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Grigoryan Liana
Doctor of Economic Sciences, Professor,
Head of Chair of Managerial Accounting and Auditing
Armenian State University of Economics
Григорян Лиана
доктор экономических наук, профессор,
заведующая кафедрой Управленческого учета и аудита
Армянский государственный экономический университет

Hakobyan Arpine
PhD Student of the Chair of Managerial Accounting and Auditing
Armenian State University of Economics
Акобян Арпине
аспирантка кафедры Управленческого учета и аудита
Армянского государственного экономического университета

COST-VOLUME-PROFIT ANALYSIS AS A SOURCE OF INFORMATION FOR MAKING MANAGERIAL DECISIONS
АНАЛИЗ СООТНОШЕНИЯ «ЗАТРАТЫ-ОБЪЁМ-ПРИБЫЛЬ» КАК ИСТОЧНИК ИНФОРМАЦИИ ДЛЯ ПРИНЯТИЯ УПРАВЛЕНЧЕСКИХ РЕШЕНИЙ

Summary. *The issues of calculation of cost and the registration of expenditures have always been topical, especially that they are intended to the reorientation of the accumulated experience of accounting at the direction of the solution of new problems. The decisions of the managing circle can be effective if they are based on the analysis of the relationships between cost, volume and profit. During the analytical research, we have studied "cost-volume" and*

"cost-volume-profit" relations among the most important indices characterizing the industrial activities of the organization, whose analysis has a great role in the matter of the management and control of costs. The analysis of the production cost structure is an important tool to make managerial decisions about the production and sales of output. This allows to estimate the relationships among products selling price, production and sales volumes, marginal profit, direct variable costs per unit of output and fixed costs.

Its practical application, in our opinion, will lead to the provision of information for making managerial decisions on the following issues related to the production and economic activity: assessment of marginal profit, contribution margine and financial stability, decisions on the expediency of continuing or stopping the production of the given product, make or buy decisions connected to the raw materials, pricing decisions for the new products, decisions on selection and renewal of production technologies, development of a more effective manufacturing and sales plan.

***Key words**: cost, analysis, break-even point, case study, marginal profit*

***Аннотация.** Вопросы учета затрат и расчета себестоимости всегда были актуальными, тем более что они направлены на переориентацию накопленного бухгалтерского опыта. Важное место в системе управленческого учета занимают вопросы, связанные с принятием и обоснованием управленческих решений, прежде всего, на основе проведения анализа взаимосвязи затрат, объема производства и прибыли. Решения руководства могут быть эффективными в том случае, если они основаны на анализе соотношения затрат, объёма, прибыли. В ходе аналитического исследования были изучены соотношения «затраты-объем» и «затраты-объем-прибыль» как наиболее важные показатели, характеризующие производственную деятельность организации и анализ которых играет важную роль в управлении и в контроле затрат. Таким*

образом, анализ структуры производственных затрат является важным инструментом для принятия управленческих решений о производстве и реализации продукции. Это позволяет оценить взаимосвязь между отпускной ценой продукции, объемами производства и продаж, маржинальной прибылью, прямыми переменными затратами на единицу продукции и постоянными затратами.

Его практическое применение, на наш взгляд, приведет к предоставлению информации для принятия управленческих решений по следующим вопросам производственно-хозяйственной деятельности: оценка маржинальной прибыли, и финансовой устойчивости, решения о целесообразности продолжения или прекращения производства данной продукции, целесообразности производства новой продукции, решение покупать или производить сырье, какие цены установить на продаваемую продукцию, как определить ее внутренний лимит, решения по выбору и обновлению технологий производства; разработка более эффективного плана выпуска продукции и продаж.

Ключевые слова: *затраты, анализ, точка безубыточности, тематическое исследование, маржинальная прибыль.*

Statement of the problem. In parallel with the development of the market relations, there is a necessity of review of the issues concerning both theoretical and practical calculation and control of expenditures in the current RA industrial entities. The issues of calculation of cost and the registration of expenditures have always been topical, especially that they are intended to the reorientation of the accumulated experience of accounting at the direction of the solution of new problems which stand before the entrepreneurs, and the application of new approaches is exclusively serving for the interests of the latter.

The decisions of the managing circle can be effective if they are based on the analysis of relations among cost, volume and profit.

Analysis of recent researches and publications. The study of theoretical and methodological foundations of CVP analysis during the managerial decision making process, are devoted the works of Armenian researchers: Grigoryan L., Poghosyan M., Sargsyan A.. Foreign scientists, in particular Kondrakov N.P., Vodopyanov I.V., Drury, Gautie Etal, Enkeleda Lulaj, Etem Iseni and others have made a significial scientific contribution to the researched problem.

Formulation purposes of article (problem): During the analytical research, we have studied "cost-volume" and "cost-volume-profit" relations among the most important indices characterizing the industrial activities of the organization, whose analysis has a great role in the matter of the management and control of costs. It is possible to provide the information base of the mentioned analysis only through the information received by the system of variable expenditures [9].

We have presented diagram 1 showing the relation of the volume of production and expenditures per unit of production for the further study of the dynamics of the production volume and costs.

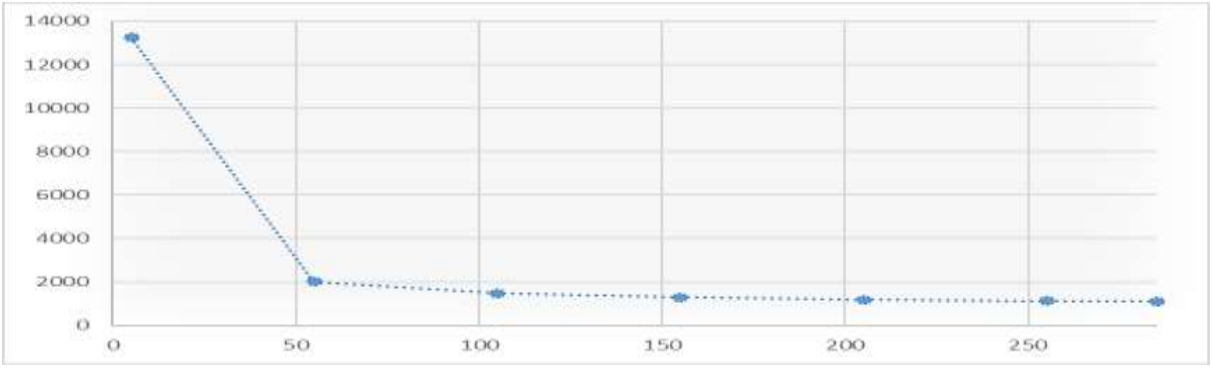

Diagram 1. The ratio of the production volume and the costs per unit of production for the production of the "Van" LLC

Source: the diagram is prepared by the authors

The "cost-volume" ratio, in comparison with the normative calculation or full distribution of expenditures, exposes the profitable and expensive sides of the production, because it can show the zones of variable and fixed expenditures in the volume of the production, which is most important during the analysis of the voluminous production and production of different assortment.

Using the regularity of the "cost-volume" ratio and replenishing the profit from sale with a curve, we come to the "cost-volume" ratio, which shows the expected mutual relations between the amounts of profit and the general volume of expenditures in case of different volumes of the production.

The main material. The volume of the production and sale of output, when the profit is equal to zero, is the critical volume of the production, when, in fact, the difference of the amounts of variable and fixed costs of the organization and the sale revenues of the organization is equal to zero [1, p. 167], which can be expressed with the following equation:

$$\mathrm{Pr} \times Q - VC \times Q - FC = 0, \qquad \text{(Equation 1)}$$

where:

Pr – unit selling price,

VC - the variable costs per unit of product

FC – fixed costs

Q - the critical volume of the production

It proceeds from the abovementioned equation that the critical volume of the production can be determined with the quantitative expression, correlating the amount of the fixed costs with the difference of price of the sale of unit and the variable costs per unit according to the following equation:

$$Q = FC/(Pr - VC). \qquad \text{(Equation 2)}$$

The denominator of equation 2 is a marginal profit of the unit of production; the latter is a part of sales income that is directed at the compensation of fixed costs. [1, pg.170] It comes to the following: if the marginal profit satisfies the covering of all the fixed costs, the organization gets

a profit, and vice versa. In table 1, the calculation of marginal profit of each of product assortment of the organization under research is presented.

Table 1

The calculation of marginal profit of "Van" LLC individual product types in2019

Product Assortment	Sales Volumes, (thousand AMD)	Variable costs (thousand AMD)	Marginal profit (thousand AMD)
A	1	2	3
Apricot jam	48 * 1100 = 52690	48 * 685 = 32838	19852
Walnut jam	58 x 1300 = 75400	58 x 858 = 49764	25636
Cherry jam	34 x 1039 = 35326	34 x 722 = 24548	10778
Fig jam	30 x 1350 = 40500	30 x 1435 = 43050	-2550
Strawberry jam	35 x 950 = 33250	35 x 884 = 30940	2310
Total	237166	181,140	56022

Source: the table is prepared using the information received from the management of the VAN LLC

It is clear from the table that the marginal profit is gained from the sale of all the product types except fig jam. Fig jam variable costs exceed the price of sale, as a result of which the marginal profit is not provided by this assortment.

Analyzing the marginal profit in case of all the assortment, we may see that it (56,022 thousand drams) in case of this sale volumes (237, 166 thousand drams) does not satisfy the compensation of fixed costs (61, 860 thousand drams) for the period under review and the formation of profit, i.e. The sale volume of output is less than the point of balance, which brought to the appearance of loss of 5838 thousand AMD (table 2).

Table 2

The results of the "Cost-volume-profit" analysis of the production of the "Van" LLC in 2019

Figures	Amounts, thousand AMD
A	1
Revenue	237,166
Variable costs	181,140
Marginal profit (1-2)	56,022
Fixed costs	61,860
Profit/ Loss (3-4)	(5838)

Source: the table is prepared using the information received from the management of the VAN LLC

Making use of the above, we have tried to clarify the minimum volume of the production when the company does not have loss, and later also receives profit. It means that we have determined the critical volume of each of the assortment or in other words the balance point or the break-even point, when the marginal profit is equal to the fixed costs. As each of the assortment has different variable expenditures and sale price, it will be necessary to conduct the following steps in order to be able to decide the break-even point on each line:

1. It is necessary to observe the sale volume of assortment having minimum sale price as a basis for the conduction of calculation, which will be conditionally mentioned as Q. [2, pg.257-260]

2. It is necessary to express the volumes of sale of other assortment, profit and variable expenditures through Q (table 3).

3. To compile the equation to calculate the break even point of the production (see the Equation 1).

$$7105.9\ Q - 5712\ Q - 61{,}860 = 0$$

Table 3

The calculation of the critical point of Product Assortment of "Van" LLC in 2019

Product Assortment	**The Sales volume presented as a ratio with the volume of the product having the lowest selling price**	**Revenues, (thousand AMD)**	**Varible costs (thousand AMD)**
A	1	2	3
Apricot jam	1.16 Q (1100 / 950)	1100 * 1.16Q	685 * 1.16Q
Walnut jam	1.4 Q (1300/ 950)	1300 *1.4Q	858 * 1.4Q
Cherry jam	1.1 Q (1039 / 950)	1039 * 1.1Q	722 * 1.1Q
Fig jam	1.42 Q (1350 / 950)	1350 * 1.42Q	1350 * 1.42Q
Strawberry jam	Q	950 * Q	884 * Q
Total	x	**7105.9 Q**	**5712 Q**

Source: the table is prepared using the information received from the management of the VAN LLC

It follows from the equation that the critical volume of the sale of strawberry jam is equal to 44,3 c.u. The critical volumes of sale of other assortment with the natural and cost expression are presented in table 4. So, for the "Van" LLC to overcome the profitability limit, the volume of sale of jams should be at least 267,4 c.u.

In the event that the product sales volume exceeds the critical volume, the organization will start to make a profit[7. pg.77-85]. If there is a structural shift in the total volume of output, the Sales Revenue, marginal profit and profit will change. The critical volumes of sale will change as well. The analysis shows that the salling price of fig jam is lower than variable cost per unit. Suppose the management staff of the company decides to increase the price of fig jam from 1350 AMD to 1450AMD.

Table 4

The Critical Volumes of Sale of Van LLC's assortment in units and in sale revenues in 2019

Product Assortment	**Break-even Sales units, cond. units**	**Sales Revenue at break even point, thousand AMD**
A	1	2
Apricot jam	51.3	1100 * 51.3 = 56386
Walnut jam	60.6	1300 * 60.6 = 78754
Cherry jam	48.4	1039 * 48.4 = 50305.68
Fig jam	62.9	1350 * 62.9 = 84928.5
Strawberry jam	44,3	950 * 44.3 = 42056.5
Total	**267.4**	312430.7

Source: the table is prepared using the information received from the management of the VAN LLC

Considering this case, we have calculated the break-even point in the new conditions. (Table 5) Putting the data of the table in the Equation 1, we get the recalculated break-even points.

Table 5

The recalculation of the Critical Volumes of Sale of Van LLC's product assortment

Product Assortment	**The Sales volume presented as a ratio with the volume of the product having the lowest selling price**	**Revenue, thousand AMD**	**Variable Costs, thousand AMD**
A	1	2	3
Apricot jam	1.16 Q (1100 / 950)	1100 * 1.16 Q	685 * 1.16 Q
Walnut jam	1.4 Q (1300 / 950)	1300 *1.4 Q	858 * 1. 4Q
Cherry jam	1.1 Q (1039 / 950)	1039 * 1.1 Q	722 * 1.1 Q
Fig jam	1.53 Q (1450 / 950)	1450 * 1.53 Q	1435 * 1.53 Q
Strawberry jam	Q	950 * Q	884 * Q
Total	x	**7407.4 Q**	**5869.55 Q**

Source: the table is prepared using the information received from the management of the VAN LLC

We can see, as a result of the increase in the Fig jam price, the recalculated break-even point in sale units for the company has decreased

from 267.4 to 249 c.u..

Table 5

The Recalculated Critical Volumes of Sale of Van LLC's assortment with natural and cost expressions

Product Assortment	Break-even point	Calculation (Pr x Q)	Revenue, (thousand AMD)
A	1	2	3
Apricot jam	46.7	1100 * 46.7	51,370
Walnut jam	56.3	1300 * 56.3	73,190
Cherry jam	44.2	1039 * 44.2	45,923.8
Fig jam	61.5	1450 * 61.5	89,175
Strawberry jam	40.3	950 * 40.3	38,285
Total	**249**	x	**297,944**

Source: the table is prepared using the information received from the management of the VAN LLC

Insights from this study and perspectives for further research in this direction: Thus, the analysis of the production cost structure is an importanat tool to make managerial decisions about the production and sales of output. This allows to estimate the relationship among products selling price, production and sales volumes, marginal profit, direct variable costs per unit of output and fixed costs. Its practical application, in our opinion, will lead to the provision of information for making managerial decisions on the following issues related to the production and economic activity:

1) assessment of marginal profit, contribution margine and financial stability;

2) decisions on the expediency of continuing or stopping the production of the given product;

3) make or buy decisions connected to the raw materials;

4) pricing decisions for the new products;

5) decisions on selection and renewal of production technologies;

6) development of a more effective manufacturing and sales plan.

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