

Cost Behavior and Cost Estimation

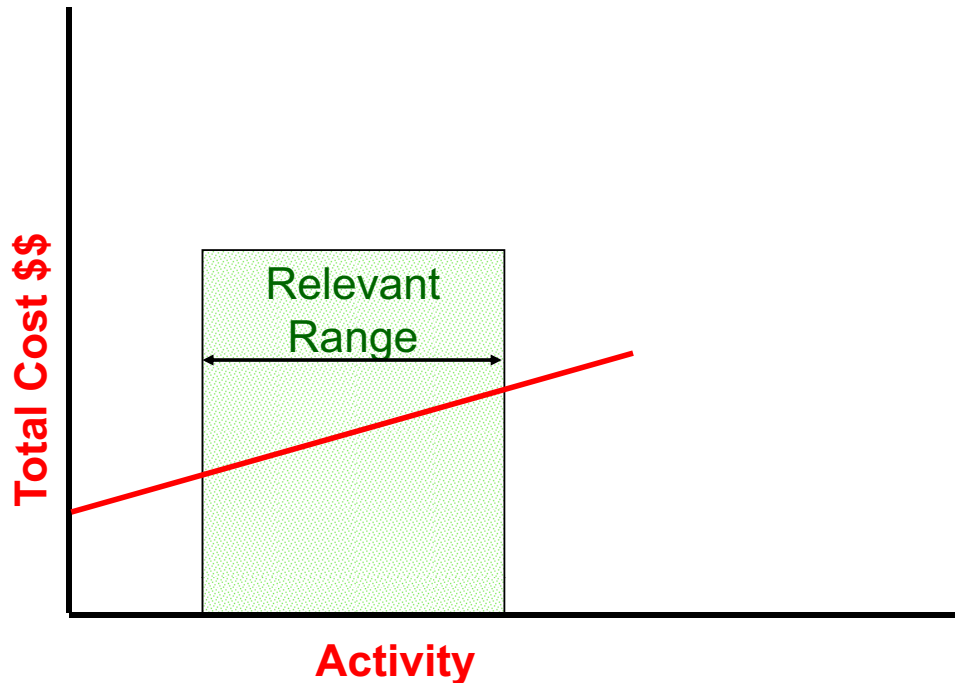
1

Types of Cost Behavior Patterns

Summary of VC and FC Behavior		
Cost	In Total	Per Unit
VC	Total VC is proportional to the activity level within the RR.	VC per unit remains the same over wide ranges of activity.
FC	Total FC remains the same even when the activity level changes within the RR.	FC per unit goes down as activity level goes up.

2

The Linearity Assumption and the Relevant Range



13

Prepare an Income Statement Using the CM Format

	Total	Unit
Revenue	\$ 100,000	\$ 50
Less: VC	60,000	30
CM	\$ 40,000	\$ 20
Less: FC	30,000	
Net Income	<u>\$ 10,000</u>	

The CM format emphasizes cost behavior. CM covers FCs and provides for Net Income.

14

Uses of the Contribution (CM) Format

The CM income statement format is used as an internal planning and decision making tool. Uses of this approach include:

1. CVP analysis
2. Budgeting
3. Segmented reporting of profit data
4. Special decisions such as pricing and make-or-buy analysis

15

Contribution (CM) Format

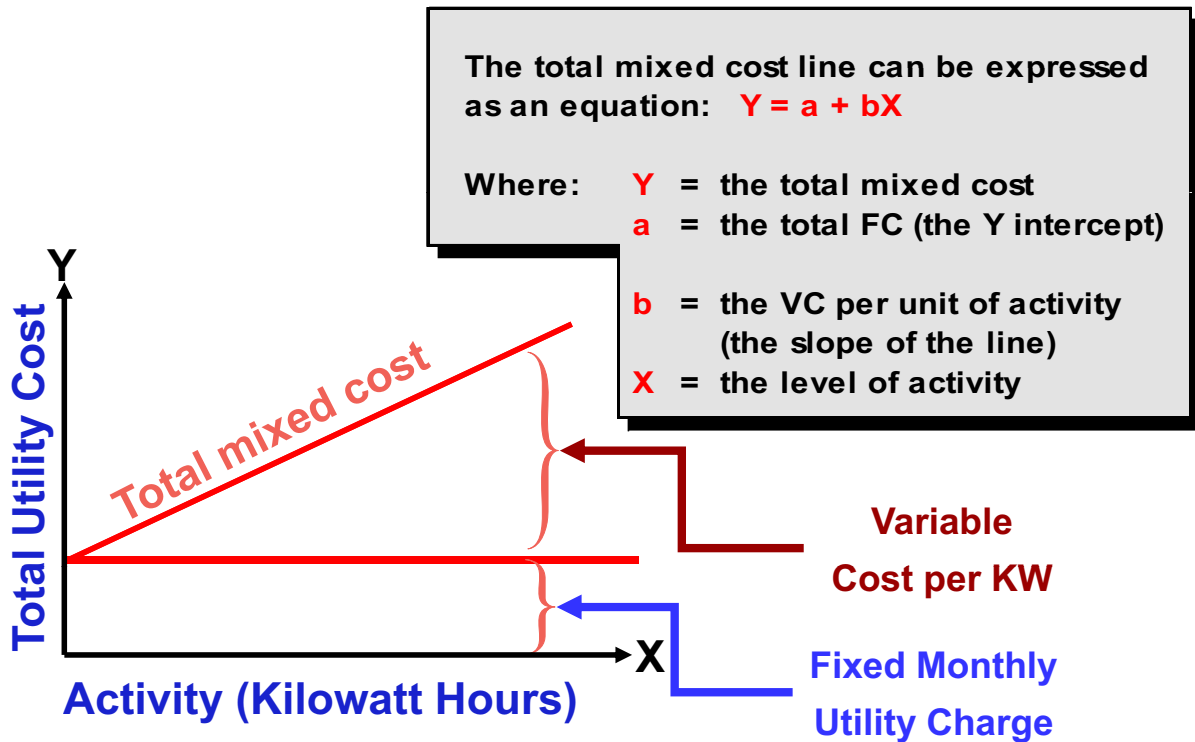
Comparison of the Contribution Income Statement with the Traditional Income Statement			
Traditional Approach (costs organized by function)		Contribution Approach (costs organized by behavior)	
Sales	\$ 100,000	Sales	\$ 100,000
Less CGS (product)	70,000	Less VC	60,000
Gross margin	\$ 30,000	Contribution margin	\$ 40,000
Less S&A (period)	20,000	Less FC	30,000
Net operating income	\$ 10,000	Net operating income	\$ 10,000

Used primarily for
external reporting.

Used primarily by
management.

16

Mixed Costs



17

Mixed Costs Example

If your fixed monthly utility charge is \$40, your VC is \$0.03 per kwh, and your monthly activity level is 2,000 kwh, what is the amount of your utility bill?

$$Y = a + bX$$

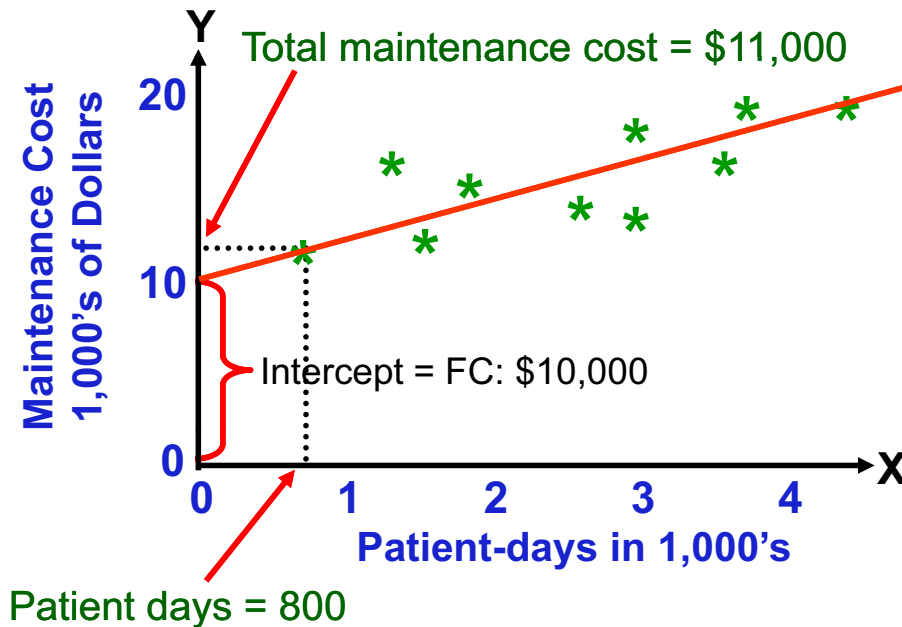
$$Y = \$40 + (\$0.03 \times 2,000)$$

$$Y = \$100$$

18

Scattergraph Method

Use one data point to estimate the total level of activity and the total cost.



19

Scattergraph Method

Make a quick estimate of VC per unit and determine the cost equation.

Total maintenance at 800 patients	\$ 11,000
Less: Fixed cost	10,000
Estimated total variable cost for 800 patients	<u>\$ 1,000</u>

$$\text{VC per unit} = \frac{\$1,000}{800} = \$1.25/\text{patient-day}$$

$$Y = \$10,000 + \$1.25X$$

Total maintenance cost

Number of patient days

20

High-Low Method

	A	B	C	D	E	F	G
1							
2		Month	Hours of Maintenance			Total Maintenance Cost	
3		January	625		\$	7,950	
4		February	500			7,400	
5		March	700			8,275	
6		April	550			7,625	
7		May	775			9,100	
8		June	800			9,800	
9		High Level	800		\$	9,800	
10		Low Level	500			7,400	
11		Change	300		\$	2,400	
12							

The VC per hour of maintenance is equal to the change in cost divided by the change in hours.

$$\frac{\$2,400}{300} = \$8.00/\text{hour}$$

21

High-Low Method

	A	B	C	D	E	F	G
1							
2		Month	Hours of Maintenance			Total Maintenance Cost	
9		High Level	800		\$	9,800	
10		Low Level	500			7,400	
11		Change	300		\$	2,400	
12							

Total FC = Total Cost – Total VC

Total FC = \$9,800 – (\$8/hour × 800 hours)

Total FC = \$9,800 – \$6,400

Total FC = **\$3,400**

22

High-Low Method

	A	B	C	D	E	F	G
1							
2		Month	Hours of Maintenance			Total Maintenance Cost	
9		High Level	800			\$ 9,800	
10		Low Level	500			7,400	
11		Change	300			\$ 2,400	
12							

The Cost Equation for Maintenance

$$Y = \$3,400 + \$8.00X$$

23

Regression Method

A method used to analyze mixed costs if a scattergraph plot reveals an approximately linear relationship between the X and Y variables.

This method uses *all* of the data points to estimate the fixed and variable cost components of a mixed cost.

10784.36
529
2.710372

The goal of this method is to fit a straight line to the data that *minimizes the sum of the squared errors*.

24

Regression Method

- Software can be used to fit a regression line through the data points.
- The cost analysis objective is the same: $Y = a + bX$

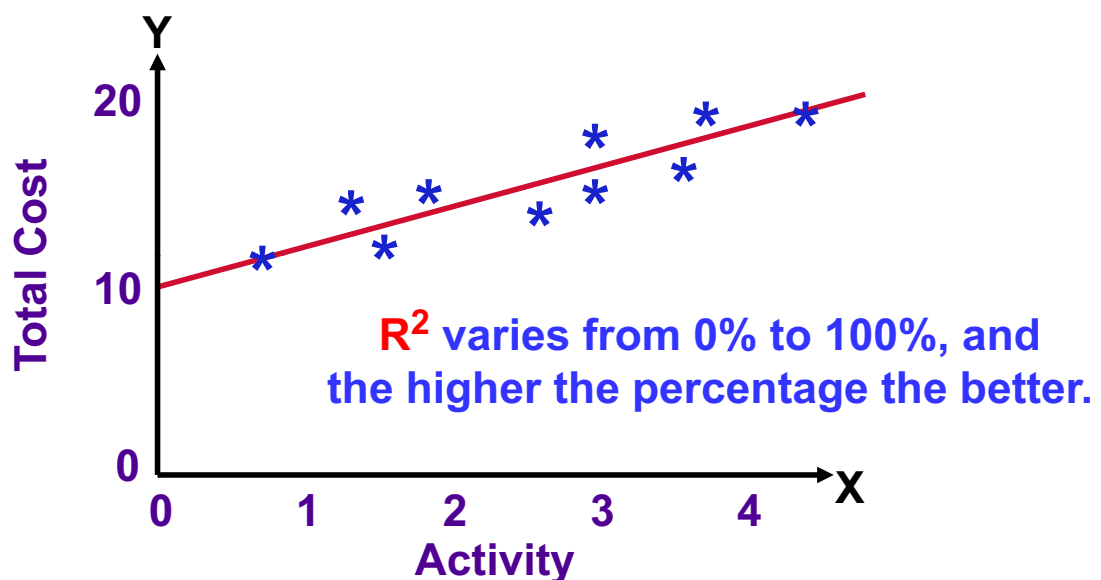


Regression also provides a statistic, called the R^2 , which is a measure of the goodness of fit of the regression line to the data points.

25

Regression Method

R^2 is the percentage of the variation in total cost explained by the activity.



26