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# Answers

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- 1 (a) Purchasing power parity (PPP) predicts that the exchange rates between two currencies depend on the relative differences in the rates of inflation in each country. Therefore, if one country has a higher rate of inflation compared to another, then its currency is expected to depreciate over time. However, according to PPP the 'law of one price' holds because any weakness in one currency will be compensated by the rate of inflation in the currency's country (or group of countries in the case of the euro).

Economic exposure refers to the degree by which a company's cash flows are affected by fluctuations in exchange rates. It may also affect companies which are not exposed to foreign exchange transactions, due to actions by international competitors.

If PPP holds, then companies may not be affected by exchange rate fluctuations, as lower currency value can be compensated by the ability to raise prices due to higher inflation levels. This depends on markets being efficient.

However, a permanent shift in exchange rates may occur, not because of relative inflation rate differentials, but because a country (or group of countries) lose their competitive positions. In this case the 'law of one price' will not hold, and prices readjust to a new and long-term or even permanent rate. For example, the UK £ to USA \$ rate declined in the 20th century, as the USA grew stronger economically and the UK grew weaker. The rate almost reached parity in 1985 before recovering. Since the financial crisis in 2009, it has fluctuated between roughly \$1.5 to £1 and \$1.7 to £1.

In such cases, where a company receives substantial amounts of revenue from companies based in countries with relatively weak economies, it may find that it is facing economic exposure and its cash flows decline over a long period of time.

- (b) Discussion paper to the board of directors (BoD), Lirio Co

Discussion paper compiled by

Date

Purpose of the discussion paper

The purpose of this discussion paper is:

- (i) To consider the implications of the BoD's proposal to use funds from the sale of its equity investment in the European company and from its cash flows generated from normal business activity over the next two years to finance a large project, instead of raising funds through equity and/or debt;
- (ii) To assess whether or not the project adds value for Lirio Co or not.

#### Background information

The funds needed for the project are estimated at \$40,000,000 at the start of the project. \$23,118,000 of this amount is estimated to be received from the sale of the equity investment (appendices 2 and 3). This leaves a balance of \$16,882,000 (appendix 3), which will be obtained from the free cash flows to equity (the dividend capacity) of \$21,642,000 (appendix 1) expected to be generated in the first year. However, this would leave only \$4,760,000 available for dividend payments in the first year, meaning a cut in expected dividends from \$0.27/share to \$0.0595/share (appendix 3). The same level of dividends will be paid in the second year as well.

#### Project assessment

Based on the dividend valuation model, Lirio Co's market capitalisation, and therefore its value, is expected to increase from approximately \$360 million to approximately \$403 million, or by just under 12% (appendix 3). This would suggest that it would be beneficial for the project to be undertaken.

#### Possible issues

1. The dividend valuation model is based on a number of factors such as: an accurate estimation of the dividend growth rate, a non-changing cost of equity and a predictable future dividend stream growing in perpetuity. In addition to this, it is expected that the sale of the investment will yield €20,000,000 but this amount could increase or reduce in the next three months. The dividend valuation model assumes that dividends and their growth rate are the sole drivers of corporate value, which is probably not accurate.
2. Although the dividend irrelevancy theory proposed by Modigliani and Miller suggests that corporate value should not be affected by a corporation's dividend policy, in practice changes in dividends do matter for two main reasons. First, dividends are used as a signalling device to the markets and unexpected changes in dividends paid and/or dividend growth rates are not generally viewed positively by them. Changes in dividends may signal that the company is not doing well and this may affect the share price negatively.
3. Second, corporate dividend policy attracts certain groups of shareholders or clientele. In the main this is due to personal tax reasons. For example, higher rate taxpayers may prefer low dividend payouts and lower rate taxpayers may prefer higher dividend payouts. A change in dividends may result in the clientele changing and this changeover may result in excessive and possibly negative share price volatility.
4. It is not clear why the BoD would rather not raise the required finance through equity and/or debt. The BoD may have considered increasing debt to be risky. However, given that the current level of debt is \$70 million compared to an estimated market capitalisation of \$360 million (appendix 3), raising another \$40 million through debt finance will probably not result in a significantly higher level of financial risk. The BoD may have been concerned that going into the

markets to raise extra finance may result in negative agency type issues, such as having to make proprietary information public; or being forced to give extra value to new equity owners; or sending out negative signals to the markets.

#### Areas for further discussion by the BoD

Each of these issues should be considered and discussed further by the BoD. With reference to point 1, the BoD needs to discuss whether the estimates and the model used are reasonable in estimating corporate value or market capitalisation. With reference to points 2 and 3, the BoD needs to discuss the implications of such a significant change in the dividend policy and how to communicate Lirio Co's intention to the market so that any negative reaction is minimised. With reference to point 4, the BoD should discuss the reasons for any reluctance to raise finance through the markets and whether any negative impact of this is perhaps less than the negative impact of points 2 and 3.

#### Appendix 1: Expected dividend capacity prior to large project investment

	\$000
Operating profit (15% x (1.08 x \$300 million))	48,600
Less interest (5% of \$70 million)	(3,500)
Less taxation (25% x (\$48.6 million – 3.5 million))	(11,275)
Less investment in working capital (\$0.10 x (0.08 x \$300 million))	(2,400)
Less investment in additional non-current assets (\$0.20 x (0.08 x \$300 million))	(4,800)
Less investment in projects	(8,000)
Cash flows from domestic operations	18,625
Cash flows from Pontac Co's dividend remittances (see appendix 1.1)	3,297
Additional tax payable on Pontac Co's profits (5% x \$5.6 million)	(280)
Dividend capacity	<u>21,642</u>

#### Appendix 1.1: Dividend remittances expected from Pontac Co

	\$000
Total contribution \$24 x 400,000 units	9,600
Less fixed costs	(4,000)
Less taxation (20% x \$5.6 million)	(1,120)
Profit after tax	<u>4,480</u>
Remitted to Lirio Co (80% x \$4.48 million x 92%)	<u>3,297</u>

#### Appendix 2: Euro (€) investment sale receipt hedge

Lirio Co can use one of forward contracts, futures contracts or option contracts to hedge the € receipt.

##### Forward contract

Since it is a € receipt, the 1.1559 rate will be used.

$$€20,000,000 \times 1.1559 = \$23,118,000$$

##### Futures contracts

Go long to protect against a weakening € and use the June contracts to hedge as the receipt is expected at the end of May 2016 or beginning of June 2016 (in three months' time).

June contracts will be closed out one month before expiry, therefore expected futures price (based on a linear narrowing of basis) is:

$$0.8638 + (2/3 \times (0.8656 - 0.8638)) = 0.8650 \text{ [This can also be done using the spot rates or forward rates]}$$

$$\text{Expected receipt} = €20,000,000 / 0.8650 = \$23,121,387$$

Number of contracts bought =  $\$23,121,387 / \$125,000 =$  approximately 185 contracts (resulting in a very small over-hedge and therefore not material)

[Full credit will be given where the calculations are used to show the correction of the over-hedge using forwards]

##### Option contracts

Purchase the June call option to protect against a weakening € and because receipt is expected at the end of May 2016 or beginning of June 2016.

$$\text{Exercise price is } 0.86, \text{ therefore expected receipt is } €20,000,000 / 0.8600 = \$23,255,814$$

$$\text{Contracts purchased} = \$23,255,814 / \$125,000 = 186.05, \text{ say } 186$$

$$\text{Amount hedged} = \$125,000 \times 186 = \$23,250,000$$

$$\text{Premium payable} = 186 \times 125,000 \times 0.0290 = €674,250$$

$$\text{Premium in } \$ = €674,250 \times 1.1618 = \$783,344$$

$$\text{Amount not hedged} = €20,000,000 - (186 \times 125,000 \times 0.8600) = €5,000$$

$$\text{Use forward contracts to hedge } €5,000 \text{ not hedged. } €5,000 \times 1.1559 = \$5,780$$

[Full credit will be given if a comment on the under-hedge being immaterial and therefore not hedged is made, instead of calculating the correction of the under-hedge]

$$\text{Total receipts} = \$23,250,000 + \$5,780 - \$783,344 = \$22,472,436$$

**Advice and recommendation**

Hedging using options will give the lowest receipt at \$22,472,436 from the sale of the investment, while hedging using futures will give the highest receipt at \$23,127,387, with the forward contracts giving a receipt of \$23,118,000.

The lower receipt from the option contracts is due to the premium payable, which allows the option buyer to let the option lapse should the € strengthen. In this case, the option would be allowed to lapse and Lirio Co would convert the € into \$ at the prevailing spot rate in three months' time. However, the € would need to strengthen significantly before the cost of the option is covered. Given market expectation of the weakness in the € continuing, this is not likely to be the case.

Although futures and forward contracts are legally binding and do not have the flexibility of option contracts, they both give higher receipts. Hedging using futures gives the higher receipt, but futures require margin payments to be made upfront and contracts are marked-to-market daily. In addition to this, the basis may not narrow in a linear fashion and therefore the amount received is not guaranteed. All these factors create uncertainty in terms of the exact amounts of receipts and payments resulting on a daily basis and the final receipt.

On the other hand, when using forward contracts to hedge the receipt exposure, Lirio Co knows the exact amount it will receive. It is therefore recommended that Lirio Co use the forward markets to hedge the expected receipt.

[Note: It could be argued that in spite of the issues when hedging with futures, the higher receipt obtained from using futures markets to hedge mean that they should be used. This is acceptable as well.]

**Appendix 3: Estimate of Lirio Co's value based on the dividend valuation model****If the large project is not undertaken and dividend growth rate is maintained at the historic level****Dividend history**

Year to end of February	2013	2014	2015	2016
Number of \$1 equity shares in issue (000)	60,000	60,000	80,000	80,000
Total dividends paid (\$000)	12,832	13,602	19,224	20,377
Dividend per share	\$0.214	\$0.227	\$0.240	\$0.255

Average dividend growth rate =  $(0.255/0.214)^{1/3} - 1 = 1.0602$  (or say 6%)

Expected dividend in February 2017 =  $\$0.255 \times 1.06 = \$0.270$

Lirio Co, estimate of value if large project is not undertaken =  
 $\$0.270 / (0.12 - 0.06) = \$4.50$  per share or \$360 million market capitalisation

**If the large project is undertaken**

Funds required for project	\$40,000,000
Funds from sale of investment (appendix 2)	\$23,118,000
Funds required from dividend capacity cash flows	\$16,882,000
Dividend capacity funds before transfer to project (appendix 1)	\$21,642,000
Dividend capacity funds left after transfer	\$4,760,000
Annual dividend per share after transfer	\$0.0595
Annual dividend paid (end of February 2017 and February 2018)	\$0.0595
Dividend paid (end of February 2019)	\$0.3100
New growth rate	7%

Lirio Co, estimate of value if large project is undertaken =  
 $\$0.0595 \times 1.12^{-1} + \$0.0595 \times 1.12^{-2} + \$0.3100 \times 1.12^{-3} + [\$0.3100 \times 1.07 / (0.12 - 0.07)] \times 1.12^{-3} = \$5.04$  per share or \$403 million market capitalisation

(Note: A discussion paper can take many formats. The answer provides one possible format. Credit will be given for alternative and sensible formats; and for relevant approaches to the calculations and commentary.)

**2 (a) Advantages of the acquisition**

Louieed Co and Tidded Co appear to be a good strategic fit for a number of reasons. Louieed Co appears to have limited potential for further growth. Acquiring Tidded Co, a company with better recent growth, should hopefully give Louieed Co the impetus to grow more quickly.

Acquiring a company which has a specialism in the area of online testing will give Louieed Co capabilities quicker than developing this function in-house. If Louieed Co does not move quickly, it risks losing contracts to its competitors.

Acquiring Tidded Co will give Louieed Co access to the abilities of some of the directors who have led Tidded Co to becoming a successful company. They will provide continuity and hopefully will help integrate Tidded Co's operations successfully into Louieed Co. They may be able to lead the upgrading of Tidded Co's existing products or the development of new products which ensures that Louieed Co retains a competitive advantage.

It appears that Tidded Co's directors now want to either realise their investment or be part of a larger company, possibly because it will have more resources to back further product development. If Louieed Co does not pursue this opportunity, one of Louieed Co's competitors may purchase Tidded Co and acquire a competitive advantage itself.

There may also be other synergistic benefits, including savings in staff costs and other savings, when the two companies merge.

**Disadvantages of the acquisition**

It is not known what the costs of developing in-house capabilities will be. Although the process may be slower, the costs may be less and the process less disruptive to Louieed Co than suddenly adding on Tidded Co's operations.

It is not possible to tell which of Tidded Co's directors are primarily responsible for its success. Loss of the three directors may well represent a significant loss of its capability. This will be enhanced if the three directors join a competitor of Louieed Co or set up in competition themselves.

There is no guarantee that the directors who remain will fit into Louieed Co's culture. They are used to working in a less formal environment and may resent having Louieed Co's way of operating imposed upon them. This could result in departures after the acquisition, jeopardising the value which Tidded Co has brought.

Possibly Tidded Co's leadership in the online testing market may not last. If competitors do introduce major advances, this could mean that Tidded Co's current growth is not sustainable.

**(b) P/E Ratio calculations**

Value of Louieed Co's share =  $\$296m \times 14/340m = \$12.19$

Value of Tidded Co share per original bid =  $\$12.19 \times (5/3) = \$20.32$

Tidded Co earnings per share =  $\$128m/90 = \$1.42$

Tidded Co P/E ratio implied by original bid =  $\$20.32/\$1.42 = 14.3$

Tidded Co P/E ratio implied by all Tidded Co's shareholders taking up the share offer =  $\$12.19 \times 2/\$1.42 = 17.2$

Tidded Co P/E ratio implied by mixed cash and share offer =  $(\$22.75 \times 0.4 + \$12.19 \times 2 \times 0.6)/\$1.42 = 16.7$

Tidded Co P/E ratio implied by all Tidded Co's shareholders taking up the cash offer =  $\$22.75/\$1.42 = 16.0$

**(c) Funding of bid**

No extra finance will be required if all Tidded Co's shareholders take up the share offer.

All Tidded Co's shareholders take up cash offer

Cash required =  $90 \text{ million} \times \$22.75 = \$2,048m$

Extra debt finance required =  $\$2,048m - \$220m - \$64m = \$1,764m$

60% share-for-share offer, 40% cash offer

Cash required =  $40\% \times 90m \times \$22.75 = \$819m$

Extra debt finance required =  $\$819m - \$220m - \$64m = \$535m$

**Impact of bid on EPS**

Louieed Co's EPS prior to acquisition =  $\$296m/340 = \$0.87$

All Tidded Co's shareholders take up share offer

Number of shares after acquisition =  $340m + (90m \times 2) = 520m$

EPS after acquisition =  $(\$296m + \$128m + \$20m)/520m = \$0.85$

All Tidded Co's shareholders take up cash offer

Number of shares after acquisition =  $340m$

EPS after acquisition =  $(\$296m + \$128m + \$20m - \$11.36m - \$105.84m)/340m = \$0.96$

$\$105.84m$  is the post-tax finance cost on the additional loan finding required of  $\$1,764m$ . Therefore  $\$1,764m \times 7.5\% \times 80\% = \$105.84m$

$\$11.36m$  is the post-tax opportunity cost of interest foregone on the cash and cash equivalents surpluses of the two companies of  $\$220m + \$64m = \$284m$ . Therefore  $\$284m \times 5\% \times 80\% = \$11.36m$

60% share-for-share offer, 40% cash offer

Number of shares after acquisition  $340m + (90m \times 2 \times 0.6) = 448m$

EPS after acquisition =  $(\$296m + \$128m + \$20m - \$11.36m - \$32.1m)/448m = \$0.89$

$\$32.1m$  is the post-tax finance cost on the additional loan funding required of  $\$535m$ . Therefore  $\$535m \times 7.5\% \times 80\% = \$32.1m$

**Impact of bid on gearing (using market values)**

Louieed Co's gearing (debt/(debt + equity)) prior to bid =  $540/(540 + (340 \times 12.19)) = 11.5\%$

All Tidded Co's shareholders take up share offer

Debt/(Debt + equity) after bid =  $(540 + 193)/(540 + 193 + (520 \times \$0.85 \times 14)) = 10.6\%$

All Tidded Co's shareholders take up cash offer

Debt/(Debt + equity) after anticipated bid =  $(540 + 193 + 1,764)/(540 + 193 + 1,764 + (340 \times \$0.96 \times 14)) = 35.3\%$

60% share-for-share offer, 40% cash offer

Debt/(Debt + equity) after bid =  $(540 + 193 + 535)/(540 + 193 + 535 + (448 \times \$0.89 \times 14)) = 18.5\%$

#### Comments

The calculations suggest that if Tidded Co's shares are acquired on a share-for-share exchange on the terms required by its shareholders, Louieed Co's shareholders will suffer a fall in earnings per share attributable to them from \$0.87 to \$0.85. This is because Tidded Co is being bought on a higher price-earnings ratio than Louieed Co and the synergies arising from the acquisition are insufficient to compensate for this.

Use of loan finance to back a cash offer will attract tax relief on interest. The cost of debt will be lower than the cost of equity.

Issuing extra shares will lead to a dilution of the power of Louieed Co's existing shareholders. If all of Tidded Co's shareholders take up the share-for-share offer, they will hold around a third of the shares of the combined company (180m/520m) and this may be unacceptable to Louieed Co's shareholders.

The benefits which Tidded Co's shareholders will gain will be fixed if they take up a cash offer and do not acquire shares in the combined company. If there are significant gains after the acquisition, these will mostly accrue to Louieed Co's existing shareholders if a significant proportion of Tidded Co's shareholders have taken a cash offer.

If the forecast for take up of the offer is correct, even by combining the cash flows of the two companies, the new company will have insufficient funds to be able to pay all the shareholders who are expected to take up the cash offer. Further finance will be required.

The alternative to loan finance is financing the bid by issuing shares. Depending on the method used, this may also result in dilution of existing shareholders' ownership and also there is no guarantee that the issue will be successful.

There is also no guarantee that the forecast of 40% of the shareholders taking up the cash offer is correct. If all five of the major shareholders decide to realise their investment rather than just two, this will increase the cash required by \$512 million ( $25\% \times \$22.75 \times 90m$ ), for example.

Gearing will increase if loan finance is needed to finance the cash offer. If the mixed share and cash offer is taken up in the proportions stated, the gearing level of the combined company will increase from 11.5% to 18.5%. Current shareholders may not be particularly concerned about this. However, if all or most of the share capital is bought for cash, the gearing level of the combined company will be significantly greater, at maximum 35.3%, than Louieed Co's current gearing. This may be unacceptable to current shareholders and could mean an increase in the cost of equity, because of the increased risk, and also possibly an increase in the cost of debt, assuming in any case that debt finance at the maximum level required will be available. To guard against this risk, Louieed Co's board may want to limit the cash offer to a certain percentage of share value.

### 3 (a) Staple Local

Net assets valuation =  $15/18 \times \$66.6m = \$55.5m$ .

It is assumed that the titles in this division are equal in size.

The division's pre-tax profits are \$4.5m and post-tax cash flows \$0.3m, with losses forecast for the next year. Therefore any valuation based on current or future expected earnings is likely to be lower than the net assets valuation.

#### Benefits of selling Staple Local

The local newspapers seem to have the poorest prospects of any part of the group. Further investment may not make a big difference, if the market for local newspapers is in long-term decline.

The offer from Postway Co gives Staple Group the chance to gain cash immediately and to dispose of the papers. The alternative of selling the titles off piecemeal is an uncertain strategy, both in terms of the timescale required and the amounts which can be realised for individual titles. It is very likely that the titles with the best prospects would be sold first, leaving Staple Group with a remaining portfolio which is of very little value.

#### Drawbacks of selling Staple Local

The offer is not much more than a net asset valuation of the titles. The amount of cash from the sale to Postway Co will be insufficient for the level of investment required in the Daily Staple.

The digital platforms which will be developed for the Daily Staple could also be used to boost the local papers. Staff on the local titles could have an important role to play in providing content for the platforms.

Loss of the local titles may mean loss of economies of size. In particular, printing arrangements may be more economic if both national and local titles are printed at the same locations.

#### Staple View

Free cash flows to equity =  $\$53.5m - \$12.5m - \$6.2m = \$34.8m$

Free cash flow valuation to equity =  $\$34.8m (1.04)/(0.12 - 0.04) = \$452.4m$

The assumption of constant growth is most important in this valuation. It is possibly fairly conservative, but just as faster growth could be achieved by gaining the rights to broadcast more sporting events, results may be threatened if Staple View loses any of the rights which it currently has.

### **Benefits of selling Staple View**

Present circumstances may be favourable for selling the television channels, given their current profitability. Staple Group may be able to obtain a better offer from a competitor than in the future, given recent acquisition activity in this sector.

Selling Staple View will certainly generate more cash than selling either of the smaller divisions. This will allow investment not only in the Daily Staple, but also investment in the other divisions, and possibly targeted strategic acquisitions.

### **Drawbacks of selling Staple View**

The television channels have become a very important part of the Staple Group. Investors may believe that the group should be focusing on further investment in this division rather than investing in the Daily Staple, which may be in decline.

Selling the television channels removes an important opportunity for cross-selling. Newspaper coverage can be used to publicise important programmes on the television channels and the television channels can be used for advertising the newspaper.

Staple View is a bigger part of the group than the other two divisions and therefore selling it is likely to mean a bigger reduction in the group's borrowing capacity.

### **Staple Investor**

The valuation made by the finance director is questionable as it is based on one year's profits, which may not be sustainable. There is no information about how the additional earnings have been calculated, whether the finance director has used a widely-accepted method of valuation or just used a best estimate. If a premium for additional earnings is justified, there is also no information about whether the benefit from staff's expertise and experience is assumed to be perpetual or just to last for a certain number of years.

### **Benefits of selling Staple Investor**

This division appears to have great potential. Staple Group will be able to sell this division from a position of strength, rather than it being seen as a forced sale like selling the Staple Local division might be.

The division is in a specialist sector which is separate from the other areas in which Staple Group operates. It is not an integral part of the group in terms of the directors' current core strategy.

### **Drawbacks of selling Staple Investor**

The division currently has the highest profit margin at 19.7% compared with Staple National 12.5%, Staple Local 3.0% and Staple View 14.8%. It seems likely to continue to deliver good results over the next few years. Investors may feel that it is the part of the group which offers the safest prospect of satisfactory returns.

Investors may be happy with the structure of the group as it is, as it offers them some diversification. Selling the Staple Investor division and focusing more on the newspaper parts of the group may result in investors seeking diversification by selling some of the shareholding in Staple Group and investing elsewhere.

Although Staple Group's management may believe that the valuation gives a good indication of the division's true value, they may not be able to sell the division for this amount now. If the division remains within the group, they may achieve a higher price in a few years' time. Even if Staple Investor could be sold for the \$118.5 million valuation, this is less than the \$150 million required for the planned investment.

### **Conclusion**

Selling the Staple View division offers the directors the best chance to obtain the funds they require for their preferred strategy of investment in the Daily Staple. However, the directors are not considering the possibility of selling the Daily Staple, perhaps in conjunction with selling the local newspapers as well. Although this could be seen as selling off the part of the group which has previously been essential to its success, it would allow Staple Group to raise the funds for further investment in the television channels and the Staple Investor division. It could allow the directors to focus on the parts of the group which have been the most successful recently and offer the best prospects for future success.

### **(b) Stakeholder conflicts**

If Staple Group takes a simple view of the role of stakeholders, it will prioritise the interest of shareholders over other stakeholders, particularly employees here, and take whatever actions are required to maximise profitability. However, in Staple Group's position, there may be a complication because of the differing requirements of shareholders. Some may want high short-term profits and dividends, which may imply significant cost cutting in under-performing divisions. Other shareholders may wish to see profits maximised over the long term and may worry that short-term cost cutting may result in a reduction of investment and adversely affect staff performance at an important time.

Transformational change of the newspaper business is likely to require the co-operation of at least some current employees. Inevitably redundancy will create uncertainty and perhaps prompt some staff to leave voluntarily. Staple Group's management may want to identify some key current employees who can lead the change and try to retain them.

Also the policy of making employees who have not been with the group very long redundant is likely to make it difficult to recruit good new employees. The group will probably create new roles as a result of its digital investment, but people may be unwilling to join the group if it has a reputation for bad faith and not fulfilling promises to develop its staff.

**Ethical issues**

The significance of what the firm's annual report says about its treatment of employees may depend on how specific it is. A promise to treat employees fairly is rather vague and may not carry much weight, although it broadly commits the firm to the ethical principle of objectivity. If, however, the policy makes more specific statements about engaging with employees and goes in the statement beyond what is required by law, then Staple Group is arguably showing a lack of honesty if it does not fulfil the commitments it has made.

The suggestion that managers should ensure that employees who are perceived to be 'troublemakers' should be first to be chosen for redundancy is dubious ethically. If managers do this, then they may be breaking the law, and would certainly be acting with a lack of honesty and transparency.

**4 (a) Value of option to expand****Variables**

Volatility = 30%

Current price (value of project including option exercise price) = \$15m x 0.712 = \$10.68m

Exercise price (capital expenditure) = \$15m

Exercise date = 3 years

Risk free rate = 4%

$$d_1 = [\ln(10.68/15) + (0.04 + 0.5 \times 0.3^2) \times 3] / (0.3 \times \sqrt{3}) = -0.1630$$

$$d_2 = -0.1630 - 0.3 \times \sqrt{3} = -0.6826$$

$$N(d_1) = 0.5 - 0.0636 = 0.4364 \text{ (using 0.16 for } d_1)$$

$$N(d_2) = 0.5 - 0.2517 = 0.2483 \text{ (using 0.68 for } d_2)$$

$$\begin{aligned} \text{Value of call option} &= P_a \times N(d_1) - P_e \times N(d_2) \times e^{-rt} \\ &= (10.68 \times 0.4364) - (15 \times 0.2483 \times e^{-0.04 \times 3}) \\ &= 4.66 - 3.30 \\ &= \$1.36 \text{ million} \end{aligned}$$

$$\text{Overall value} = \$1.36\text{m} - \$1.01\text{m} = \$0.35\text{m}$$

The investment has a positive net present value, so should be accepted on those grounds. Furlion Co should also consider the value of an abandonment option if results turn out to be worse than expected or a delay option if it wants to see how the reclamation programme is going to continue.

**Assumptions made and other factors**

Using real options for decision-making has limitations. Real options are built around uncertainties surrounding future cash flows, but real option theory is only useful if management can respond effectively to these uncertainties as they evolve. The Black-Scholes model for valuing real options has a number of assumptions which may not be true in practice. It assumes that there is a market for the underlying asset and the volatility of returns on the underlying asset follows a normal distribution. The model also assumes perfect markets, a constant risk-free interest rate and constant volatility.

Furlion Co will also consider expectations about the future of the land reclamation programme. Has the programme been as quick and as effective as the Naswan government originally expected? Furlion Co will also want to consider how the programme will be affected by the amount of funding the government obtains and any conditions attached to that funding.

Furlion Co may also wish to consider whether its investment of this type will be looked on favourably by the Naswan government and whether tax or other concessions will be available. These may come with conditions, given the government's commitment to a sustainable economy, such as the way production facilities operate or the treatment of employees.

Given that this is a market which may expand in the future, Furlion Co should also consider the reaction of competitors. This may be a market where establishing a significant presence quickly may provide a significant barrier if competitors try to enter the market later.

As the investment is for the manufacture of specialist equipment, it is possible that there is insufficient skilled labour in the local labour pool in Naswa. As well as training local labour, supervision is likely to be required, at least initially, from staff based in other countries. This may involve cultural issues such as different working practices.

- (b)** The sensitivity of the valuation of options to interest rate changes can be measured by the option's rho. The option's rho is the amount of change in the option's value for a 1% change in the risk-free interest rate. The rho is positive for calls and so will be positive if the risk-free interest rate does increase.

However, interest rates tend to move quite slowly and the interest rate is often not a significant influence on the option's value, particularly for short-term options. However, many real options are longer term and will have higher rhos than short-term options. A change in interest rates will be more significant the longer the time until expiry of an option.

In addition, there are possible indirect economic effects of interest rate changes, such as on the return demanded by finance providers and hence on the cost of capital.



- (c) The World Bank provides loans, often direct to governments, on a commercial basis, for capital projects. Loans are generally for a long-term period, which may suit the Naswan government. However, the terms of the loan may be onerous, not just the finance costs but the other conditions imposed on the scope of the projects.

Given the circumstances of the investment, Naswa may be able to obtain assistance from the International Development Association, which is part of the World Bank. This provides loans on more generous terms to the poorest countries. However, it is designed for countries with very high credit risk which would struggle to obtain funding by other means, and Naswa may not be eligible.

**Professional Level – Options Module, Paper P4  
Advanced Financial Management**

**March/June 2016 Sample Marking Scheme**

	<i>Marks</i>
<b>1 (a)</b> Up to 2 marks per well-explained point	Max <u>6</u>
<b>(b) (i) Appendices 1 and 1.1</b>	
Operating profit	1
Interest paid	1
Tax paid for normal activities	1
Investment in working capital	1
Investment in additional non-current assets	1
Correct treatment of depreciation	1
Cash flows remitted from Pontac Co	2
Additional tax payable	1
	<u>9</u>
<b>(ii) Appendix 2</b>	
Amount received based on forward contracts	1
Correctly identifying long contracts and purchasing call options	1
Expected futures price based on linear narrowing of basis	1
Amount received based on futures contracts	1
Recognition of small over-hedge when using futures contracts	1
Option contracts or futures contracts purchased	1
Premium paid in dollars	1
Amount received based on options contracts	2
1–2 marks for each well-discussed point	4
Reasonable recommendation	1
	<u>14</u>
<b>(iii) Appendix 3 and project assessment</b>	
Estimate of dividend growth rate (prior to project undertaken)	2
Estimate of corporate value (prior to project undertaken)	1
Annual dividend per share after transfer of funds to project	2
Estimate of value after project is undertaken	2
Concluding comments on project assessment	1
	<u>8</u>
<b>(iv) Discussion of issues</b>	
Limitations of method used	1–2
Signalling impact of change in dividend policy	1–2
Clientele impact of change in dividend policy	2–3
Rationale for not considering debt or equity	3–4
Other relevant discussion points	2–3
	<u>9</u>
	Max
<b>Professional marks for part (b)</b>	
Structure and presentation of the discussion paper	3
Clearly highlighting/emphasising areas for further discussion/detailed summary	1
	<u>4</u>
<b>Total</b>	<u>50</u>

		<i>Marks</i>	
<b>2</b>	<b>(a)</b> Reasons for acquisition	3	
	Reasons against acquisition	3	
		<hr/> <b>6</b>	
<b>(b)</b>	Calculations: 1 mark for EPS, 1 mark each for PE ratio for original offer, and for each of the three options for the proposed offer	5	
<b>(c)</b>	Funding of bid: 1 mark for cash option, 1 mark for mixed option	2	
	Earnings per share: 1 mark for share-for-share option, 2 marks for cash option, 2 marks for mixed option	5	
	Gearing: 1 mark for each option	3	
	Comments	4–5	
		<hr/> <b>Max 14</b>	
	<b>Total</b>	<b>25</b>	
<b>3</b>	<b>(a)</b> Sale of Staple Local		
	Calculations/comments on figures	2	
	Discussion of benefits/drawbacks	3–4	
	Sale of Staple View		
	Calculations/comments on figures	3	
	Discussion of benefits/drawbacks	3–4	
	Sale of Staple Investor		
	Comments on figures	2	
	Discussion of benefits/drawbacks	3–4	
	Other points/conclusion	2–3	
		<hr/> <b>Max 19</b>	
<b>(b)</b>	Discussion of importance of different stakeholders and possible conflicts	3–4	
	Discussion of other ethical issues	2–3	
		<hr/> <b>Max 6</b>	
	<b>Total</b>	<b>25</b>	
<b>4</b>	<b>(a)</b> Current price variable ( $P_a$ ) in BSOP formula	1	
	Other variables in BSOP formula	1	
	Calculation of $d_1$ and $d_2$	3	
	Determination of $N(d_1)$ and $N(d_2)$	2	
	Value of the option to expand decision	1	
	Revised value of projects and comments	<b>Max 3</b>	
	Assumptions	<b>Max 3</b>	
	Other factors	<b>Max 3</b>	
			<hr/> <b>Max 16</b>
	<b>(b)</b>	Explanation of rho	2
	Impact of interest rate movements	3	
		<hr/> <b>5</b>	
<b>(c)</b>	Role of World Bank	1	
	Usefulness of World Bank as a source of finance	1–2	
	Role of IDA	1	
	Usefulness of IDA as a source of finance	1–2	
		<hr/> <b>Max 4</b>	
	<b>Total</b>	<b>25</b>	