

CA BUSINESS SCHOOL
POSTGRADUATE DIPLOMA IN BUSINESS AND FINANCE

SEMESTER 1 : FINANCIAL PLANNING AND CONTROL

Cost Volume Profit [CVP] Analysis

M B G Wimalarathna
[FCA, FCMA, MCIM, FMAAT, MCPM][MBA-PIM/USJ]

Introduction

Determining a suitable price for your product/service should be the most crucial decision for the entrepreneur/businessman amidst many. In simple term, failing to establish a suitable price creates many problems and even it could cause winding up the business.

Accurate determination of costs of the particular product/service is must for the purpose of setting suitable price.

Marginal Costing (MC) and Absorption Costing (AC) are two different principles which are widely used in determining total costs of the particular product/service.

Analysis of marginal costing essentially provides details on overall costs of an entity and the production level to be maintained in order to record profit at all the time. Hence, our topic mainly surrounds with how the entity determined marginal cost and use it in the business.

Marginal Costing

Some argue that Marginal Cost (MC) is almost a Variable Cost (VC) of a product/service. This statement is quite true since both MC and VC will have positive co-relationship with the level of production (units). But, these two have different meanings too.

Marginal cost depicts the element/portion of total costs changes due to increase or decrease of total production by one unit.

$$\begin{aligned} \text{MC} &= \text{VC} \\ \text{VC} &= \text{VPC} + \text{VADMN} + \text{VSDB} \\ \text{VPC} &= \text{DM} + \text{DL} + \text{DOE} + \text{VOHs} \end{aligned}$$

MC – Marginal Cost

VC – Variable Cost

VPC – Variable Production Cost

VADMN – Variable Administration Cost/Overheads

ASDB – Variable Selling & Distribution Cost/Overheads

DOE – Direct Other Expenses

VOHs – Variable Overheads

Marginal Costing (Contd.)

Concept of *Contribution*

Contribution is a preliminary concept in CVP analysis which basically derive through mechanism of marginal costing. Contribution is one of the fundamental element/phenomena in most routine decision making by the entity's engaged in manufacturing goods/service.

Mathematically, contribution is an amount derived by eliminating variable cost of the product/service from its sales price. But, conceptually contribution denotes the capability of an entity to post profit even after eliminating uncontrollable costs. How strong/safe we are?

Contribution Per Unit (CPU) = (Selling Price – Variable Cost) per unit

Total Contribution (TC) = (Total Sales Value – Total Variable Cost)

TC = CPU X Total Sales Volume/Quantity

TC = Total Fixed Cost +/- Profit or Loss

TC = Total Sales Revenue X Profit Volume Ratio

Total Profit = TC – TFC

Marginal Costing (Contd.)

How contribution helps in decision making?

- To determine which product makes profit and which is not.
- To determine whether an entity can compete with existing price levels in the market.
- To determine the suitable price of the particular product/service when introduce into the market.
- To determine whether raw materials and other essentials should buy from outside or make internally.
- To determine BEP & MOS.
- To determine most profitable sales mix of the entity and drive ahead accordingly.

General practices in MC;

1. Total cost will be categorized into fixed & variable
2. Stock will be valued at its variable cost only
3. Fixed cost will be treated as period cost (more relevant to the period)

Absorption Costing

Absorption costing is the mechanism of absorbing fixed overheads of the manufacturing process to a particular product/service using pre-determine base/source/rate.

We used absorption costing in financial accounting to prepare manufacturing/profit & loss account (income statement).

Key application rules in absorption costing

- No classification of total costs into fixed and variable. Total cost will be apportioned among all cost units. Hence, total cost will be categorized into manufacturing and non-manufacturing only.
- Closing stock will be valued based on total cost in which fixed cost will be apportioned among cost units based on pre-determined rate.

Marginal Costing Vs. Absorption Costing

Bottom line of the profit/loss statement will be same under both mechanism provided that no opening and closing stock.

Marginal costing is the best;

- It is simple to calculate and understand
- No absorption of costs among production units using assumptions
- Problem of over/under absorption of fixed costs will not arise
- It is more accurate to treat fixed costs as period costs since it will not vary based on the production but must incur periodically
- As a result of calculating contribution, it quite easy to determine profit/loss in each level of production

Absorption costing is the best;

- Can produce any product/service without incurring fixed costs?
- According to LKAS, it is compulsory to determine the value of the closing stock by considering total costs involved with the production.
- Tendency of determining low price levels which ultimately bring losses will not be arise. (in marginal costing, it will occur)

CVP & BEP

CVP – Cost Volume Profit analysis : analysis of total cost and profitability at different levels of production.

BEP – Break Even Point analysis : analysis which leads to determine the level of production(number of units) at which entity neither generate profit nor experience any losses. (neutral)

At BEP; **total revenue = total costs** and hence **total contribution = total fixed costs**

Methods of calculating BEP?

1. Mathematical approach
2. Graphical approach

Mathematical approach:

Determining a BEP using mathematical formulae when an entity produce only one product.

BEP (in units) = Total Fixed Cost (TFC)/Contribution Per Unit (CPU)

BEP (LKR) = BEP in units X Selling Price of One Unit (SPU)

or

BEP (LKR) = TFC/Contribution Sales (CS) ratio or CM ratio or PV ratio

BEP with desired profit (units) = TFC + desired profit (DP)/CPU

BEP with desired profit (LKR) = BEP with DP in units X SPU

or

BEP with desired profit (LKR) = TFC + desired profit/CS ratio

Graphical approach:

Determining a BEP using graphs will be considered.

- ❑ Traditional break even chart (angle of incidence can determine)
following lines will be plotted into the graph
 1. total fixed cost
 2. total cost
 3. total revenue

- ❑ Contribution break even chart (contribution can determine)
following lines will be plotted into the graph
 1. total variable cost
 2. total cost
 3. total revenue

- ❑ Profit-volume chart : profit/loss will be plotted in to the graph in line with the sales volume (for one product or more)

MOS

MOS – Margin of safety: level/degree of safety/risk an entity currently experiencing with respect to the productions/supply to market. Difference between current level of units of production/sales and BEP units. This can be calculated both in number of units and rupee value.

Lower the margin : higher the risk (low costs)

Higher the margin: lower the risk (high costs) *matter of trade-off.*

MOS (in units) = current level of production – BEP production level

or

MOS (in units) = profit/ CPU

MOS (LKR) = current sales value – BEP sales value

or

MOS (LKR) = MOS in units X SPU

or

MOS (LKR) = profit/CS ratio

Benefits Vs. Constraints of BEP

Benefits;

- ❑ As a result of the BEP & MOS, key management can determine overall business risk and as such can take prompt and proactive actions.
- ❑ Since it depicts graphically, any employee can understand even without having much accounting knowledge and as a result decision making could be more efficient/effective.
- ❑ Since profit (including expected) can determine at each level of production, decisions will be more accurate/ relevant and effective.

Constraints;

- ❑ It might not be practical to determine VC & FC separately at all the time.
- ❑ In most circumstances, FC will also vary when increase the level of production and as such results might lead wrong conclusion.
- ❑ Assumption of remaining selling price constant will no more applicable in a highly competitive market.

Exercise;

1. One unit of product X is selling at LKR 140 and variable cost is LKR 80 per unit.
Calculate the profit volume ratio.
2. Production/cost details of one unit of "P" is as follows; (LKR)
DM - 62, DL- 42, VOHs - 22, FOHs - 14, total is 140
Selling price of this product is LKR 170 per unit

In next year, cost of DM and DL will be increased by 20% and 25% respectively. VOHs will also increase in line with DL. No changes in FOHs.

Calculate;

- a. profit volume ratio as at now.
- b. determine the SPU in next year to earn same profit volume ratio as in current.

Exercise;

3. SPU of product “Y” is LKR 150. VC of producing one unit of Y is LKR 80. TFC per annum is LKR 1,400,000 and company manufacturing/selling 35,000 units per annum.

Calculate the following;

- a. BEP in units and LKR
- b. Current profit volume ratio
- c. Number of units to manufacture/sell and rupee value if company expected LKR 700,000 profit per annum
- d. MOS in units and LKR
- e. If VC increased by 35% and TFC increased by LKR 100,000, number of units to manufacture/sell and rupee value in order to earn current year profit assuming no changes in SPU.