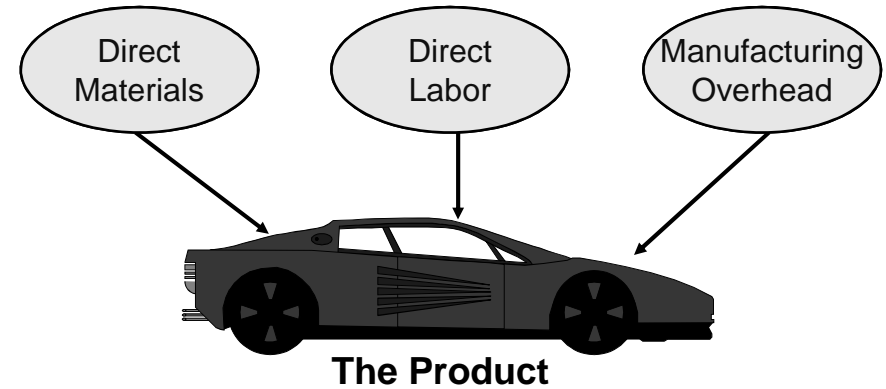


Managerial Accounting and Cost Concepts

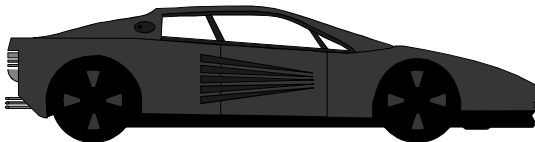
Chapter 2

Classifications of Manufacturing Costs



Direct Materials

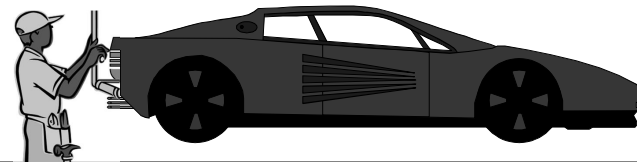
Raw materials that become an integral part of the product and that can be conveniently traced directly to it.



Example: A radio installed in an automobile

Direct Labor

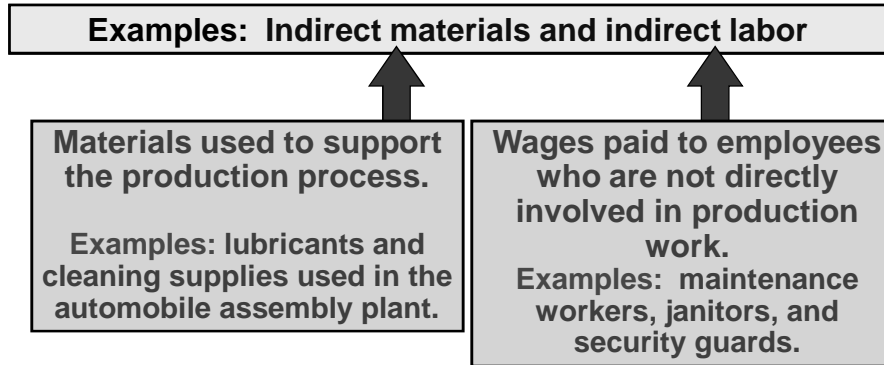
Those labor costs that can be easily traced to individual units of product.



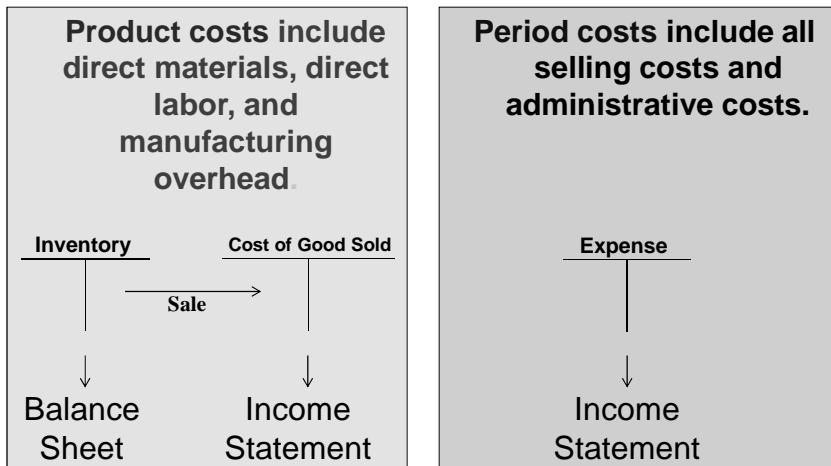
Example: Wages paid to automobile assembly workers

Manufacturing Overhead

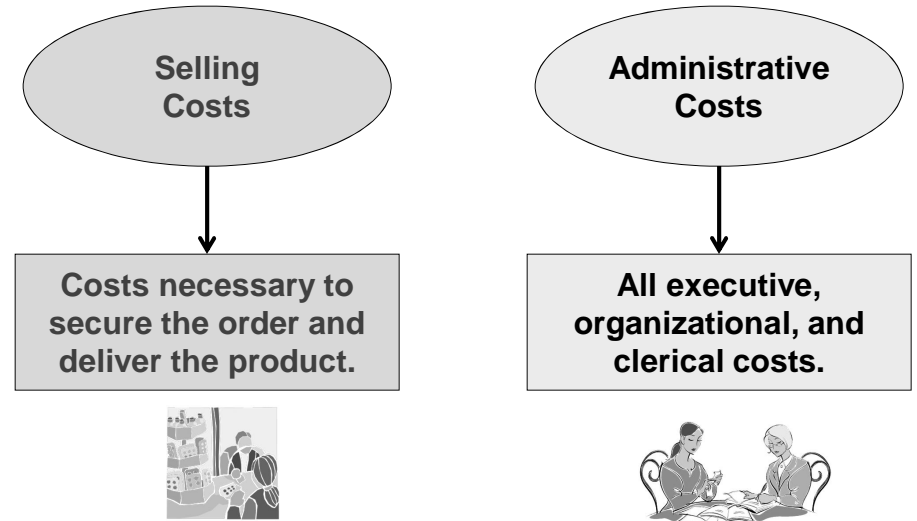
Manufacturing costs that cannot be easily traced directly to specific units produced.



Product Costs Versus Period Costs

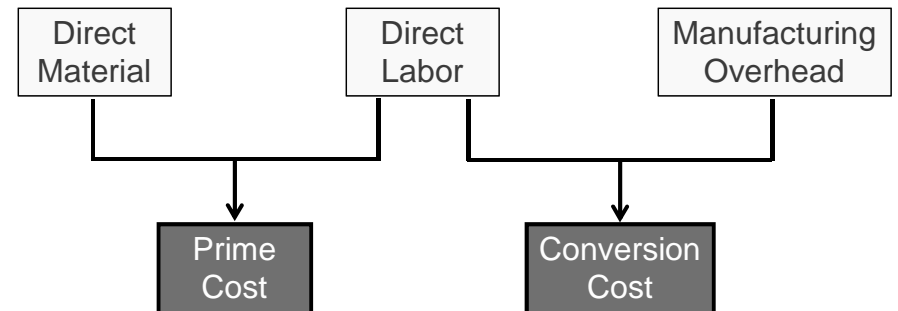


Nonmanufacturing Costs



Classifications of Costs

Manufacturing costs are often classified as follows:



Cost Classifications for Predicting Cost Behavior

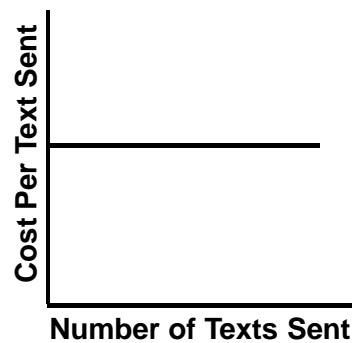


Cost behavior refers to how a cost will react to changes in the level of activity. The most common classifications are:

- Variable costs.
- Fixed costs
- Mixed costs.

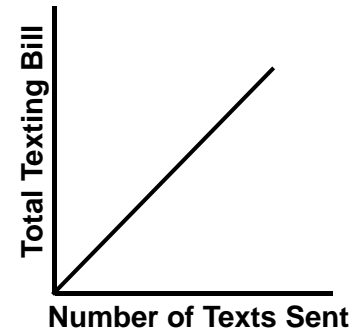
Variable Cost Per Unit

The **cost per text** sent is constant at 5 cents per text message.

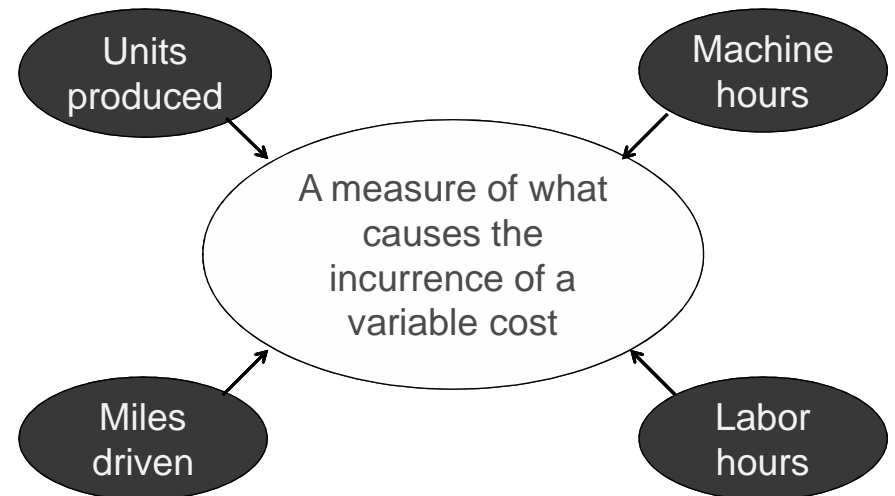


Variable Cost

Your **total texting bill** is based on how many texts you send.

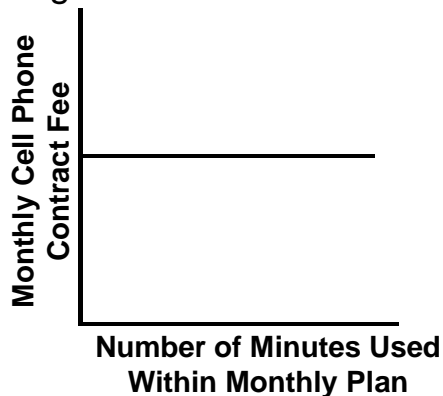


The Activity Base (Cost Driver)



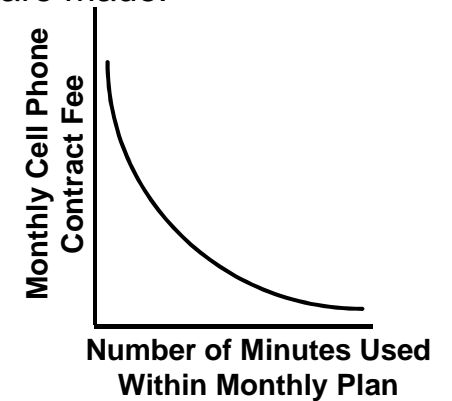
Fixed Cost

Your monthly contract fee for your cell phone is fixed for the number of monthly minutes in your contract. The monthly contract fee does not change based on the number of calls you make.

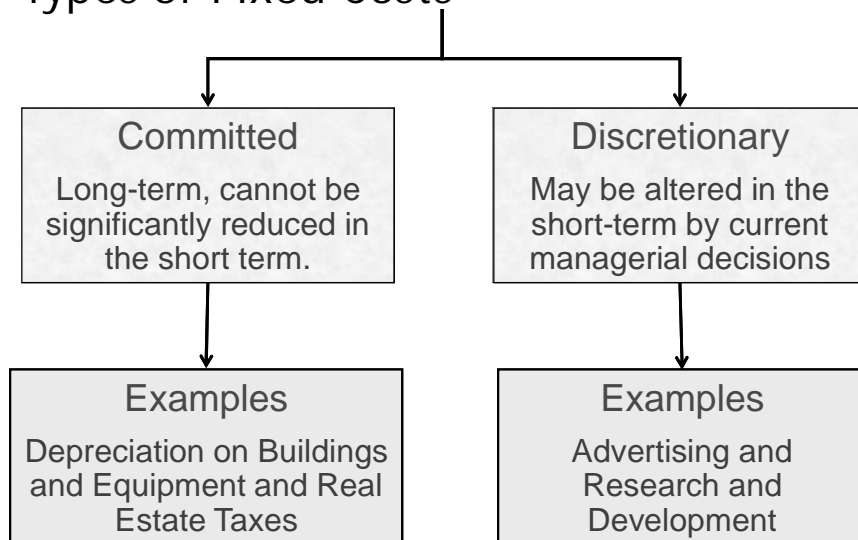


Fixed Cost Per Unit

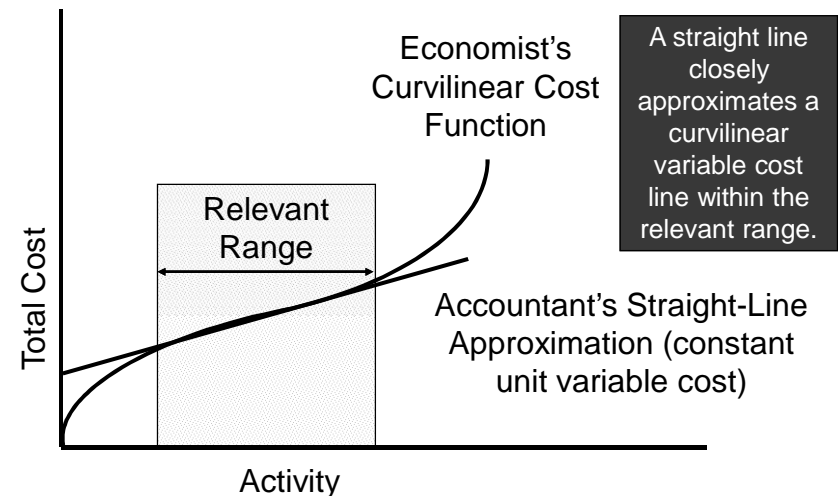
Within the monthly contract allotment, the average fixed cost **per cell phone call made** decreases as more calls are made.



Types of Fixed Costs



The Linearity Assumption and the Relevant Range



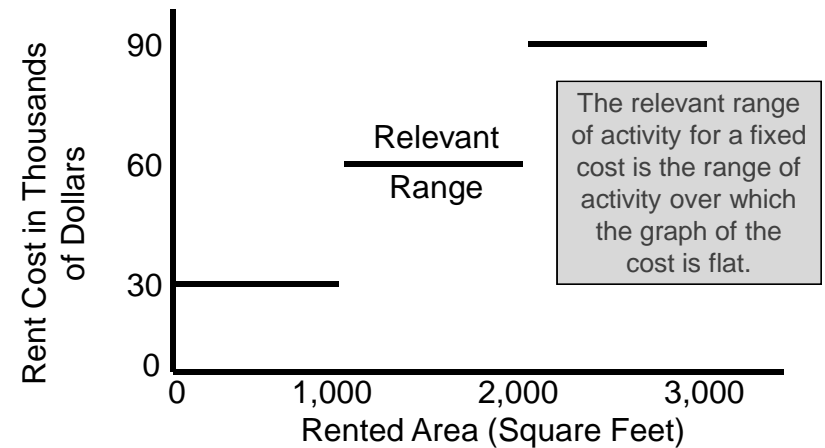
Fixed Costs and the Relevant Range

For example, assume office space is available at a rental rate of \$30,000 per year in increments of 1,000 square feet.

Fixed costs would increase in a step fashion at a rate of \$30,000 for each additional 1,000 square feet.



Fixed Costs and the Relevant Range

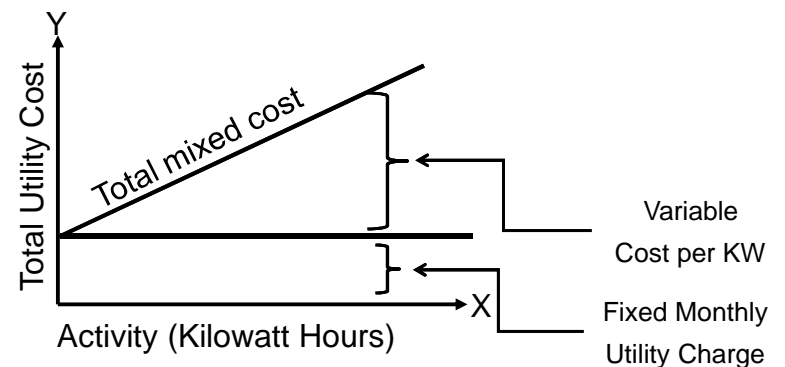


Cost Classifications for Predicting Cost Behavior

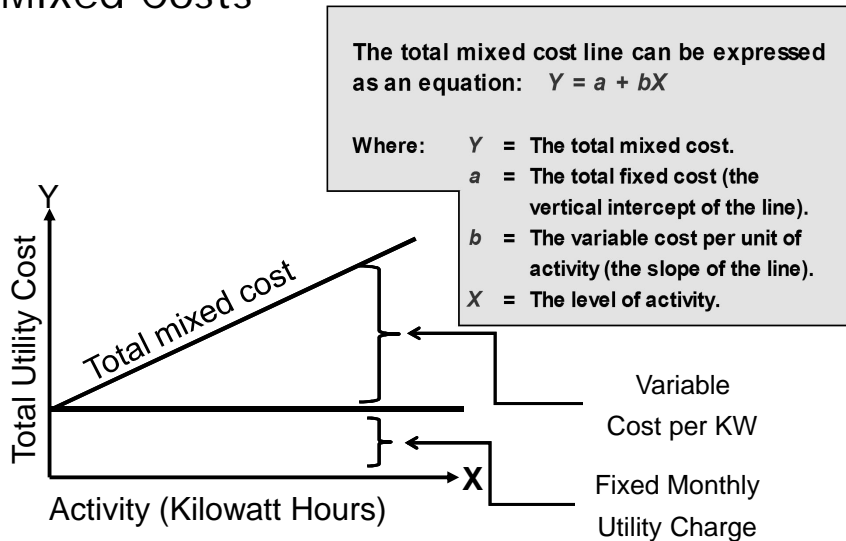
Behavior of Cost (within the relevant range)		
Cost	In Total	Per Unit
Variable	Total variable cost increase and decrease in proportion to changes in the activity level.	Variable cost per unit remains constant.
Fixed	Total fixed cost is not affected by changes in the activity level within the relevant range.	Fixed cost per unit decreases as the activity level rises and increases as the activity level falls.

Mixed Costs (also called semivariable costs)

A mixed cost contains both variable and fixed elements. Consider the example of utility cost.



Mixed Costs



Analysis of Mixed Costs

Account Analysis and the Engineering Approach



In **account analysis**, each account is classified as either variable or fixed based on the analyst's knowledge of how the account behaves.



The **engineering approach** classifies costs based upon an industrial engineer's evaluation of production methods, and material, labor, and overhead requirements.

Mixed Costs - An Example

If your fixed monthly utility charge is \$40, your variable cost is \$0.03 per kilowatt hour, and your monthly activity level is 2,000 kilowatt hours, what is the amount of your utility bill?

$$Y = a + bX$$

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

$$Y = \mathbf{\$100}$$

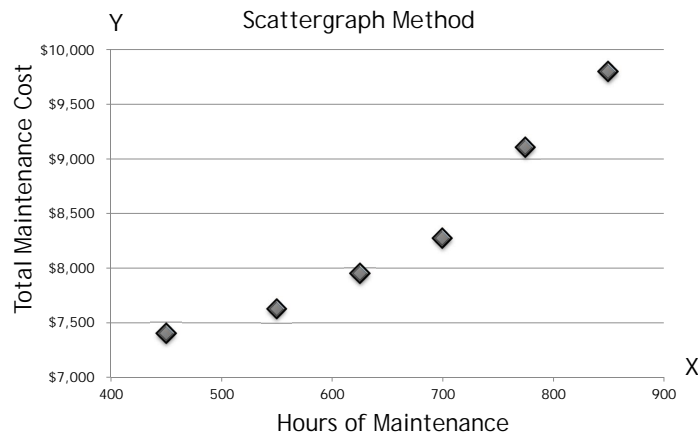
Scattergraph Plots - An Example

Assume the following hours of maintenance work and the total maintenance costs for six months.

High Low Method.xlsx							
	A	B	C	D	E	F	G
		Month		Hours of Maintenance		Total Maintenance Cost	
1							
2		January		625	\$	7,950	
3		February		450		7,400	
4		March		700		8,275	
5		April		550		7,625	
6		May		775		9,100	
7		June		850		9,800	

The Scattergraph Method

Plot the data points on a graph
(Total Cost **Y** vs. Activity **X**).



The High-Low Method - An Example

	A	B	C	D	E	F	G
1		Month		Hours of Maintenance		Total Maintenance Cost	
8		High		850		\$ 9,800	
9		Low		450		7,400	
10		Change		400		\$ 2,400	
11							

Total Fixed Cost = Total Cost – Total Variable Cost

Total Fixed Cost = \$9,800 – (\$6/hour × 850 hours)

Total Fixed Cost = \$9,800 – \$5,100

Total Fixed Cost = \$4,700

The High-Low Method - An Example

	A	B	C	D	E	F	G
1		Month		Hours of Maintenance		Total Maintenance Cost	
2		January		625		\$ 7,950	
3		February		450		7,400	
4		March		700		8,275	
5		April		550		7,625	
6		May		775		9,100	
7		June		850		9,800	
8		High		850		\$ 9,800	
9		Low		450		7,400	
10		Change		400		\$ 2,400	
11							

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

$$\frac{\$2,400}{400} = \$6.00/\text{hour}$$

The High-Low Method - An Example

	A	B	C	D	E	F	G
1		Month		Hours of Maintenance		Total Maintenance Cost	
8		High		850		\$ 9,800	
9		Low		450		7,400	
10		Change		400		\$ 2,400	
11							

The Cost Equation for Maintenance

$$Y = \$4,700 + \$6.00X$$

Least-Squares 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.

$$\frac{10784.36}{5} = \frac{2156.872}{1}$$

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

Least-Squares Regression Method

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



Least-squares 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.

Comparing Results From the Two Methods

The two methods just discussed provide different estimates of the fixed and variable cost components of a mixed cost.

This is to be expected because each method uses differing amounts of the data points to provide estimates.

Least-squares regression provides the most accurate estimate because it uses all the data points.

The Traditional and Contribution Formats

Comparison of the Contribution Income Statement with the Traditional Income Statement			
Traditional Format		Contribution Format	
Sales	\$ 100,000	Sales	\$ 100,000
Cost of goods sold	70,000	Variable expenses	60,000
Gross margin	\$ 30,000	Contribution margin	\$ 40,000
Selling & admin. expense:	20,000	Fixed expenses	30,000
Net operating income	\$ 10,000	Net operating income	\$ 10,000

Used primarily for external reporting.

Used primarily by management.

Uses of the Contribution Format

The contribution income statement format is used as an internal planning and decision-making tool.

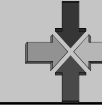
We will use this approach for:

1. Cost-volume-profit analysis (Chapter 5).
2. Budgeting (Chapter 8).
3. Segmented reporting of profit data (Chapter 6).
4. Special decisions such as pricing and make-or-buy analysis (Chapter 12).

Assigning Costs to Cost Objects

Direct costs

- **Costs that can be easily and conveniently traced to a unit of product or other cost object.**
- **Examples: direct material and direct labor**



Indirect costs

- **Costs that cannot be easily and conveniently traced to a unit of product or other cost object.**
- **Example: manufacturing overhead**



Cost Classifications for Decision Making

- Every decision involves a choice between at least two alternatives.
- Only those costs and benefits that differ between alternatives are relevant in a decision. All other costs and benefits can and should be ignored as irrelevant.



Differential Cost and Revenue

Costs and revenues that differ among alternatives.

Example: You have a job paying \$1,500 per month in your hometown. You have a job offer in a neighboring city that pays \$2,000 per month. The commuting cost to the city is \$300 per month.

Differential revenue is:
 $\$2,000 - \$1,500 = \$500$

Differential cost is:
 $\$300$

Opportunity Cost

The potential benefit that is given up when one alternative is selected over another.

Example: If you were not attending college, you could be earning \$15,000 per year. Your opportunity cost of attending college for one year is \$15,000.



Sunk Costs

Sunk costs have already been incurred and cannot be changed now or in the future. These costs should be ignored when making decisions.

Example: Suppose you had purchased gold for \$400 an ounce, but now it is selling for \$250 an ounce. Should you wait for the gold to reach \$400 an ounce before selling it? You may say, "Yes" even though the \$400 purchase is a sunk cost.

Summary of the Types of Cost Classifications

Financial Reporting

Predicting Cost Behavior

Assigning Costs to Cost Objects

Making Business Decisions