPV projects it could invest in and had the choice of paying a dividend to shareholders, and then raising new cash from a share sale, or not paying the dividend and using the cash to invest in the projects, there would be no difference to the wealth of the shareholder. It does not matter which route the company takes.

   If shareholders wanted a dividend and the company used it for investment purposes, the shareholder could create a 'homemade' dividend by selling shares in the market place. The shares would reflect the positive NPV project because of the free flow of information and there would be no costs associated with the selling.

   Leaving other financial decisions intact, higher dividends require more new shares to be sold, lower dividends require fewer.

2. **Discuss the ways in which taxation will impact on the company's dividend decision. (7 marks)**

   The explanation for Part (1) works when there is perfect markets; it works less well when there are market frictions. One of these is taxation. Taxation will impact on dividend decisions in different ways in different countries depending on the tax regime. Debt has a tax benefit in the tax deductibility of interest payments. Dividends have no such deduction, and in some countries the dividend is taxed twice; once on the company's profits, and then again when the shareholder receives it. In those countries there would be an incentive not to pay large dividends as it would not be in shareholder's interests. The US was like this up until the tax reforms of 2003. A consequence of this was that by the end of the 1990s companies were buying back (share repurchases) more shares in value terms that they were paying out in dividends.

   Some countries work on an imputation system, whereby the dividend is only taxed once, so there is less bias against dividends.

   The aim of the company is to maximise the wealth of their shareholders and if that means returning cash to them in ways other than dividend payments because of the tax environment, then that is what they should do.

3. **What are the agency concerns surrounding the dividend payment and the share repurchase? (7 marks)**

   The dividend represents cash leaving the company. This is a concern to bondholders. They want their interest paid each period and they want their capital repaid at the end of the bond's life. If by paying (large) dividends the company weakens that likelihood, then this is against the interests of the bondholders. They will usually insert clauses in the bond contract limiting the amount that can be paid out as dividends.

   As far as shareholders are concerned, the dividend is part of the return they would expect to receive from the company. They are not guaranteed a dividend since the bondholders come first. But if the company is making good profits, then the shareholders would expect a cash dividend. If the company decides to make a share repurchase instead of a dividend payment, it may be for the benefit of the directors who have executive options, which don't receive dividends. For the directors the payment of the dividend does not particularly help them, whereas the share buyback should push the share price higher (although it shouldn't affect the overall value of the company).

   The directors may also decide to pay a share dividend rather than a cash dividend. The shareholders do not benefit here. They own the same stake in the company, and they don't have a cash dividend.