
Answers

1 (a) (i) *Period 1 closing balance*

Opening balance \$000	Cash flow \$000	Closing balance \$000	Probability	Expected value \$000
(500)	8,000	7,500	0.1	750
(500)	4,000	3,500	0.6	2,100
(500)	(2,000)	(2,500)	0.3	(750)
				<u>2,100</u>

The expected value of the period 1 closing balance is \$2,100,000

(ii) *Period 2 closing balance*

Period 1 closing balance \$000	Probability	Period 2 cash flow \$000	Probability	Period 2 closing balance \$000	Joint Probability	Expected value \$000
7,500	0.1	7,000	0.3	14,500	0.03	435
		3,000	0.5	10,500	0.05	525
		(9,000)	0.2	(1,500)	0.02	(30)
3,500	0.6	7,000	0.3	10,500	0.18	1,890
		3,000	0.5	6,500	0.30	1,950
		(9,000)	0.2	(5,500)	0.12	(660)
(2,500)	0.3	7,000	0.3	4,500	0.09	405
		3,000	0.5	500	0.15	75
		(9,000)	0.2	(11,500)	0.06	(690)
						<u>3,900</u>

The expected value of the period 2 closing balance is \$3,900,000

(iii) The probability of a negative cash balance at the end of period 2 = $0.02 + 0.12 + 0.06 = 20\%$

(iv) The probability of exceeding the overdraft limit in period 2 is $0.12 + 0.06 = 18\%$

Discussion

The expected value analysis has shown that, on an average basis, ZSE Co will have a positive cash balance at the end of period 1 of \$2.1 million and a positive cash balance at the end of period 2 of \$3.9 million. However, the cash balances that are expected to occur are the specific balances that have been averaged, rather than the average values themselves.

There could be serious consequences for ZSE Co if it exceeds its overdraft limit. For example, the overdraft facility could be withdrawn. There is a 30% chance that the overdraft limit will be exceeded in period 1 and a lower probability, 18%, that the overdraft limit will be exceeded in period 2. To guard against exceeding its overdraft limit in period 1, ZSE Co must find additional finance of \$0.5 million (\$2.5m – \$2.0m). However, to guard against exceeding its overdraft limit in period 2, the company could need up to \$9.5 million (\$11.5m – \$2.0m). Renegotiating the overdraft limit in period 1 would therefore be only a short-term solution.

One strategy is to find now additional finance of \$0.5 million and then to re-evaluate the cash flow forecasts at the end of period 1. If the most likely outcome occurs in period 1, the need for additional finance in period 2 to guard against exceeding the overdraft limit is much lower.

The expected value analysis has been useful in illustrating the cash flow risks faced by ZSE Co. Although the cash flow forecasting model has been built with the aid of a firm of financial consultants, the assumptions used in the model must be reviewed before decisions are made based on the forecast cash flows and their associated probabilities.

Expected values are more useful for repeat decisions rather than one-off activities, as they are based on averages. They illustrate what the average outcome would be if an activity was repeated a large number of times. In fact, each period and its cash flows will occur only once and the expected values of the closing balances are not closing balances that are forecast to arise in practice. In period 1, for example, the expected value closing balance of \$2.1 million is not forecast to occur, while a closing balance of \$3.5 million is likely to occur.

(b) The factors to be considered in formulating a policy to manage the trade receivables of ZSE Co will relate to the key areas of credit assessment or analysis, credit control and collection procedures. A key factor is the turbulence in the company's business environment and the way it affects the company's customers.

Credit analysis

The main objective of credit analysis is to ensure that credit is granted to customers who will settle their account at regular intervals in accordance with the agreed terms of sale. The risk of bad debts must be minimised as much as possible.

Key factors to consider here are the source and quality of the information used by ZSE Co to assess customer creditworthiness. The information sources could include bank references, trade references, public information such as published accounts, credit reference agencies and personal experience. The quality of the information needs to be confirmed as part of the credit analysis process. Some organisations have developed credit scoring systems to assist in the assessment of creditworthiness.

Credit control

Once credit has been granted, it is essential to ensure that agreed terms and conditions are adhered to while the credit is outstanding. This can be achieved by careful monitoring of customer accounts and the periodic preparation of aged debtor analyses. A key factor here is the quality of the staff involved with credit control and the systems and procedures they use to maintain regular contact with customers, for example invoices, statements, reminders, letters and telephone contacts.

ZSE Co has been experiencing difficulties in collecting amounts due because its customers have been experiencing difficult trading conditions. Close contact with customers is essential here in order to determine where revised terms can be negotiated when payment is proving hard, and perhaps to provide advance warning of serious customer liquidity or going concern problems.

Collection procedures

The objective here is to ensure timely and secure transfer of funds when they are due, whether by physical means or by electronic means. A key factor here is the need to ensure that the terms of trade are clearly understood by the customer from the point at which credit is granted. Offering credit represents a cost to the seller and ensuring that payment occurs as agreed prevents this cost from exceeding budgeted expectations.

Procedures for chasing late payers should be clearly formulated and trained personnel must be made responsible for ensuring that these procedures are followed. Legal action should only be considered as a last resort, since it often represents the termination of the business relationship with a customer.

- (c) Profitability and liquidity are usually cited as the twin objectives of working capital management. The profitability objective reflects the primary financial management objective of maximising shareholder wealth, while liquidity is needed in order to ensure that financial claims on an organisation can be settled as they become liable for payment.

The two objectives are in conflict because liquid assets such as bank accounts earn very little return or no return, so liquid assets decrease profitability. Liquid assets in fact incur an opportunity cost equivalent either to the cost of short-term finance or to the profit lost by not investing in profitable projects.

Whether profitability is a more important objective than liquidity depends in part on the particular circumstances of an organisation. Liquidity may be the more important objective when short-term finance is hard to find, while profitability may become a more important objective when cash management has become too conservative. In short, both objectives are important and neither can be neglected.

2 (a) Calculation of cost of debt

After-tax interest payment = $9 \times 0.7 = \$6.30$ per bond

Year	Cash flow	\$	8% discount factor	Present value (\$)
0	Issue price	(100)	1.000	(100.00)
1–10	After-tax interest	6.30	6.710	42.27
10	Redemption	110	0.463	50.93
				<u>(6.80)</u>

Year	Cash flow	\$	6% discount factor	Present value (\$)
0	Issue price	(100)	1.000	(100.00)
1–10	After-tax interest	6.30	7.360	46.37
10	Redemption	110	0.558	61.38
				<u>7.75</u>

After-tax cost of debt = $6 + [(8 - 6) \times 7.75 / (7.75 + 6.8)] = 6 + 1.1 = 7.1\%$

- (b) YGV Co does not currently have any long-term debt and so the current weighted average cost of capital (WACC) is the same as the current cost of equity, which is 12%.

Current market capitalisation = $10m \times \$4.10 = \41 million

If the company issues \$4m of bonds at par with an after-tax cost of debt of 7.1%, the WACC will be $[(41m \times 12) + (4m \times 7.1)] / 45m = 11.6\%$

The effect of the bond issue is therefore to reduce the WACC from 12% to 11.6% per year.

This calculation assumes that the current share price does not change as a result of the bond issue. In reality, the share price might change as a result of the change in financial risk. This calculation also assumes that the overdraft is not relevant in calculating the WACC, when in reality the size of the overdraft might make it a significant factor.

Examiner's note:

WACC calculations that include the overdraft are also acceptable.

(c) (i) *Interest coverage ratio*

Current interest = \$4.5m x 5% = \$225,000 per year
Current interest coverage ratio = $1\text{m}/0.225 = 4.4$ times

Interest from bond issue = \$4m x 9% = \$360,000 per year
Interest on remaining overdraft = \$0.5m x 5% = \$25,000 per year
Total interest = 360,000 + 25,000 = \$385,000 per year
Revised interest coverage ratio = $1\text{m}/0.385 = 2.6$ times

(ii) *Gearing*

Market capitalisation of YGV plc = 10m shares x \$4.10 = \$41 million

Current gearing using market values, excluding overdraft = zero
Revised gearing using market values, excluding overdraft = $100 \times (4,000/41,000) = 9.8\%$

Current gearing using market values, including overdraft = $100 \times (4,500/41,000) = 11.0\%$
Revised gearing using market values, including overdraft = $100 \times (4,500/41,000) = 11.0\%$

Examiner's note: full credit could have been obtained whether or not the overdraft had been included in the gearing calculations.

(d) *Interest coverage ratio*

The current interest coverage ratio of 4.4 times is just over half of the sector average value of 8 times, although before the fall in profit it was 22 times. As a result of the bond issue, the interest coverage ratio would fall to 2.6 times, which is a dangerously low level of cover.

Gearing

Whether the bond issue has an effect on gearing depends on whether the gearing calculation includes the overdraft. If the overdraft is excluded, gearing measured by the debt/equity ratio on a market value basis increases from zero to 9.8%. If the overdraft is included, there is no change in gearing, since the bond issue replaces an equal amount of the overdraft. Given the sector average debt/equity of 10%, there does not appear to be any concerns about gearing as a result of the bond issue.

Security

It is very likely that the bond issue would need to be secured against the tangible non-current assets of YGV Co, especially in light of the recent decline in profitability. However, the bond issue is for \$4 million while the tangible non-current assets of YGV Co have a value of only \$3 million. It is not known whether the intangible non-current assets can be used as security, since their nature has not been disclosed.

Advisability of using the bond issue to reduce the overdraft

Considering the significant decrease in the interest coverage ratio as a result of the bond issue and the lack of tangible non-current assets to offer as security, it appears that the proposed bond issue cannot be recommended and would probably be unsuccessful. YGV Co should therefore consider alternative sources of finance in order to reduce the overdraft.

Alternative sources of finance

Given the recent fall in profit before interest and tax from \$5 million to \$1 million, any potential investor would initially seek reassurances that YGV Co would continue to be a viable business. The reason for the decline in profitability needs to be determined and the longer-term sustainability of the company needs to be confirmed before further financing is considered.

If longer-term viability is assured, the need for further finance could be reduced by taking measures to reduce costs and increase income, for example through improved working capital management.

If the company pays dividends, consideration could be given to reducing or passing the dividend in order to increase the flow of retained earnings in the company.

Given the problems with interest coverage and security, and the lack of availability of further overdraft finance, equity finance is the first alternative choice that could be considered. While no information has been provided on recent share price changes or on the dividend policy of YGV Co, existing shareholders could be consulted about a rights issue. Using a discount to the current market price of 20% gives a rights issue price of \$3.28. A 1 for 8 rights issue at this price would raise \$4.1 million, increasing the interest coverage ratio to 50 ($1\text{m}/0.02\text{m}$) if the proceeds were used to reduce the overdraft to \$400,000.

If shares were offered to new shareholders, the dilution of existing ownership and control would be small, given that \$4 million is only 9% of \$45 million ($41 + 4$). New shareholders would be unlikely to invest, however, if no dividend were on offer.

Sale and leaseback would not raise sufficient finance, given that tangible non-current assets are only \$3 million, but this avenue could be explored in conjunction with another source of finance.

Other finance sources that could be considered include convertible bonds or bonds with warrants attached. Improved working capital management could also decrease the amount of finance required.

3 (a) Errors in the original investment appraisal

Inflation was incorrectly applied to selling prices and variable costs in calculating contribution, since only one year's inflation was allowed for in each year of operation.

The fixed costs were correctly inflated, but included \$200,000 per year before inflation that was not a relevant cost. Only relevant costs should be included in investment appraisal.

Straight-line accounting depreciation had been used in the calculation, but this depreciation method is not acceptable to the tax authorities. The approved method using 25% reducing balance capital allowances should be used.

Interest payments have been included in the investment appraisal, but these are allowed for by the discount rate used in calculating the net present value.

The interest rate on the debt finance has been used as the discount rate, when the nominal weighted average cost of capital should have been used to discount the calculated nominal after-tax cash flows.

(b) Nominal weighted average cost of capital = $1.07 \times 1.047 = 1.12$, i.e. 12% per year

NPV calculation

Year	1	2	3	4	5
	\$000	\$000	\$000	\$000	\$000
Contribution	1,330	2,264	3,010	1,600	
Fixed costs	(318)	(337)	(357)	(379)	
Taxable cash flow	1,012	1,927	2,653	1,221	
Taxation		(304)	(578)	(796)	(366)
CA tax benefits		150	112	84	178
After-tax cash flow	1,012	1,773	2,187	509	(188)
Scrap value				250	
After-tax cash flows	1,012	1,773	2,187	759	(188)
Discount at 12%	0.893	0.797	0.712	0.635	0.567
Present values	904	1,413	1,557	482	(107)
		\$000			
Present value of future cash flows		4,249			
Initial investment		2,000			
Net present value		2,249			

The net present value is positive and so the investment is financially acceptable.

Alternative NPV calculation using taxable profit calculation

Year	1	2	3	4	5
	\$000	\$000	\$000	\$000	\$000
Contribution	1,330	2,264	3,010	1,600	
Fixed costs	(318)	(337)	(357)	(379)	
Taxable cash flow	1,012	1,927	2,653	1,221	
Capital allowances	(500)	(375)	(281)	(594)	
Taxable profit	512	1,552	2,372	627	
Taxation		(154)	(466)	(712)	(188)
Profit after tax	512	1,398	1,906	(85)	(188)
Capital allowances	500	375	281	594	
After-tax cash flow	1,012	1,773	2,187	509	(188)
Scrap value				250	
After-tax cash flows	1,012	1,773	2,187	759	(188)
Discount at 12%	0.893	0.797	0.712	0.635	0.567
Present values	904	1,413	1,557	482	(107)
		\$000			
Present value of future cash flows		4,249			
Initial investment		2,000			
Net present value		2,249			

Workings

Annual contribution

Year	1	2	3	4
Sales volume (units/yr)	250,000	400,000	500,000	250,000
Selling price (\$/unit)	12.60	13.23	13.89	14.59
Variable cost (\$/unit)	7.28	7.57	7.87	8.19
Contribution (\$/unit)	5.32	5.66	6.02	6.40
Contribution (\$/yr)	1,330,000	2,264,000	3,010,000	1,600,000

Capital allowance (CA) tax benefits

Year	Capital allowance (\$)	Tax benefit (\$)
1	500,000	150,000
2	375,000	112,500
3	281,250	84,375
4	593,750	178,125
Scrap value	250,000	
	2,000,000	

(c) (i) Asset replacement decisions

The problem here is that the net present value investment appraisal method may offer incorrect advice about when an asset should be replaced. The lowest present value of costs may not indicate the optimum replacement period.

The most straightforward solution to this problem is to use the equivalent annual cost method. The equivalent annual cost of a replacement period is found by dividing the present value of costs by the annuity factor or cumulative present value factor for the replacement period under consideration. The optimum replacement period is then the one that has the lowest equivalent annual cost.

Other solutions that could be discussed are the lowest common multiple method and the limited time horizon method.

(ii) Multiple internal rates of return

An investment project may have multiple internal rates of return if it has unconventional cash flows, that is, cash flows that change sign over the life of the project. A mining operation, for example, may have initial investment (cash outflow) followed by many years of successful operation (cash inflow) before decommissioning and environmental repair (cash outflow). This technical difficulty makes it difficult to use the internal rate of return (IRR) investment appraisal method to offer investment advice.

One solution is to use the net present value (NPV) investment appraisal method instead of IRR, since the non-conventional cash flows are easily accommodated by NPV. This is one area where NPV is considered to be superior to IRR.

(iii) Projects with significantly different business risk to current operations

Where a proposed investment project has business risk that is significantly different from current operations, it is no longer appropriate to use the weighted average cost of capital (WACC) as the discount rate in calculating the net present value of the project. WACC can only be used as a discount rate where business risk and financial risk are not significantly affected by undertaking an investment project.

Where business risk changes significantly, the capital asset pricing model should be used to calculate a project-specific discount rate which takes account of the systematic risk of a proposed investment project.

4 (a) Dividend yield is calculated as the dividend divided by the share price at the start of the year.

$$2008: \text{dividend yield} = 100 \times 38.5/740 = 5.2\%$$

$$2009: \text{dividend yield} = 100 \times 40.0/835 = 4.8\%$$

The capital gain is the difference between the opening and closing share prices, and may be expressed as a monetary amount or as a percentage of the opening share price.

$$2008: \text{capital gain} = 835 - 740 = 95c \text{ or } 12.8\% (100 \times 95/740)$$

$$2009: \text{capital gain} = 648 - 835 = (187c) \text{ or } (22.4\%) (100 \times -187/835)$$

The total shareholder return is the sum of the percentage capital gain and the dividend yield, or the sum of the dividend paid and the monetary capital gain, expressed as a percentage of the opening share price.

$$2008: \text{total shareholder return} = 100 \times (95 + 38.5)/740 = 18.0\% (5.2\% + 12.8\%)$$

$$2009: \text{total shareholder return} = 100 \times (-187 + 40)/835 = -17.6\% (4.8\% - 22.4\%)$$

(i) *The return on equity predicted by the CAPM*

The actual return for a shareholder of QSX Co, calculated as total shareholder return, is very different from the return on equity predicted by the CAPM. In 2008 the company provided a better return than predicted and in 2009 the company gave a negative return while the CAPM predicted a positive return.

Year	2009	2008
Total shareholder return	(17.6%)	18.0%
Return on equity predicted by CAPM	8%	12%

Because the risk-free rate of return is positive and the equity risk premium is either zero or positive, and because negative equity betas are very rare, the return on equity predicted by the CAPM is invariably positive. This reflects the reality that shareholders will always want a return to compensate for taking on risk. In practice, companies sometimes give negative returns, as is the case here. The return in 2008 was greater than the cost of equity, but the figure of 10% quoted here is the current cost of equity; the cost of equity may have been different in 2008.

(ii) *Other comments*

QXS Co had turnover growth of 3% in 2008, but did not generate any growth in turnover in 2009. Earnings per share grew by 4.1% in 2008, but fell by 8.3% in 2009. Dividends per share also grew by 4.1% in 2008, but unlike earnings per share, dividend per share growth was maintained in 2009. It is common for dividends to be maintained when a company suffers a setback, often in an attempt to give reassurance to shareholders.

There are other negative signs apart from stagnant turnover and falling earnings per share. The shareholder will be concerned about experiencing a capital loss in 2009. He will also be concerned that the decline in the price/earnings ratio in 2009 might be a sign that the market is losing confidence in the future of QXS Co. If the shareholder was aware of the proposal by the finance director to suspend dividends, he would be even more concerned. It might be argued that, in a semi-strong form-efficient market, the information would remain private. If QXS Co desires to conserve cash because the company is experiencing liquidity problems, however, these problems are likely to become public knowledge fairly quickly, for example through the investigations of capital market analysts.

Workings:

Year	2009	2008	2007
Closing share price	\$6.48	\$8.35	
Earnings per share	58.9c	64.2c	61.7c
PER	11 times	13 times	
Year	2009	2008	2007
Earnings per share	58.9c	64.2c	61.7c
Dividend per share	40.0c	38.5c	37.0c
Dividend cover	1.5 times	1.7 times	1.7 times
Earnings per share growth	(8.3%)	4.1%	
Dividend per share growth	3.9%	4.1%	
Turnover growth	nil	3%	

- (b) Historical dividend growth rate = $(40/37)^{0.5} - 1 = 0.04$ or 4% per year
Share price using dividend growth model = $(40 \times 1.04)/(0.1 - 0.04) = 693c$ or \$6.93

In three years' time, the present value of the dividends received from the fourth year onwards can be calculated by treating the fourth-year dividend as D_1 in the dividend growth model and assuming that the cost of equity remains unchanged at 10% per year. Applying the dividend growth model in this way gives the share price in three years' time:
Share price = $70/(0.1 - 0.03) = 1,000c$ or \$10.00.

For comparison purposes this share price must be discounted back for three years:
Share price = $0.751 \times 10.00 = \$7.51$.

The current share price of \$6.48 is less than the share price of \$6.93 calculated by the dividend growth model, indicating perhaps that the capital market believes that future dividend growth will be less than historic dividend growth.

The share price resulting from the proposed three-year suspension of dividends is higher than the current share price and the share price predicted by the dividend growth model. However, this share price is based on information that is not public and it also relies on future dividends and dividend growth being as predicted. It is very unlikely that a prediction as tentative as this will prove to be accurate.

- (c) Investment decisions, dividend decisions and financing decisions have often been called the decision triangle of financial management. The study of financial management is often divided up in accordance with these three decision areas. However, they are not independent decisions, but closely connected.

For example, a decision to increase dividends might lead to a reduction in retained earnings and hence a greater need for external finance in order to meet the requirements of proposed capital investment projects. Similarly, a decision to increase capital investment spending will increase the need for financing, which could be met in part by reducing dividends.

The question of the relationship between the three decision areas was investigated by Miller and Modigliani. They showed that, if a perfect capital market was assumed, the market value of a company and its weighted average cost of capital (WACC)

were independent of its capital structure. The market value therefore depended on the business risk of the company and not on its financial risk. The investment decision, which determined the operating income of a company, was therefore shown to be important in determining its market value, while the financing decision, given their assumptions, was shown to be not relevant in this context. In practice, it is recognised that capital structure can affect WACC and hence the market value of the company.

Miller and Modigliani also investigated the relationship between dividend policy and the share price of a company, i.e. the market value of a company. They showed that, if a perfect capital market was assumed, the share price of a company did not depend on its dividend policy, i.e. the dividend decision was irrelevant to value of the share. The market value of the company and therefore the wealth of shareholders were shown to be maximised when the company implemented its optimum investment policy, which was to invest in all projects with a positive NPV. The investment decision was therefore shown to be theoretically important with respect to the market value of the company, while the dividend decision was not relevant.

In practice, capital markets are not perfect and a number of other factors become important in discussing the relationship between the three decision areas. Pecking order theory, for example, suggests that managers do not in practice make financing decisions with the objective of obtaining an optimal capital structure, but on the basis of the convenience and relative cost of different sources of finance. Retained earnings are the preferred source of finance from this perspective, with a resulting pressure for annual dividends to be lower rather than higher.

**Fundamentals Level – Skills Module, Paper F9
Financial Management**

June 2010 Marking Scheme

	<i>Marks</i>	<i>Marks</i>
1 (a) Expected value of period 1 closing balance	2	
Expected value of period 2 closing balance	5	
Probability of negative cash balance	1	
Probability of exceeding overdraft limit	2	
Discussion of expected value analysis	<u>3</u>	
		13
(b) Credit analysis	2–3	
Credit control	2–3	
Collection procedures	<u>2–3</u>	
	Maximum	8
(c) Relevant discussion		<u>4</u>
		25
2 (a) Calculation of after-tax interest payment	1	
Calculation of after-tax cost of debt	<u>3</u>	
		4
(b) Current WACC	1	
Calculation of WACC after bond issue	2	
Comment on effect of bond issue	1	
Comment on assumptions	<u>1</u>	
		5
(c) Current interest coverage ratio	1	
Revised interest coverage ratio	1	
Current gearing	1	
Revised gearing	<u>1</u>	
		4
(d) Comment on interest coverage ratio	1–2	
Comment on gearing	1–2	
Comment on need for security	2–3	
Comment on advisability of bond issue	1–2	
Discussion of alternative sources of finance	4–5	
Other relevant discussion	<u>1–2</u>	
	Maximum	<u>12</u>
		25

	<i>Marks</i>	<i>Marks</i>
3 (a) Identification of errors in the evaluation		5
(b) Nominal weighted average cost of capital	1	
Inflated selling prices	1	
Inflated variable costs	1	
Inflated contribution	1	
Inflated fixed costs	1	
Capital allowances and/or related tax benefits	3	
Scrap value	1	
Discount factors	1	
Net present value	1	
Comment	<u>1-2</u>	
	Maximum	12
(c) Discussion of asset replacement decisions	2-3	
Discussion of projects with several IRR	2-3	
Discussion of projects with different business risk	<u>3-4</u>	
	Maximum	<u>8</u>
		25
4 (a) Calculation of dividend yields	2	
Calculation of capital gains	2	
Calculation of total shareholder returns	2	
Discussion of returns relative to the CAPM	1-3	
General discussion of returns	<u>1-3</u>	
	Maximum	10
(b) Calculation of historic dividend growth rate	1	
Calculation of share price using DGM	2	
Calculation of share price after policy change	3	
Comment on shares prices	<u>1-2</u>	
	Maximum	7
(c) Practical links between the decision areas	1-2	
Relevant illustrations	1-2	
Miller and Modigliani and dividend decisions	2-3	
Miller and Modigliani and financing decisions	2-3	
Other relevant discussion	<u>1-3</u>	
	Maximum	<u>8</u>
		25