

Cost volume and profit analysis



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The quantitative analysis can be defined as a technique that tries to interpret the behavior of the business by using the composite or advanced mathematical or statistical modeling. The quantitative analyst tries to replicate the reality by assigning numerical values to real life problems and make predictions about the future. It can be done so as to make measurement, functioning and valuation about the financial instruments. Also use to make predictions about the real world events like changes in share price or investments avenues.

In the given project we will first introduce about quantitative analysis and different type of quantitative methods. Than in the latter section we will choose one of the quantitative methods, we will choose cost-volume profit analysis method in this case. And we will do the depth analysis about that method and also solve one case with related to that method.

Introduction

The quantitative analysis can be defined as a technique that tries to interpret the behavior of the business by using the composite or advanced mathematical or statistical modeling. The quantitative analyst tries to

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replicate the reality by assigning numerical values to real life problems and make predictions about the future. It can be done so as to make measurement, functioning and valuation about the financial instruments. Also use to make predictions about the real world events like changes in share price or investments avenues (Investopedia).

Quantitative analysis is mostly used by business managers for decision making, attaining profitability and also to maximize the profits of the company. As it has been seen that companies who are not able to achieve profitability generally fails, so proper planning is needed in case of taking business decisions that's why quantitative analysis plays a more important role in today's business processes. Nowadays managers use variety of techniques to take decision from a raw information or data, generally involving quantitative reasoning. It defines as the method of drawing conclusions and making better predictions or decisions on the basis of numbers and statistical tools. In the following section, we are going to discuss about the various quantitative methods which companies using for decision making (Hamel).

Cost-volume profit analysis: A cost volume profit analysis is a cost accounting method in the managerial economics use to determine the breakeven point of cost and volume of goods. The three terms cost, volume and profit when integrated in analysis help in identifying and analysing the levels of operating activity required to earn profits at particular cost of manufacturing. The analysis helps in avoiding losses, planning the organizational operations for attaining the targeted profits e. g. the product mix etc. and achieving the desired organizational performance.

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Break-even analysis: it is a type of quantitative method in which we determine about the units of the certain product (business in which we are dealing) which must be sell so as to reach break-even point. It can be also defined as the point in the business at which company is able to recover its fixed cost and above this point it starts earning profit. So the company has to reach break-even point in order to avoid losing money and start earning profit above this point.

Statistical analysis: in type of quantitative analysis, in which we draws conclusion from the numerical data containing information about particular product or business processes. For example if we an e-commerce company wants to know about the sales region wise information, he will analyze the transactions details of user visiting its site and how of them have purchase its product.

Feasibility Analysis: it is the type of quantitative analysis method in which we studies the viability of a new business or project, whether it being able to achieve profitability or not in future. So the feasibility analysis is the quantitative analysis about the certain project whether it has potential to produce to the profits based on the given business model and price that company is expected to charge the user for its product or service.

Cost Volume and Profit Analysis

Cost volume and profit analysis helps in identifying that what would be the impact on the financial results of the company for a given volume of production at a certain cost. Consequently the cost and price also play their role in deciding the profit margin, the most crucial factor for any

organization. Thus in brief the cost volume and profit analysis helps in identifying (John Wiley & Sons):

Product mix

Sales volume to attain the targeted profits

Break-even point

Decisions on increasing profits

Discretionary expenditure budgets

Assessing the operating risk of the firm

Usage of a particular type of technology

Case Study:

Wyatt Inc., a multinational manufacturing firm involved in production of architectural millwork like custom molding, panels, book cases and others. Suppose that the Wyatt Inc. is involved in the production of the molding and it is expected to maintain same inventory at the end of the year as at the beginning of the year. Let us suppose the estimated fixed cost is \$288, 000, and the estimated variable costs per unit are \$14. Also assume that 60, 000 units will be sold at price of \$20 per unit (Waren). The maximum sales within the relevant range are 70, 000 units. Calculate the following:

Questions

Calculate the contribution margin ratio and unit contribution margin.

Find out the break-even point in units.

Draw the cost volume profit chart, indicating the break-even point.

Determine the margin of safety.

Solution)

1. Contribution Margin Ratio

The contribution margin ratio is defined as the marginal profit per unit of sales. It helps the company in determining the profitability for the particular product. In the companies dealing with labor intensive tertiary sector have high intensive contribution margin ratio while the companies dealing in the capital intensive sectors have low intensive contribution margin ratio (Investopedia).

Contribution margin ratio = (product revenue – product variable cost)/product revenue

$$= (60,000 * \$20 - 60,000 * \$14) / (60,000 * \$20)$$

$$= (\$360,000 / \$600,000) * 100$$

$$= 30\%$$

So, contribution margin ratio for the firm is 30 percent.

Unit Contribution margin – it is value obtained when we subtract the selling price per unit with the unit variable cost.

i. e. Unit contribution margin = selling price per unit – variable cost per unit.

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$$= \$20 - \$14$$

$$= \$6$$

So the unit contribution margin for the firm in the production of molding is \$6.

2. Break-even point in units

Break-even point is generally defined as the point at which gains equals the losses, so there is the condition of no profit no loss. In graphical terms, it is the point at which total revenues and total cost curves meet each other. It is also defined as the total fixed cost divided by the contribution margin per unit.

Break-even of sales in units = total fixed cost/ unit contribution margin

$$= \$2,88,000/\$6$$

$$= 48,000 \text{ units}$$

So break-even point in units of sales is 48,000 units i. e. company can reach break even when it will sell 48,000 units of molding.

3. Break-even Analysis

It is the analysis to determine the break-even point i. e. the point at which revenue received equals to the cost associated with the receiving of the revenue. To calculate the break-even point we have first calculate the number of units, sales, total variable cost and total fixed cost (Investopedia).

We have assumed that the initial number of units is 10, 000 and it is incremented by 10, 000, after each iteration and time is in months. Our assumptions are:

Break-even analysis graph is shown below:

The given shows the relation between the cost of sales vs. the number of units sales and we have shown the four parameters in the graph namely sales, fixed cost, total cost linear sales and breakeven unit which is approximately coming out be 48, 000 units. The graph reaches the breakeven at 48, 000 units or cost of sales \$9, 60, 000 which shown rectangle in the graph.

4. Margin of safety

The excess of a firm's expected sales in some future time over and above the breakeven point is called the margin of safety. Or in other words it represents the amount which corresponds to the drop in sales before the breakeven is reached.

The margin of safety is defined as the difference between the total revenue obtained from sales in the current year and the sales required to get break-even. It shows the possible increase in sales which may be occurred before an operating loss may occurs. If the margin of safety is low then even a small drop in sales may results in operating loss (Investopedia).

Margin of safety = (sales - sales at break-even) / sales

Calculation:

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$$\text{Expected sales} = \$60,000 * \$20 = \$12,00,000$$

$$\text{Sales at break-even point} = \text{break-even units} * \text{unit price}$$

$$= 48,000 * \$20$$

$$= \$9,60,000$$

$$\text{Margin of Safety} = \text{Expected sales} - \text{sales at break-even units}$$

$$= 12,00,000 - 9,60,000$$

$$= 2,40,000$$

$$\text{Margin of safety} = (\text{expected sales} - \text{sales at break-even units}) / \text{sales}$$

$$= \$2,40,000 / \$12,00,000$$

$$= 20\%$$

So, margin of safety for the Wyatt Inc. is 20 percent.

Conclusion

The quantitative analysis can be defined as a technique that tries to interpret the behavior of the business by using the composite or advanced mathematical or statistical modeling. Quantitative analysis is mostly used by business managers for decision making, attaining profitability and also to maximize the profits of the company. In the given case we have given in-depth analysis of cost-volume profit and also solved a case about the Wyatt Inc to gain more understanding of the concept. We have calculated the

break-even, contribution margin and margin of safety for Wyatt Inc. The break-even units were 48, 000 and margin of safety was 20 percent.