
Answers

Section C

Spine Co

(a) Increased PBIT = $13.040\text{m} \times 1.2 = \$15,648,000$

Financing by debt

Current interest payment = \$240,000

Increase in interest = $15\text{m} \times 0.08 = \$1,200,000$

Revised interest payment = $1,200,000 + 240,000 = \$1,440,000$

Revised PBT = $15,648,000 - 1,440,000 = \$14,208,000$

Revised PAT = $14,208,000 \times 0.7 = \$9,945,600$

Current EPS = $8,960,000 / 12,000,000 = \0.747 per share

Revised EPS = $9,945,600 / 12,000,000 = \0.829 per share

Current PER = $6.25 / 0.747 = 8.37$ times

Revised share price = $8.37 \times 0.829 = \$6.94$ per share

Capital gain = $6.94 - 6.25 = \$0.69$ per share

Financing by equity

Revised PBT = $15,648,000 - 240,000 = \$15,408,000$

Revised PAT = $15,408,000 \times 0.7 = \$10,785,600$

Revised number of shares = $12\text{m} \times 1.25 = 15\text{m}$ shares

Revised EPS = $10,785,600/15,000,000 = \0.719

Current PER = $6.25/0.747 = 8.37$ times

Revised share price = $8.37 \times 0.719 = \$6.02$ per share

TERP = $((4 \times 6.25) + 5.00)/5 = \6.00 per share

Capital gain = $6.02 - 6.00 = \$0.02$ per share

Comment on findings

Financing by debt is recommended as this leads to the larger capital gain for the shareholders. This recommendation could have been made on the basis of EPS values alone, as the price/earnings ratio multiplier is the same for both financing choices. However, it is important to compare the share price arising from the equity financing option with the theoretical ex rights share price, rather than with the cum rights share price.

(b) With any investment, there is a risk that the actual outcome may be different from the expected or predicted outcome. This risk can be reduced by holding several different investments, since different investments are affected to differing extents by changes in economic variables such as interest rates and inflation rates. The return from one investment may increase, for example, when the return from a different investment decreases. Holding a range of different investments is known as portfolio diversification.

Experience shows that there is a limit to the reduction in total risk that can be achieved as a result of portfolio diversification. The risk that cannot be removed by portfolio diversification is called systematic risk. It represents risk relating to the financial system as a whole that cannot be avoided by any company in which an investment is made.

The risk that can be removed through portfolio diversification is called unsystematic risk or specific risk, as it relates to specific companies in which investments are made.

Experience has shown that investing in the shares of between 20 and 30 companies is sufficient to eliminate almost all of the unsystematic risk from an investment portfolio.

Systematic risk contains both business risk and financial risk. A company with no debt finance faces business risk alone, while a company with both equity and debt finance faces both business risk and financial risk.

(c) The capital asset pricing model (CAPM) is based on several key assumptions.

Investors hold diversified portfolios

While portfolio theory considers total risk, the CAPM considers only systematic risk, as it makes the assumption that all investors hold diversified portfolios. Investors will therefore only require compensation for the systematic risk in their portfolios.

Single-period transaction horizon

In order to compare the returns on different assets such as shareholdings, the CAPM assumes that all returns are over a standard single-period transaction horizon, usually taken to be one year.

Perfect capital market

The CAPM assumes a perfect capital market, with no taxes, no transaction costs and perfect information freely available to all participants.

Borrowing and lending at the risk-free rate

The CAPM assumes that all investors can borrow and lend at the risk-free rate of return. This represents a minimum rate of return required by all investors and is one of the variables in the CAPM equation.

Crocket Co**(a) (i)**

Calculate the NPV of project B

Year	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
Sales (inflated at 4%)	754	827	996	716
Costs (inflated at 5%)	152	185	234	114
Net cash flow	602	642	762	602
DCF @ 10%	0.909	0.826	0.751	0.683
Present Values	547	530	572	411

Total PV	2,061
Less: Initial outlay	1,500
NPV	561

(a) (ii)

Firstly, calculate the profitability index for each project and rank.

Project	Outlay		NPV		P. Index	(NPV/Outlay)	Rank
	\$'000	\$'000					
A	1,000	390	390 / 1,000 =	0.390		5	
B	1,500	561	561 / 1,500 =	0.374		6	
D	1,125	590	590 / 1,125 =	0.524		1 {highest}	
E	1,850	840	840 / 1,850 =	0.454		3	
F	1,300	635	635 / 1,300 =	0.488		2	

Projects C and E are mutually exclusive so cannot be done together. As all projects are divisible, the project with the highest PI will be chosen out of the two which in this case is E at 0.454, rather than C with 0.433.

Optimal combination

Rank	Project	%	Capital	NPV
			\$'000	\$'000
1	D	100	1,125	590
2	F	100	1,300	635
3	E	100	1,850	840
4	A	72.5	725	283
			5,000	2,348

After selection of project E, only \$725,000 of capital remains. Consequently, only 72.5% ($725/1,000=0.725$) of project A can be undertaken. This will result in only 72.5% of the NPV ($0.725 \times \$390,000 = \$283,000$).

The optimum investment plan is to invest fully in projects D, F and E and only 72.5% in project A. This will yield a maximum net present value of \$2,348,000

(b)

Firstly, the cash flows must be determined for each cycle under consideration (3, 4 and 5 years). These cash flows will include the initial outlay of the car fleet, maintenance and running costs and the residual value of the car fleet at the end of the cycle.

These cash flows will then require discounting at a suitable discount rate to determine the present value (PV) for each cycle. All of the PVs will be negative as they represent the cost of running the company car fleet with no relevant income attributable.

Given the continual replacement nature of the decision, a common timescale must then be incorporated. To put it simply, while the PV of the three year cycle will appear the cheapest, it will be incurred more times than the four or five year cycles going forward indefinitely.

To allow for the difference in timescales, the PV for each cycle will need converting to an equivalent annual cost (EAC). The EAC will represent the annuity cash flow which when discounted gives the same PV as the actual cash flows themselves. The EAC would be calculated by taking each cycle's PV and dividing by the annuity factor for the

cycle length. For example, the three-year PV will need to be divided by a three-year annuity factor.

Once the EAC has been calculated for each cycle, the lowest figure, ie cheapest, will indicate the optimum replacement cycle for the fleet. By comparing the EAC for each cycle, a common timescale (one year) will be considered making the figures comparable.

(c)

When appraising an investment, the treatment of inflation needs to be considered as it will affect both cash flows and the required rate of return used as the discount rate. Real-terms and nominal-terms approaches to investment appraisal differ in the way that the effects of inflation are incorporated into the appraisal calculation.

Nominal-terms approach

With the nominal-terms approach, both the cash flows and the discount rate incorporate the effects of inflation. The cost of capital would also need to include the effects of general inflation on the investors' required rate of return. This means Crocket Co will need to apply the specific rates of inflation to sales, material costs and other cash flows and ensure the cash flows in the appraisal incorporate these. The uncertainty surrounding the rates of inflation that Crocket Co faces with this project will certainly make an appraisal in nominal-terms more difficult to prepare with any accuracy and this should be considered when reviewing the results.

Real-terms approach

A real terms approach would exclude the effects of general inflation. Therefore, nominal cash flows incorporating the effects of specific inflation rates would be deflated by the general rate of inflation to give real-terms cash flows. The discount rate will also exclude the effects of inflation. Consequently, a real discount rate would be used which represents the investors' base level of return for risk before inflation is taken into account.

Choice of approach

A real-terms approach would result in a much easier appraisal exercise for Crocket Co as the uncertainty surrounding the estimation of inflation is removed, however, a number of conditions must be met in order for the real-terms approach to be suitable.

Firstly, there must be a single rate of inflation affecting all of the project's cash flows. Given that the estimated increase in material costs is different to the expected rise in sales prices this means that a real-terms approach is already deemed unsuitable. As Crocket Co expects the rate of inflation on sales to be less than the rate of inflation on its costs, particularly materials, then it would be expected that any real-terms NPV is likely to be overstated compared to a nominal-terms NPV as costs will be rising faster than income.

Secondly, the single rate of inflation affecting the cash flows must also be the same as the general rate of inflation suffered by investors. If the inflation rate affecting cash flows is the same as the inflation rate ignored by the real discount rate, this common rate of inflation can be ignored. Given that Crocket Co expects the general rate of inflation to differ from the rates affecting sales and material cost, this also means a real-terms approach ignoring specific inflation is not suitable.

Recommendation

As a result of the above conditions not being met, use of the real-terms approach will not be suitable for Crocket Co to appraise this project. A nominal-terms approach should be used.

	<i>Marks</i>	<i>Marks</i>
Marking Scheme		
Spine Co		
(a) Increased PBIT	0.5	
Debt - increased interest	1	
Debt - increased PBT	0.5	
Debt - increased PAT	0.5	
Debt - revised EPS	1	
Debt - capital gain	1	
Equity - increased PBT	0.5	
Equity - revised EPS	1	
Equity - TERP	1	
Equity - capital gain	1	
Recommendation	1	
Other discussion	1	
		<u>10</u>
(b) Portfolio diversification	2	
Systematic risk	1	
Unsystematic risk	1	
Other discussion	<u>1</u>	
		<u>5</u>

	<i>Marks</i>	<i>Marks</i>
(c) Diverse portfolios	1	
Single-period	1	
Perfect capital market	1	
Risk-free rate	1	
Other discussion	<u>1</u>	
		<u>5</u>
Total marks		<u>20</u>

	<i>Marks</i>	<i>Marks</i>
Crocket Co		
(a) (i) Inflated sales	1	
(i) Inflated costs	1	
(i) NPV	<u>2</u>	
		<u>4</u>
(ii) PI calculation	2	
(ii) PI ranking	1	
(ii) Choose project E over C	1	
(ii) Optimal NPV	<u>2</u>	
		<u>6</u>
(b) Determine cash flows	1	
PV for each cycle	1	
Calculate EAC	1	
Decision rule	<u>1</u>	
		<u>4</u>
(c) Specific inflation	1	
Cost of capital	1	
Nominal method	1	
Real method	1	
Other points	1	
Recommendation	<u>1</u>	
		<u>6</u>
Total marks		<u>20</u>