CHAPTER 12 Using breakeven analysis to make decisions

PRACTICE EXERCISE

Total: 25 marks (25 minutes)

The following information applies to a product:

- units of output: 500
- total variable costs: £3,000
- fixed costs: £1,200
- selling price: £11 per item

1 What is meant by the term 'variable costs'? *(2 marks)*

2 Calculate the contribution per unit. *(4 marks)*

3 Calculate the total contribution from 500 units. *(3 marks)*

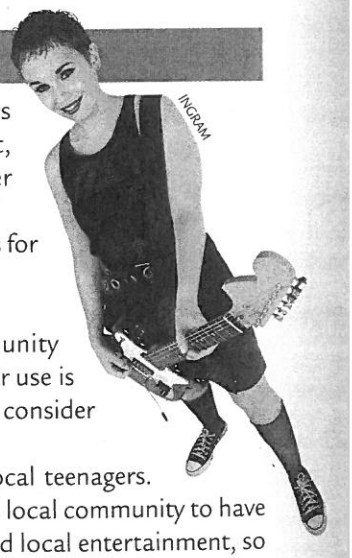
4 Calculate the breakeven quantity. *(5 marks)*

5 How much profit is made if all 500 units are sold? *(4 marks)*

6 What is the margin of safety if 500 units are sold? *(2 marks)*

7 Calculate the breakeven quantity if the variable costs rise to £7 per unit and the fixed costs increase to £1,400. *(5 marks)*

CASE STUDY 1 CJ's gigs



CJ operates a small store in her town, selling records, posters and various items of interest to her predominantly teenage customer base.

In order to increase local awareness of her shop, she has started to organise gigs featuring local bands at the town's community centre. These gigs take place every Friday evening.

There are two separate sources of both revenue and expenditure from running a gig: those arising from the gig itself, and the revenue and expenditure involved in running a bar during the event. CJ's friend, Dom, runs the bar and keeps some of the profit. For this reason, CJ records the finances of the bar separately from the running of the gig itself.

CJ's predictions for her revenue and expenditure from a gig are set out in Table 12.4.

The number of customers varies according to the popularity of the bands performing. Based on considerable experience, CJ estimates that there will be 80 customers for most gigs. For her worst-case scenario CJ estimates 30 customers for a gig. Her best-case scenario is a sell-out of 150 customers. These best-case and worst-case scenarios have both happened on a few occasions in the past, but on every other occasion the numbers have been fairly consistent, averaging 80 customers per gig.

CJ has a number of reasons for running the gigs:

- To make money.
- To help keep the community centre open. Unless regular use is made of it, the council will consider closing it down.
- To provide activities for local teenagers. CJ believes it is vital for the local community to have a central meeting place and local entertainment, so that local residents do not have to travel too far for their leisure activities.
- To help increase the profile of talented, local bands so that they can gain recognition.
- To increase sales in her shop through the publicity gained, and through stocking records and items featuring the bands that perform in the community centre. CJ has found that after a gig, her customers show a sharp increase in interest in these bands.

Table 12.4 Revenue and expenditure forecasts for a community centre gig

Item	Gig	Bar	Total
Staffing	£50 fixed cost	£10 fixed cost	£60 fixed cost
Hire of accommodation and equipment	£150 fixed cost	£20 fixed cost	£170 fixed cost
Materials and other costs	Variable cost of £1 per customer	Variable cost of £2.50 per customer	Variable cost of £3.50 per customer
Average amount spent	£6 per customer	£4.50 per customer	£10.50 per customer

Questions

Total: 55 marks (65 minutes)

1 For the *bar only*, calculate the contribution per unit from a customer. *(2 marks)*

2 **a** Give two examples of variable costs that CJ may have to pay when running an event. *(2 marks)*
b Give two examples of fixed costs that CJ may have to pay when running an event. *(2 marks)*

3 If 80 customers attend a gig, what is the *total contribution* of the gig itself (excluding the bar) towards fixed costs? *(3 marks)*

4 *Combining the gig and the bar*, what is the breakeven number of customers? *(5 marks)*

5 On graph paper, draw a breakeven chart showing the total revenue line, fixed costs and variable costs for the *bar only*. On this chart, show the breakeven point, and show and calculate the margin of safety, based on 80 customers attending. *(8 marks)*

6 CJ has noticed that the breakeven quantity for the bar is much lower than it is for the gig, and yet the gig is more profitable than the bar. Explain this apparent contradiction. *(6 marks)*

7 Calculate the total profit (or loss) made from the combined gig and bar in the case of:
a the worst-case scenario
b the best-case scenario
c the expected scenario (80 customers) *(12 marks)*

8 Taking into consideration your answers to question 7 and the other reasons for running the gigs, discuss whether it might be worthwhile for CJ to double the number of gigs that she organises. *(15 marks)*

CASE STUDY 2 Rocking horses

Chris Mass produces wooden rocking horses in a barn on his farm in Oxfordshire. The farm itself has been running at a loss in recent years and Chris has managed to survive only by renting out a converted barn to holidaymakers seeking a base for visiting the Cotswolds. He has also made money by charging some local organisations to use a large woodland area on the farm for motocross and mountain biking.

Chris has been seeking to diversify into other activities, and has also developed another area of woodland for pheasant shooting. Many local farmers have sold off land in order to survive, but Mass Farm has been in Chris's family since the Domesday survey and his top priority is to avoid selling any land.

During the winter (December to February inclusive) there is a quiet period on the farm and in the past Chris has always had to reduce his staff by two or three employees. It had always been easy to find new workers for the spring and summer, but in recent years he has found it difficult to recruit good workers for such a

short time. He has partly overcome this by employing two of his workers (skilled wood craftsmen who had been made redundant by a local furniture company) to concentrate on making rocking horses for a national chain of toy shops.

The workers' skills were discovered by accident. A storm had led to the felling of a number of trees on the farm, and during a lunch break Chris found some of the workers carving shapes in the fallen trees.

On average the rocking horses sell for £385 each, and Chris's workers can produce 30 horses between them during the 3-month period. Chris's daughter then decorates and varnishes the horses to increase their individuality. During the 3 months the two craftsmen carving the horses work for a total of 990 hours at a rate of £8 per hour. Chris pays his daughter £50 per horse for decorating and varnishing. The other costs involved are as follows:

- wood – £40 per horse
- equipment hire – £80 per month
- heating, lighting etc. – £140 per quarter
- decorations and varnish – £11 per horse
- administration costs – £300 per quarter

Questions

Total: 55 marks (65 minutes)

1 Calculate the fixed costs per quarter (3 months).
(Be cautious: not all the costs are shown per quarter.) *(4 marks)*

2 Calculate the variable costs per horse. *(4 marks)*

3 On a piece of graph paper, draw a breakeven chart showing sales revenue, fixed costs, variable costs and total costs. *(8 marks)*

4 Mark the breakeven point and show the breakeven output. *(2 marks)*

5 Calculate the breakeven output using the formula. *(4 marks)*

6 Calculate and show the margin of safety. *(3 marks)*

7 Calculate the *loss* that is made from selling 30 rocking horses. *(5 marks)*

8 Discuss the possible ways in which Chris might be able to change this loss into a profit. *(15 marks)*

9 Discuss the reasons why Chris may be prepared to make rocking horses even though the organisation fails to break even. *(10 marks)*

Answers to Group Exercise questions on p. 123

1 Stop producing Waterfall. Its contribution is negative, so it is not helping to pay for the fixed costs or make profit. (Alternatively, you might want to experiment with a price above £18, but this could lead to unsold stock.)

2 Cascade. It provides almost half of the firm's sales volume but contributes less than Fountain and Stream, even though these products sell much lower volumes. (It would be an idea to investigate why these do so well, in order to improve Cascade.)

Answers to *What do you think?* on p. 131

1 **a** Selling price: increases from £5 per unit to £20 per unit.
b Variable costs: increase from £1 per unit to £5 per unit.
c Fixed costs: increase from £40 to £90.

2 Breakeven output changes from 10 units to 6 units.