6. Financial Planning. Break-even. Operating and Financial Leverage.

Problem 35

DC Limited manufactures two products X and Y, whose selling prices and costs are stated below.

	Product X per unit $	*Product Y per unit* $
Selling price	50	45
Direct material	18	15
Direct labour	6	4
Variable production overhead	6	5

Budgeted sales for four months next year are:

	January	February	March	April
X units	900	1100	1200	1300
Y units	1400	1600	1800	1500

Management policy is to hold in stock at the end of each month finished units equal to one half of the budgeted sales for the next month. Assume that this requirement will be met on 1st January.
Work in progress may be ignored.
Fixed production overhead is budgeted at $15000 per month. The budgeted selling and administration costs (all fixed) are $11000 per month.

You are required to:

(a) Prepare a production budget on a unit basis for each product in respect of each of the first months of next year;

(b) Convert this production budget into a variable production cost budget showing costs for each of the first three months by element of cost for each product and in total;

(c) Prepare a statement for the first quarter showing the budgeted results for each product and in total (monthly figures are not required and the selling and administration costs are not to be apportioned to the products.

Solution

(a)

	Product X			Product Y		
	January	February	March	January	February	March
Sales	900	1100	1200	1400	1600	1800
plus						
Closing stocks	550	600	650	800	900	750
	1450	1700	1850	2200	2500	2550
minus						
Opening stocks	450	550	600	700	800	900
Production required	1000	1150	1250	1500	1700	1650

(b)

	Product X			Product Y		
	January	February	March	January	February	March
Production required	1000	1150	1250	1500	1700	1650
Direct material	18000	20700	22500	22500	25500	24750
Direct labour	6000	6900	7500	6000	6800	6600
Variable production overhead	6000	6900	7500	7500	8500	8250
Total	30000	34500	37500	36000	40800	39600

(c)

	Product X	Product Y	Total
Sales revenue	160000	216000	376000
- Variable cost of sales	96000	115200	211200
Contribution	64000	100800	164800
- Production overhead			45000
- Selling overhead			33000
Net Profit			86800

Problem 36

The December 31, 2007, balance sheet and income statement for Myears Oil Co. are given here.

Balance Sheet

Cash	$ 100,00	Accounts payable	$ 500,00
Marketable securities	0	Notes payable	200,00
Accounts receivable	400,00	Taxes payable	
Inventory	500,00	Other accruals	
Prepaid expenses	50,00	Current liabilities	700
Current Assets	1050	Long-term debt	800,00
Gross plant and equipment	2 060,00	Preferred stock	
Less: Accumulated		Common stock	1 550,00
depreciation	-60,00	Capital contributed	
Net plant and equipment	2000	in excess of par	
Total assets	3050	Retained earnings	
		Total liabilities and stockholders' equity	3050

Income statement

Net sales	$ 1 000,00
Cost of goods sold	400,00
Gross profit	600
Selling expenses	
General and administrative expenses	300,00
Depreciation	60,00
Net operating income	240
Non operating income	66
Interest expense	6,00
Profit before taxes	300,00
Taxes	30,00
Net income	270

(a) Compute the specified ratios and compare them with the industry averages (better or worse).

Ratios	*MacMill*	*Better or Worse*	*Industry Average*
Current			2,5
Quick			1,1
Debt-equity			1,5
Times interest earned			12
Average collection period			30
Inventory turnover			2
Fixed-asset turnover			2
Operating profit margin			20,0%
Net profit margin			15,0%
Book return on assets			10,0%
Book return on equity			12,0%

(b) If you were appointed financial manager of the company, what decisions would you make based on your findings?

Solution

Current	1,50	Worse	2,5	current assets/current liabilities
Quick	0,71	Worse	1,1	(curr. assets - inv.- prep.exp.)/curr. liab.
Debt-equity	0,97	Better	1,5	(curr. liab. +LTdebt) /equity
Times interest earned	51,00	Better	12	(profit before taxes + interest)/interest
Average collection period	146,00	Worse	30	AR * 365 /sales
Inventory turnover	0,80	Worse	2	COGS : inventories
Fixed-asset turnover	0,50	Worse	2	sales/fixed assets
Operating profit margin	24,0%	Better	20,0%	net operating income/sales
Net profit margin	27,0%	Better	15,0%	net income/sales
Book return on assets	7,1%	Worse	10,0%	net operating income* (1-T)/assets
Book return on equity	17,4%	Better	12,0%	net operating income/sales

Problem 37

A small construction company undertakes a variety of jobs for its customers.

Budgeted data:

Labour hours for the year	20000
Machine hours for the year	10000
Number of jobs for the year	150

Budgeted Profit and Loss Statement for the year ending 31st December

	$	$
Sales		8000
Direct materials	500	
Direct wages	1000	
Prime cost (factory cost)	1500	
Fixed production overhead	3000	
Production cost	4500	
Selling, distribution and administration cost	2000	
		1500

An new enquiry has been received and the company has produced estimates of the factory cost involved and of the hours required to complete a new job.

	$
Direct materials	2
Direct wages	6
Prime cost (factory cost)	8
Labour hours required	100
Machine hours required	30

<u>You are required to</u>

1. Calculate overhead absorption rates:
   (a) direct material cost percentage rate
   (b) direct labour cost percentage rate
   (c) prime cost percentage rate
   (d) unit of output rate
   (e) direct labour hour rate
   (f) machine hour rate
2. Calculate total cost estimates for a new job using in turn each of the six absorption rates.
3. Comment briefly on the suitability of each method.

Solution

1.

(a) direct material cost percentage rate	6
(b) direct labour cost percentage rate	3
(c) prime cost percentage rate	2
(d) unit of output rate	20
(e) direct labour hour rate	0,15
(f) machine hour rate	0,3

2.

Cost estimates for a new job	Method					
	a	b	c	d	e	f
Direct materials	2	2	2	2	2	2
Direct wages	6	6	6	6	6	6
Prime cost (factory cost)	8	8	8	8	8	8
Fixed production overhead	12	18	16	20	15	9
Total cost	20	26	24	28	23	17

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

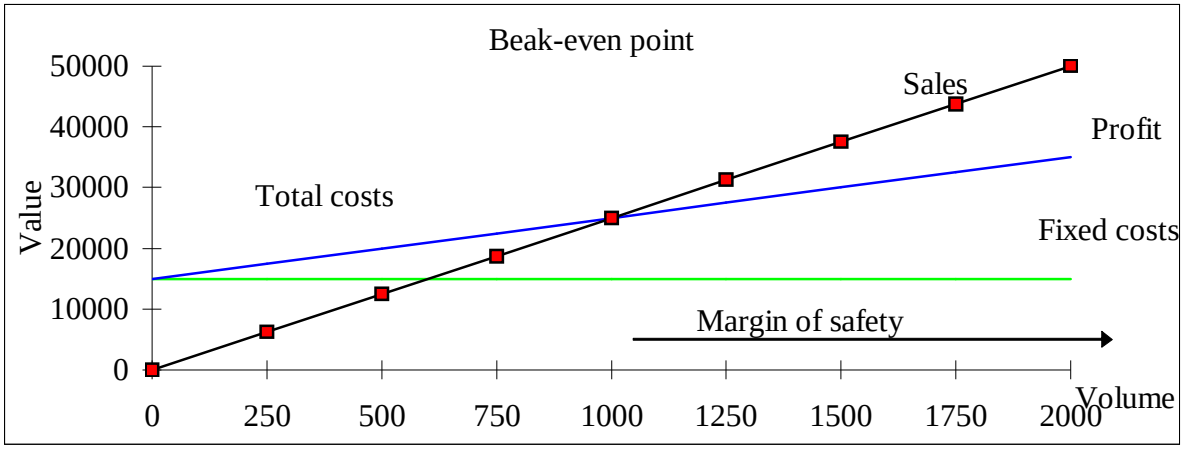
	Method	
	Total cost	Marginal cost
MARGINAL COST	10	10
Fixed cost	10	
TOTAL COST	20	
PROFIT / CONTRIBUTION	5	15
SELLING PRICE	25	25

(b)

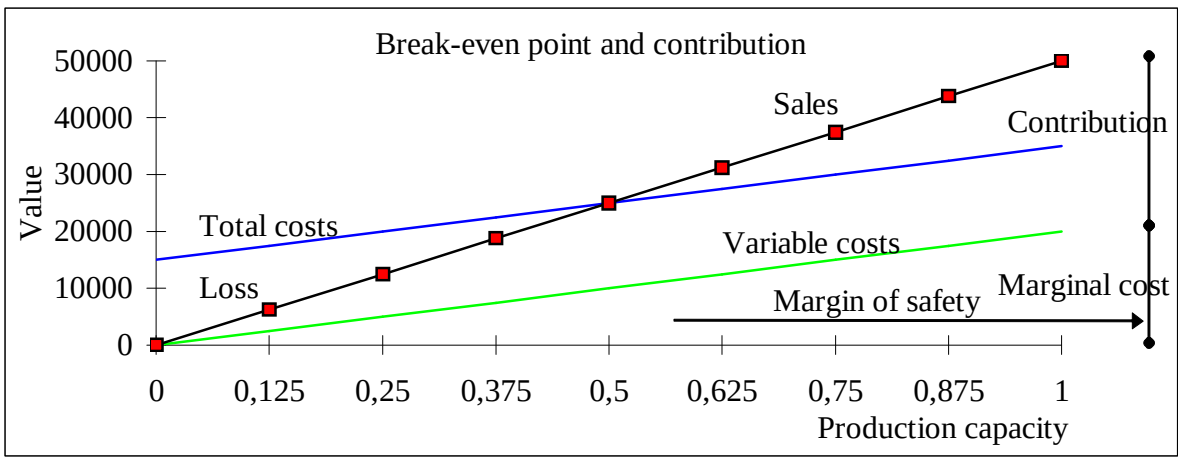
The break-even point (fixed costs : unit contribution) is 1000 units.

(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	$

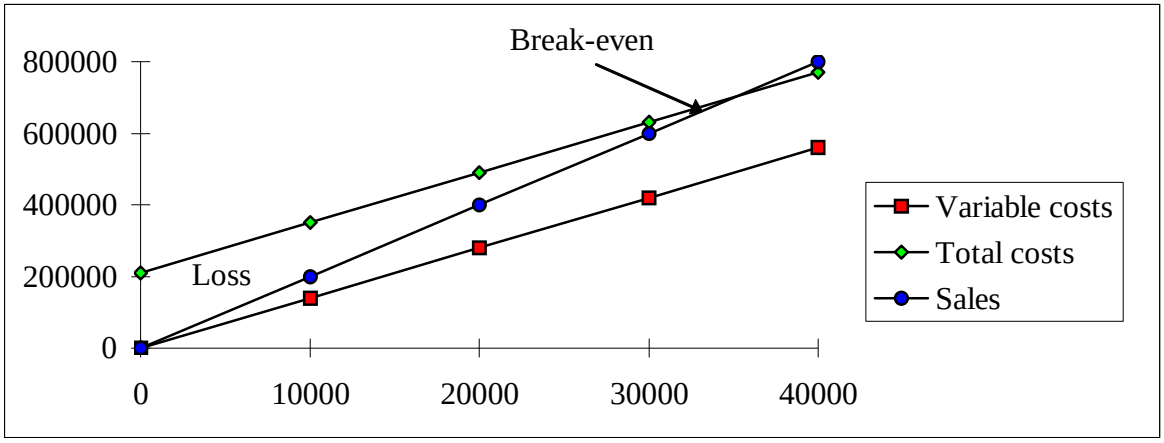
Fixed costs for the period are expected to be $210000.
The factory has the capacity to produce 40000 units.
(a) Calculate how many units must be sold in order to break-even during the period.
Express the information on a break-even chart.
(b) Ascertain the profit.
(c) Calculate the number of units to 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