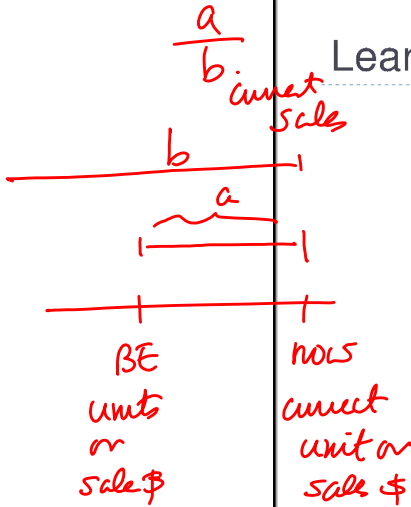


garrison

Learning Objective 4

Show the effects on contribution margin of changes in variable costs, fixed costs, selling price, and volume.



$P \times Q$ sales (i)
 ① $\$/unit \times Q$ VC (ii)
 ② $\%$ of sales $\frac{VC}{Sales}$ CM
 50% of sales
 $\frac{FC}{NI}$ (iii)
 $\frac{NI - BE/Sales}{NI}$
 ① margin of safety \Rightarrow
 calc — safe / danger
 — leverage operating
 (high operating leverage, if sales \downarrow , loss quickly)

The Variable Expense Ratio



The variable expense ratio is the ratio of variable expenses to sales. It can be computed by dividing the total variable expenses by the total sales, or in a single product analysis, it can be computed by dividing the variable expenses per unit by the unit selling price.

Racing Bicycle Company Contribution Income Statement For the Month of June			
	Total	Per Unit	CM Ratio
Sales (500 bicycles) <i>Q</i>	\$ 250,000	\$ 500 <i>P</i>	100%
Less: Variable expenses	150,000	300	60%
Contribution margin	100,000	\$ 200	40%
Less: Fixed expenses	80,000		
Net operating income	\$ 20,000		

Changes in Fixed Costs and Sales Volume



What is the "profit impact" if Racing Bicycle can increase unit sales from 500 to 540 by increasing the monthly advertising budget by \$10,000?



sales & ↑

↑ \$10,000

FC
VC

Changes in Fixed Costs and Sales Volume



\$80,000 + \$10,000 advertising = \$90,000

	500 units	540 units
Sales	\$ 250,000	\$ 270,000
Less: Variable expenses	150,000	162,000
Contribution margin	100,000	108,000
Less: Fixed expenses	80,000	90,000
Net operating income	\$ 20,000	\$ 18,000

Sales **increased** by \$20,000, but net operating income **decreased** by \$2,000.

Changes in Fixed Costs and Sales Volume

A shortcut solution using "incremental" *cf relevant analysis* analysis

Increase in <u>CM</u> (40 units X \$200)	\$ 8,000	<i>addl cm</i>
Increase in advertising expenses	10,000	
Decrease in net operating income	<u>\$ (2,000)</u>	



Change in Variable Costs and Sales Volume

What is the "profit impact" if Racing Bicycle can use higher quality raw *vc* *↑vc* "materials"; thus increasing variable costs *vc* per unit by \$10, to generate an increase in unit sales from 500 to 580?



Change in Variable Costs and Sales Volume



$$580 \text{ units} \times \$310 \text{ variable cost/unit} = \$179,800$$

	500 units	580 units
Sales	\$ 250,000	\$ 290,000
Less: Variable expenses	150,000	179,800
Contribution margin	100,000	110,200
Less: Fixed expenses	80,000	80,000
Net operating income	\$ 20,000	\$ 30,200

* Sales **increase** by \$40,000, and net operating income **increases** by \$10,200.

if advise

conclusion

Change in Fixed Cost, Sales Price and Volume



P What is the profit impact if RBC: (1) cuts its selling price by \$20 per unit, (2) increases its "advertising budget" by \$15,000 per month, and (3) increases sales from 500 to 650 units per month? Q ↑



Change in Fixed Cost, Sales Price and Volume



$$650 \text{ units} \times \$480 = \$312,000$$

	500 units	650 units	
Sales	\$ 250,000	\$ 312,000	✓ P Q
Less: Variable expenses	150,000	195,000	
Contribution margin	100,000	117,000	
Less: Fixed expenses	80,000	95,000	✓
Net operating income	\$ 20,000	\$ 22,000	✓

Sales **increase** by \$62,000, fixed costs increase by \$15,000, and net operating income **increases** by \$2,000.

Change in Variable Cost, Fixed Cost and Sales Volume



What is the "profit impact" if RBC: (1) pays a \$15 sales commission per bike sold instead of paying salespersons flat salaries ^{FC} that currently total \$6,000 per month, and (2) increases unit sales from 500 to 575 bikes?

↑ VC
↓ FC



industry

① profit ↑

② CM Δ

⇒ BE Δ

- if BE ↓
2nd food news

- if BE ↑

- but talk about operating leverage

margin of safety (op leverage ↓)
(FC ↓)

ni not fluctuate as much as before when sales ↑↓

- but might push high price low margin products

- sales people hard to find
- profit based commission

POA
highest cost

↓ \$6000

agency problem ↓
interest ↑ - employee & firm aligned

Change in Variable Cost, Fixed Cost and Sales Volume

575 units × \$315 = \$181,125

	500 units	575 units
Sales	\$ 250,000	\$ 287,500
Less: Variable expenses	150,000	181,125
Contribution margin	100,000	106,375
Less: Fixed expenses	80,000	74,000
Net operating income	\$ 20,000	\$ 32,375

Sales increase by \$37,500, fixed expenses decrease by \$6,000. Net operating income increases by \$12,375.

Change in Regular Sales Price

If RBC has an opportunity to sell 150 bikes to a wholesaler without disturbing sales to other customers or fixed expenses, what price would it quote to the wholesaler if it wants to increase monthly profits by \$3,000?



relevant costs - minimize

price to charge

\$450
↑
lower
RBC
↓
\$500 price



no reselling,

relevant cost

② ul excess capacity
 machine free (idle)
 ① employee /
 FC
 not relevant
 (assume
 excess capacity)

③ truck not full
 ④ computer / data file ul excess capacity

Change in Regular Sales Price



$\$ 3,000 \div 150 \text{ bikes} = \$ 20 \text{ per bike}$
 Variable cost per bike = 300 per bike
 Selling price required = $\$ 320 \text{ per bike}$

how much profit to make per bike

versus relevant cost example
 - glass
 - minimum price to charge

$150 \text{ bikes} \times \$320 \text{ per bike} = \$ 48,000$
 Total variable costs = $45,000$
 Increase in net operating income = $\$ 3,000$

quote

special⁴
 FC - VC per glass
 avoidable - + FC