



Lecture 4: Self-study exercises

(Adopted by Horngren, C.T., Bhimani, A., Datar, S.M. and Foster, G. (2012).
Management and cost accounting. Prentice Hall, 5th eds.)

8.11 CVP computations. (20 minutes)

Fill in the blanks for each of the following independent cases.

Case	Selling price	Variable costs per unit	Total units sold	Total contribution margin	Total fixed costs	Operating profit/loss
a	£30	£20	70 000	£?	£?	-£15 000
b	25	?	180 000	900 000	800 000	?
c	?	10	150 000	300 000	220 000	?
d	20	14	?	120 000	?	12 000

Suggested Solution

a TCM = Q (USP-UVC)
 = 70 000 (£30 - £20)
 = £700 000
 TFC = TCM – OP/L
 = £700 000 - £15 000 = £685 000

b TCM = Q (USP-UVC)
£900 000 = 180 000 (£25 – UVC)
 UVC = £20
 OP/L = TCM-TFC
 = £900 000 - £800 000 = £100 000

c TCM = Q (USP – UVC)
£300 000 = 150 000 (USP - £10)
 USP = £12
 OP/L = TCM-TFC
 = £300 000 - £220 000 = £80 000

d Q = TCM ÷ (UCP – UVC)
 = £120 000 ÷ (£20 - £14)
 = 20 000
 TFC = TCM – OP/L
 = £120 000 - £12 000 = £108 000



8.14 CVP exercises. (20 min)

Grunberg Lehrmittelverlag GmbH manufactures and sells pens. Present sales output is 5 million annually at a selling price of €0.50 per unit. Fixed costs are €900,000 per year. Variable costs are €0.30 per unit.

Required

(Consider each case separately.)

1.
 - i. What is the present operating profit for a year?
 - ii. What is the present breakeven point in revenues?

Calculate the new operating profit for each of the following changes:

2. A €0.04 per unit increase in variable costs.
3. A 10% increase in fixed costs and a 10% increase in units sold.
4. A 20% decrease in fixed costs, a 20% decrease in selling price, a 10% decrease in variable costs per unit, and a 40% increase in units sold.

Calculate the new breakeven point in units for each of the following changes:

5. A 10% increase in fixed costs.
6. A 10% increase in selling price and a €20,000 increase in fixed costs.

Suggested Solution

- 1**
- | | | |
|--------|---|-----------------|
| USP | = | €0.50 |
| UVC | = | €0.30 |
| UCM | = | €0.20 |
| FC | = | €900,000 a year |
| Output | = | 5,000,000 units |
- i Operating profit = $(UCM \times Output) - FC$
= €100,000
- ii Breakeven $Q = \frac{FC}{USM} = \frac{€900,000}{0.20}$
= 4,500,000 pens
Breakeven revenue = $4,500,000 \times €0.5 = €2,250,000$
- 2**
- | | | |
|--------|---|-----------------|
| USP | = | €0.50 |
| UVC | = | €0.34 |
| UCM | = | €0.16 |
| FC | = | €900,000 a year |
| Output | = | 5,000,000 units |
- Operating profit = $(UCM \times Output) - FC$
= (€100,000)
- 3**
- | | | |
|--------|---|-----------------|
| USP | = | €0.50 |
| UVC | = | €0.30 |
| UCM | = | €0.20 |
| FC | = | €990,000 a year |
| Output | = | 5,500,000 units |
- Operating profit = $(UCM \times Output) - FC$
= €110,000
- 4**
- | | | |
|--------|---|-----------------|
| USP | = | €0.40 |
| UVC | = | €0.27 |
| UCM | = | €0.13 |
| FC | = | €720,000 a year |
| Output | = | 7,000,000 units |
- Operating profit = $(UCM \times Output) - FC$
= €190,000



5 USP = €0.50
 UVC = €0.30
 UCM = €0.20
 FC = €990,000 a year
 Output = 5,000,000 units

$$\text{Breakeven } Q = \frac{FC}{\text{USM}} = \frac{€990,000}{0.20}$$

$$= 4,950,000 \text{ pens}$$

6 USP = €0.55
 UVC = €0.30
 UCM = €0.25
 FC = €920,000 a year
 Output = 5,000,000 units

$$\text{Breakeven } Q = \frac{FC}{\text{USM}} = \frac{€920,000}{0.25}$$

$$= 3,680,000 \text{ pens}$$

8.22 CVP, income taxes. (20-25 minutes)

La Pilotta has two restaurants in Lausanne that are open 24 hours a day. Fixed costs for the two restaurants together total SFr 450 000 per year. Service varies from a cup of coffee to full meals. The average bill for each customer is SFr 8.00. The average cost of food and other variable costs for each customer is SFr 3.20. The income tax rate is 30%. Target net profit is SFr 105 000.

Required:

1. Calculate the revenues needed to obtain the target net profit.
2. How much in sales terms is needed (a) to earn net income of SFr 105 000 and (b) to break even?
3. Calculate net income if the number of bills is 150 000.

Suggested Solution

1.

Variable cost percentage is SFr 3.20/SFr 8.00 = 40%. Let R=Revenues needed to obtain target net profit, then:

$$R - 0,40 R - \text{SFr } 450\,000 = \text{SFr } 150\,000$$

$$0,60 R = \text{SFr } 450\,000 + \text{SFr } 150\,000$$

$$R = \text{SFr } 600\,000 \div 0.60$$

$$= \text{SFr } 1\,000\,000$$

Proof:	Revenues	SFr 1 000 000
	Variable costs (at 40%)	400 000
	Contribution margin	600 000
	Fixed costs	450 000
	Operating profit	150 000
	Income taxes (at 30%)	45 000
	Net profit	Sfr 105 000



2.

a Sales necessary to earn net profit of SFr 105 000:

$$\frac{\text{SFr } 1\,000\,000}{\text{SFr } 8} = 125\,000 \text{ sales necessary}$$

b Sales necessary to break even:

Contribution margin: SFr 8.00 – SFr 3.20 = SFr 4.80

$$\frac{\text{SFr } 450\,000}{\text{SFr } 4.80} = 93\,750 \text{ sales necessary}$$

3.

Using the short-cut approach described in the chapter:

$$\begin{aligned} \text{Change in net profit} &= (150\,000 - 125\,000) \times \text{SFr } 4.80 \times (1 - 0.30) \\ &= \text{SFr } 120\,000 \times 0.7 = \text{SFr } 84\,000 \end{aligned}$$

$$\text{New net profit} = \text{SFr } 84\,000 \div \text{SFr } 105\,000 = \text{SFr } 189\,000$$

Proof:	Revenues, 150 000 x SFr 8.00	SFr 1 200 000
	Variable costs (at 40%)	<u>480 000</u>
	Contribution margin	720 000
	Fixed costs	<u>450 000</u>
	Operating profit	270 000
	Income taxes (at 30%)	<u>81 000</u>
	Net profit	<u>Sfr 189 000</u>