7. Break-even. Operating and Financial Leverage.

Problem 38

Variable costs required to produce a unit of a product are following: direct material $7, direct labor $3. A fixed cost per unit of production is $10, a selling price is $25.
Total fixed costs are $15000. The production capacity of the plant is 2000 units.
(a) Calculate total cost, marginal cost, profit and contribution margin.
(b) Calculate the break-even point.
(c) Draw the fixed costs, variable costs, total costs versus production volume.
Show break-even point.
(d) Draw variable costs, total costs and sales versus production capacity.
Show the marginal cost and contribution.

Solution

(a)

Production capacity	0,0%	12,5%	25,0%	37,5%	50,0%	62,5%	75,0%	87,5%	1
Total costs	15000	17500	20000	22500	25000	27500	30000	32500	35000
Sales	0	6250	12500	18750	25000	31250	37500	43750	50000
Profit / Loss	-15000	-11250	-7500	-3750	0	3750	7500	11250	15000

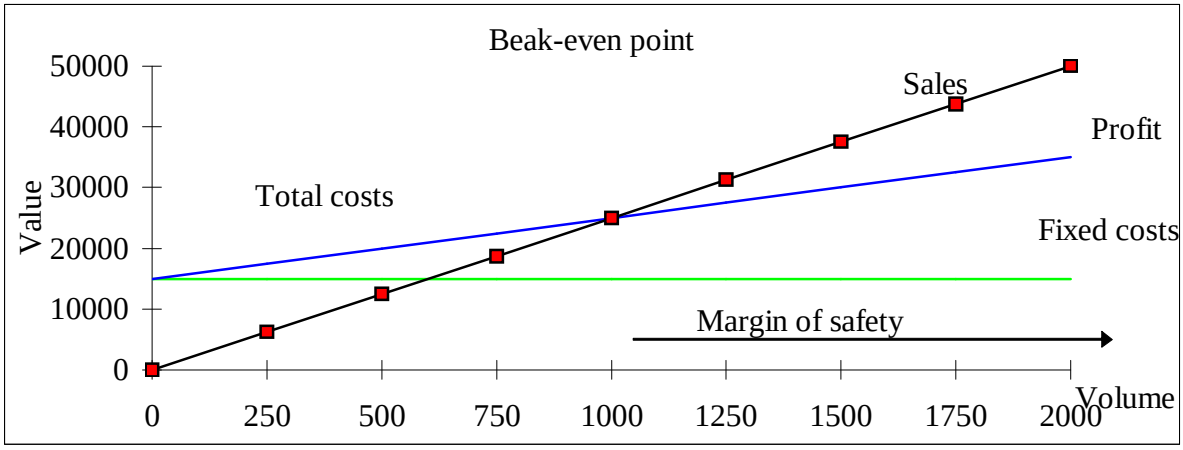
	Method	
	Total cost	Marginal cost
MARGINAL COST	10	10
Fixed cost	10	
TOTAL COST	20	
PROFIT / CONTRIBUTION	5	15
SELLING PRICE	25	25

(b)

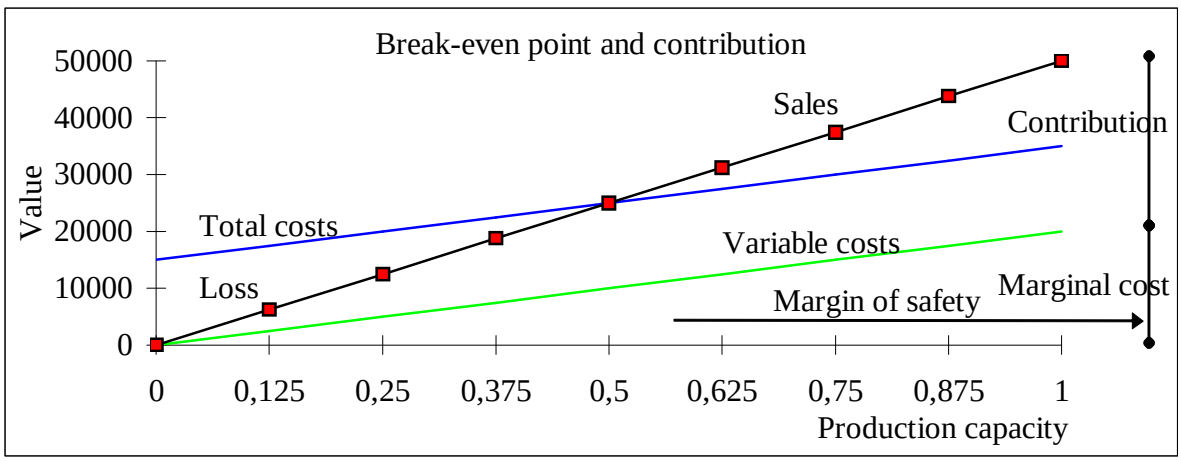
The break-even point (fixed costs : unit contribution) is 1000 units.

(c)

Production	0	250	500	750	1000	1250	1500	1750	2000
Fixed costs	15000	15000	15000	15000	15000	15000	15000	15000	15000
Variable costs	0	2500	5000	7500	10000	12500	15000	17500	20000
Total costs	15000	17500	20000	22500	25000	27500	30000	32500	35000
Sales	0	6250	12500	18750	25000	31250	37500	43750	50000
Profit/Loss	-15000	-11250	-7500	-3750	0	3750	7500	11250	15000



(d)



Problem 39

An electrical component producer budgets to sell 36000 units per annum.
Variable costs per unit are:

raw materials	2	$
wages	8	
overheads	4	
variable costs	14	$
The selling price is	20	$

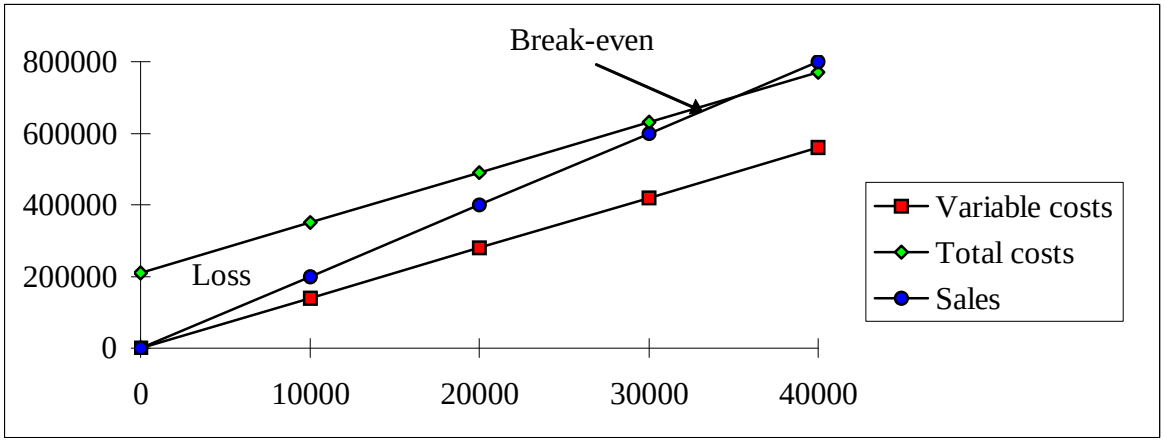
Fixed costs for the period are expected to be $210000.
The factory has the capacity to produce 40000 units.
(a) Calculate how many units must be sold in order to break-even during the period.
Express the information on a break-even chart.
(b) Ascertain the profit.
(c) Calculate the number of units to be manufactured when a buyer of a company requires 15% return and the price for a company is $300000. Should an investor buy this company?

Solution

(a)

Break-even is 210000 : 6 = 35000 units.

Production	0	10000	20000	30000	40000
Variable costs	0	140000	280000	420000	560000
Total costs	210000	350000	490000	630000	770000
Sales	0	200000	400000	600000	800000
Profit /Loss	-210000	-150000	-90000	-30000	30000



(b)

Total contribuition	6	*	36000	=	216000	
- Fixed costs					210000	
Profit					6000	0

(c)

The required profit is given by	0,15	*	300000	=	45000	
+ Fixed costs					210000	
= Total contribuition					255000	0
: contribution per unit					6	
= Units required					42500	units

Currently available manufacturing capacity is insufficient to achieve the required profit target.

The required profit target may be achieved with the following actions:

a. reduction of the unit variable cost,

b. reduction of fixed costs,

c. a price increase.

A combination of a cost reduction with a small price increase may enable an investor to achieve the profit target .

Problem 40

The Magic Co. has sales this year of $1000, variable costs account for 10% of revenues. It has fixed costs of $600, interests expense of $100 and a tax rate of 40%. The company currently has 100 shares outstanding. The expected growth rate for revenues is 20%.

(a) What is the operating income, profit before tax, earnings, EPS, DOL, DFL and DCL for alternative plans:
1. the company is unlevered and does not pay interests,
2. the company is levered.

(b) Calculate the expected operating income, net income and EPS using DOL, DFL and DCL.

(c) Present the income statement for both plans.

Solution

(a)

		Plan 1	Plan 2
	Sales	1 000	1 000
	- Variable costs	100	100
	Contribution margin	900	900
DOL	- Fixed costs	600	600
DCL	Operating income	300	300
DFL	- Interest	0	100
	Profit before tax	300	200
	- Tax	120	80
	Earnings	180	120
	EPS	1,8	1,2

(b)

	Plan 1	Plan 2
DOL	3,00	3,00
DFL	1,00	1,50
DCL	3,00	4,50
Change in operating income	60%	60%
Change in earnings	60%	90%

(c)

		Plan 1			Plan 2		
		t=1	t=2	growth	t=1	t=2	growth
	Sales	1 000	1 200	20%	1 000	1 200	20%
	- Variable costs	100	120	20%	100	120	20%
	Contribution margin	900	1 080	20%	900	1 080	20%
DOL	- Fixed costs	600	600	0%	600	600	0%
DCL	Operating income	300	480	60%	300	480	60%
DFL	- Interest	0	0		100	100	
	Profit before tax	300	480	60%	200	380	90%
	- Tax	120	192	60%	80	152	90%
	Earnings	180	288	60%	120	228	90%
	EPS	1,8	2,9	60%	1,2	2,3	90%

Problem 41

The Alpha Corp. had NOI last month of $1,000, an interest expense of $200. The DOL was 2,0.
What is the DFL and DCL ?

Solution

	Last year	
Contribution margi	2000	
Fixed costs	1000	
Operating income	1000	
Interest	200	
Profit before tax	800	(b)

(a)	DOL	2,000	=contribution margin/operating income
	DFL	1,250	=operating income/income before tax
	DCL	2,500	=contribution margin/income before tax

Problem 42

The Simco, a company that sells bicycles, had sales last month of $20,000, NOI of $2,000, earnings of $900, an interest expense of $500, and earnings per share (EPS) of $0,9. The DOL was 6,0.
Sales for the coming month are expected to be $22,000.
(a) What is the DFL and DCL ?
(b) What was the profit before taxes last month ?
Use DOL, DFL or DCL to answer the following questions.
(c) What is the NOI expected to be for the coming month ?
(d) What is the profit before taxes expected to be for the coming month ?
(e) What are earnings expected to be for the coming month ?
(f) What is the EPS expected to be for the coming month ?

Solution

	Last year		Expected		Growth
Sales	20000		22000		10%
Variable costs	8000		8800		10%
Contribution margin	12000		13200		10%
Fixed costs	10000		10000		0%
Operating income	2000		3200	(c)	60%
Interest	500		500		0%
Profit before tax	1500	(b)	2700	(d)	80%
Tax	600		1080		80%
Earnings	900		1620	(e)	80%
EPS	0,9				
no of shares	1000				

(a) DOL 6,000 = contribution margin/operating income
DFL 1,333 = operating income/income before tax
DCL 8,000 = contribution margin/income before tax

(c) Using DOL , the expected NOI is given by (1 + 6 * 0,1)* 2000 = 3200

(e) Using DCL, the expeced earnings will be (1 + 8,000 * 0,1)* 900 = 1620

(f) 1,62