

## Chapter 5

---

---

# Revenue & Cost Analysis

### 1. General

- ❑ Cost data are subject to great misunderstanding than are value data. The main reason: although the various categories of costs have precise meaning to the accountant, these categories often do not lend themselves to efficient cash-flow-based decision.
- ❑ Accounting interpretations can vary by a significant degree from company to company.
- ❑ *Principles of Accounting*
  - ❖ It involves the process providing quantitative information, primarily financial in nature, for use in the decision-making process - it the *language of business*.
  - ❖ The rules and conventions of accounting are commonly referred to as "principles," which means "a *general law or rule* adopted or professed as a *guide* to action; a settled ground or basis of conduct or practice."
  - ❖ Accounting principles do not prescribe exactly how each event occurring in an organization should be recorded. Consequently, there are many matters in accounting practice that differ from one organization to another because a single detailed set of rules could not conceivably apply to every organization. As a result, the accountants have considerable latitude within "generally accepted accounting principles" in which to express their own ideas as to the best way of recording and reporting a specific event.
  - ❖ The general acceptance of an accounting principle or practice usually depends on how well it meets three criteria:
    - Relevance: it should result in information that is meaningful and useful to those who need to know something about a certain organization.
    - Objectivity: the information is not influenced by the personal bias or judgment of those who furnish it. It connotes reliability, trustworthiness, and verifiability.
    - Feasibility: it can be implemented without undue complexity or cost.

### 2. Revenue And Cost

- ❑ Basic elements are involved in cost analysis:
  - Revenues - generated from sales, assuming the company may sell any quantity at market price
  - Cost - there are many ways to classify cost, and it may vary from company to company. Basically, they can be classified into *Production Cost* and *Capital Cost*

*Production Cost* can be further grouped as follows:

- ❖ Operating Cost - all expenses at the plant site
  - A. Direct Production Costs - (Variable Cost) those items such as labor, materials, and supplies, which are consumed directly in the production process and which are used roughly in direct proportion to the level of production. (At zero volume, total variable costs are zero and are assumed to rise in a linear fashion as volume increases.)
  - B. Indirect Production Costs – (Fixed cost) expenditures which are independent of the level of production (at least over certain range) regardless of the volume of sales or level of output
  - C. Contingencies –
  - D. Distribution costs - (Semivariable costs) Some managers consider it as a third category: advertising expense, since it tends to vary according to volume. At the same time, such costs are a matter of managerial policy.

**Note:** with the possible exception of some industrial minerals, distribution costs would not be sufficiently large to justify a separate heading and would be combined with the other operating costs categories

❖ General Expenses - off-site management or corporate-level expenditures

- A. Marketing (Sales) expense
- B. Administrative Expenses

*Capital Costs* - Expenditures made to acquire or develop capital assets, the benefit of which will be derived over several years.

- ❖ Depreciable investment: investment in a capital asset which is allocated over the useful life of the asset according to some formula acceptable to the tax authorities. All types of mining machinery and equipment fall in this category.
- ❖ Expansible investment: expenditures can, at the taxpayer's option, be either charged of against revenue immediately, or capitalized and amortized over some reasonable period. For example, mine development where the amortization option can be exercised by charging off such development at the same rate as the ore mined.
- ❖ Nondeductible investment: capital expenditures which cannot be deducted for tax purposes. Examples: successful exploration and property acquisition, and working capital.

### 3. Other Cost Concepts

- Cash vs. Noncash Costs*: Cash costs are those which represent actual monetary outlays. Noncash costs do not directly represent such outlays but are permissible deductions from revenue, the sole impact of which is to reduce the income tax liability (depreciation and depletion).
- Sunk Cost*: An expenditure that has already been made. It is the difference between the amount an asset is worth today and the worth shown by depreciation records, and only happens when the book value exceeds the present realizable value. It arises from over-estimation of the salvage value or economic life. They are irrelevant to a capital investment decision which must weigh only future benefits against future costs (They are the result of past expenditures and policies).
- Marginal Costs and Benefits* : Costs and benefits that are relevant to an investment decision. (for example: allocated corporate overhead is not, because they would be incurred regardless of whether or not the new project is accepted).
- Cost of Capital*: Which is different from *Capital Cost*, is used to refer to the cost of raising funds for capital investment. It is expressed as a percent and is usually determined by combining the costs of specific sources of capital (debt and equity) into a single value based upon the firm's relative used of the various sources.
- Opportunity Cost*: Refers to the yield or rate of return foregone on the most profitable investment opportunity rejected by a firm. They are experienced when capital rationing constraints are imposed in the capital budgeting process.

### 4. Inventory Control

- Inventory costs money. For example: Approximately 34% of the Bendix Corporation's assets were in inventories. Although exact figures are difficult to obtain, they are in the hundreds of millions, if not billions.
- Managers are usually face two related inventory problems:

1. What quantity should be purchased when an order is placed? i.e. What is the most economical quantity to order?
2. when should an order be placed (reorder point) in relation to existing inventory levels?

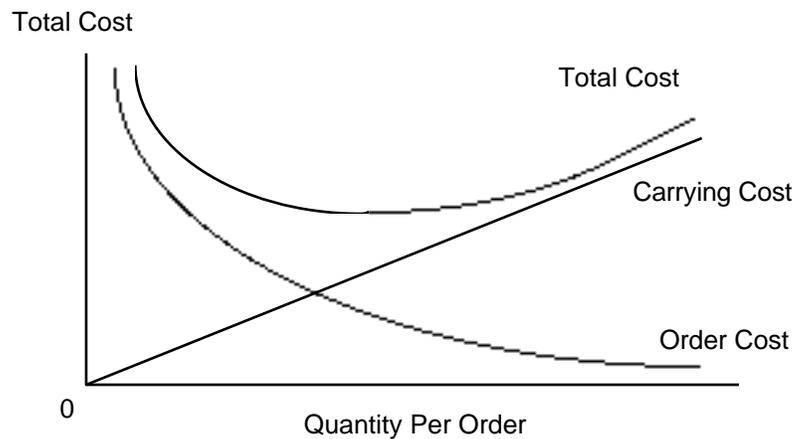
☐ **Inventory Costs**

*Unit cost* : purchase price per unit.

*carrying costs*: Incurred to maintain inventories and include such items as interest, taxes, obsolescence, deterioration, shrinkage, insurance, storage, handling, and depreciation. Total inventory carrying costs may range from 10 to 50% per year with 15 to 25% being average.

*Order costs*: Include all costs from the selection of vendors to the final paper work. For example, preparing requisitions; analyzing and selecting vendors; writing purchasing orders; following up on orders; receiving, inspecting, and storing materials; and keeping proper inventory records and completing the final paper work.

$$\text{Total costs} = \text{Unit costs} + \text{Carrying costs} + \text{Order costs}$$



☐ **Economic Order Quantity (EOQ)**

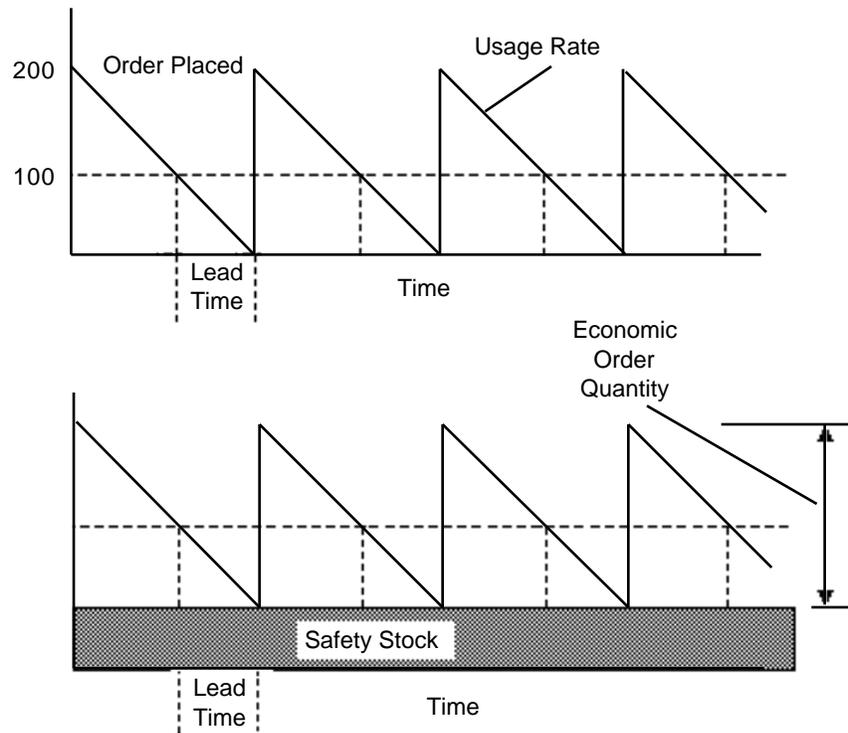
The size of order that minimize the addition of total annual ordering costs and inventory carrying costs.

☐ **Tabular solution**

For example:

Unit cost = \$1.00/ea; Annual usage: 2,500 units; Order cost = \$5.00/ea; Carrying cost: 10% or 10¢/unit

Orders/yr	Order Size	Ave. Inv.	Carrying Cost	Order Cost	Total Cost
1 . . . . .	2,500	1,250	\$125.00	\$ 5.00	\$130.00
2 . . . . .	1,250	625	\$ 62.50	\$10.00	\$ 72.50
3 . . . . .	853	416	\$ 41.60	\$15.00	\$ 56.60
4 . . . . .	625	312	\$ 31.20	\$20.00	\$ 51.20
5 . . . . .	500	250	\$ 25.00	\$25.00	\$ 50.00
6 . . . . .	416	208	\$ 20.80	\$30.00	\$ 50.80
7 . . . . .	357	178	\$ 17.80	\$35.00	\$ 52.80



□ Using formula:

$$EOQ = \frac{2RS}{C}$$

Where R = annual requirement in units  
 S = order cost per order  
 C = inventory carrying cost / unit / year

Example: R = 2,500; S = \$5; and C = 0.10;

$$EOQ = \frac{2 \times 2500 \times 5}{0.1} = 500 \text{ units}$$

□ Reorder points

- \* constant usage and lead time ( no safety stock )
- \* constant usage and lead time
- \* stock-outs

## 5. Profit Equation/Break-Even Point (BEP)

□ The basic relationship can be stated as:

$$\text{Profit (P)} = \text{Total Rev. (TP)} - \text{Total Variable Cost (TVC)} - \text{Total Fixed Cost (TFC)}$$

□ It shows that total revenue from sales must be greater than the combined total variable and fixed costs before a profit is realized.

☐ Variable costs

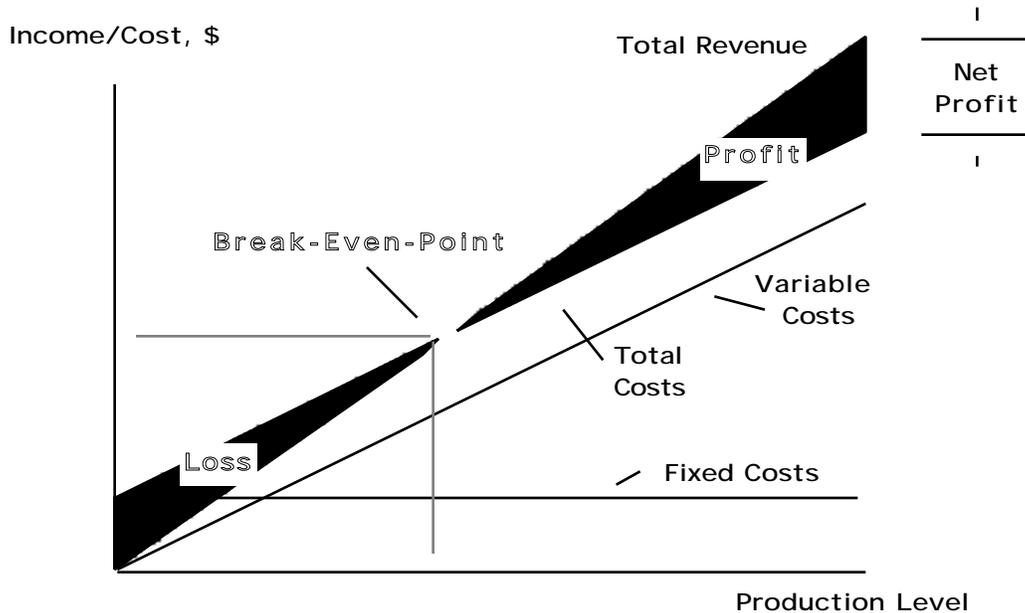
- ❖ Variable costs are always considered directly proportionate to sales. In other words, they represent a constant percentage of sales.

$$VC, \% = \frac{\text{Total Variable Cost}}{\text{Total Revenue}}$$

- ❖ They could also mean (1) the number of hours of operation necessary for a proposed investment to become profitable; (2) the required life of a project to pay for itself; and (3) the investment justified by a prospective cost savings.

☐ Break-Even Analysis - Break-even chart

one of the most common approaches to portray cost, volume, and profit relationships. The point at which total variable and fixed costs equal sales. At BEP, all costs are covered, and profits are zero.



☐ BEP Analysis

n = number of units/volume	B = Breakeven volume
TC = Total cost	P = Unit (selling) price
FC = Fixed cost	VC = Variable cost;
TFC = Total Fixed Cost	TVC = Variable Cost/Unit

Revenue/period	= n P
TC/period	= n VC + FC
Profit/Loss	= Revenue - TC = n P - (n VC + FC) = n (P - VC) - FC

At BEP, Profit = 0 ==> 0 = n (P - VC) - FC or

$$\boxed{n = \frac{FC}{P - VC}}$$

- P - VC is called *contribution margin (CM)*,
  - ❖ The difference between selling price and variable costs. It is the portion of the selling price that contributes to paying off the fixed cost (after covering VC).
  - ❖ When the total contribution margin is exactly equal to total fixed costs, sales are at the Break-Even Point. The contribution of each unit sold beyond BEP is the increment of profit.
- At  $n = B$  the sum of contributions from units equals the total fixed cost. The contribution of each unit sold beyond  $n = B$  is an increment of profit.
- Example 5-1: If VC is 60% of sales; with unit price at \$10/each and FC = \$40,000. What is the total sales?

$$\begin{aligned} \text{Sales @ BEP} &= a (\text{Sales @ the BEP}) + \text{TFC} \\ X &= .60(X) + \$40,000 \\ X &= \$100,000 \end{aligned}$$

To find break-even in units:  
 $\$100,000 / \$10.00 = 10,000$

$$\begin{aligned} \text{or BEP in units} &= \text{TFC} / (\text{Price} - \text{VC per unit}) \\ \$40,000 / (\$10.00 - \$6.00) &= 10,000 \end{aligned}$$

- Example 5-2: A small coal mine can produce a max of 100,000 tons per month. The coal sells for \$30.00 per ton and the contribution contribution is around 75%. TFC per month is \$1,850,000. How many tons of coal the mine has to produce in order to break even?

$$\begin{aligned} \text{Total revenue} &= n P = 100,000 \times \$30.00 = \$3,000,000. \\ \text{Total contribution} &= 0.75 \times 3,000,000 = \$2,250,000 \end{aligned}$$

$$B (\% \text{ capacity}) = \frac{\text{FC}}{\text{Contribution}} = \frac{1,850,000}{2,250,000} = 82.22\%$$

It requires 100,000 tons x 82.22% = 82,222 tons to break even.

Assuming a tax rate of 40%;

$$\begin{aligned} \text{Net profit} &= \text{Profit} (1 - \text{tax rate}) \\ &= (\text{Revenue} - \text{TC})(1 - \text{tax rate}) \\ &= [n(P - \text{VC}) - \text{FC}](\text{tax rate}) \\ &= [100,000 \times (0.75 \times \$30) - 1,850,000](1 - 0.4) \\ &= \$240,000 \end{aligned}$$

Net profit is only a portion of profit which depends on the tax rate.

- BEP can be lowered by,
  - 1) increase product prices (pay attention to product elasticity)
  - 2) lowering FC, and
  - 3) lowering VC