THE OPTIMUM DIMENSION OF COMPANY FOR MAXIMIZATION OF PROFIT USING THE REGRESSION METHOD

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In this paper we will try to present the possibility of optimum construction of a company and this means that level of the rate of turnover for witch is touching a maximum profit taking like a refer the relative level with a statistic method: regression.

Keyword: regression, rate of turnover, trend, maximum profit.

In a practical version the company is appreciate by the rate of turnover, the costs, the profit.

If we refer to an enterprise witch has like a principal object the production activity at realization of this production contribute factors like raw materials, semi-finished goods, energy, payment etc.

It is known the fact that any company is an organized economic unit witch has the role to process the natural means in products or services with a big degree of utility. On the other way, a firm features are: the factor of production market, the goods and services market but also an administrative and legal mechanism too, witch fixed a space for the developed activity.

In that way a firm has in her attention permanently especially a lot of activities like: the provisioning, the storing, the output, the sales and financial relations, each of they at them thorn supposing a multitude of characteristic issues (picture 1).

This aggregate issues on witch meet a firm suppose in a lot of cases the information's witch are like a result, options and decisions. After that the decisions involve the modification in all that means the quantum of the expenses and performances.

In this way exist two possibilities about decision making:

- – On base of experience or intuition;
- – On base of some of calculus: estimates, balance operations, optimizations, statistical and econometric approaches.

Picture 1. Activities of a firm

If on limit to calculus methods of statistic and econometric we must to tell that they can be a real utility to the manager for realization the some of purposes like:

- – the permanent adaptation of the output to market's requirements witch are changed all the time
- – the effect of the sale's promotion actions
- – the best combination of the resources.

All this objects is finished in fact by obtaining a maximum average witch is the major objective of any company.

The requirements of market on changed all the time and modify all the time under the influence of a multitude of specific factors.

In this way is necessary like any company to orientate her output or her sales in correspondence with the evolution of the market's capacity been necessary in this mode to be known how much is possible a lot of aspects about the behavior of the market share, witch is the "consignee" of the product or the service; the

structural changes in the request's zone; the role of the factors witch influence the market. The processing of this dates can offer us the useful answers about the market' future.

On the other way it know the methods about determination of the trend and the seasonality witch may have like conclusion an adaptation in correspondence of the output for the product with the influence witch it offer under the growth or decrease of the output or sales.

It is true that is write very much in present and in the past about the substantiation and the application of the statistic method, but to microeconomics level the scale is small. It is very important like this methods of practical interest witch are written in the theory to be introduce in the concrete management activity of the company.

A method like this is the regression method too, with very good results in the optimum construction of the firm and this is possible with realization of the rate of turnover witch permit the touching of the maximum profit.

In this paper we will try to present the possibility of optimum construction of a company and this means that level of the rate of turnover for witch is touching a maximum profit taking like a refer the relative level with a statistic method: regression.

In a practical version the company is appreciate by the rate of turnover, the costs, the profit.

If we refer to an enterprise witch has like a principal object the production activity at realization of this production contribute factors like raw materials, semi-finished goods, energy, payment etc.

Each unit of product has a cost and this cost depend at the quantity used from each factor price:

$$COST = a_0 + a_1(p_1F_1) + \ldots + a_k(P_kF_k) + u$$

where:

- $a_0, a_1, \ldots, a_k$ – fixed variables
- $p_0, p_1, \ldots, p_k$ – the price of the factors of production used in the realization of production
- $F_0, F_1, \ldots, F_k$ – the quantity of the factors of production used in the realization of production
- u – residual variable.

With this relation if it know the price's evolution of each factor we can anticipate the unitary cost of production.

The unitary cost like global cost include in his content a fixed part "c_0" and a variable part "c_i" proportional with the production's level. In this way, a small level of production and a small level of rate of turnover is in correspondence with high costs and on the other way a growth of rate of turnover has like effect the reduction of the variable part of costs.

A situation like this is reflect ate very well in picture no. 2.
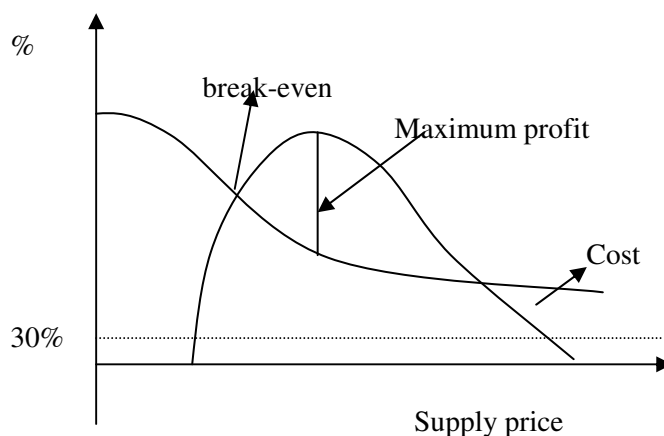
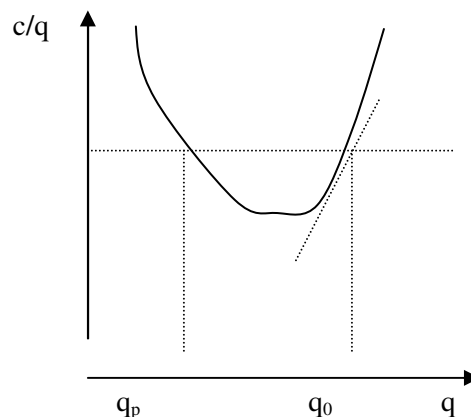*Picture 2. Rate of turnover and the supply price*

Adequate policy prices determination suppose the periodic comparing of the rate of turnover curve with the costs curve for the determination of the rate of turnover level in correspondence with a best profit's level. The most frequent curves of average unitary costs (obtained from reference of the global costs at achieved production - c/q) are displayed in Picture no. 3, 4, 5.
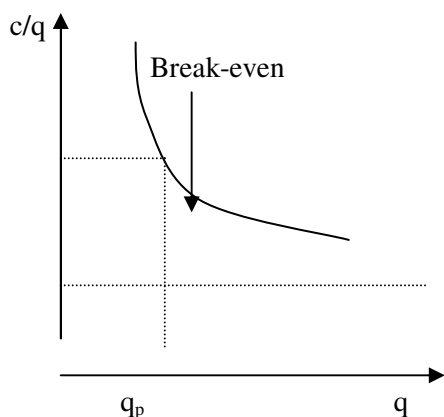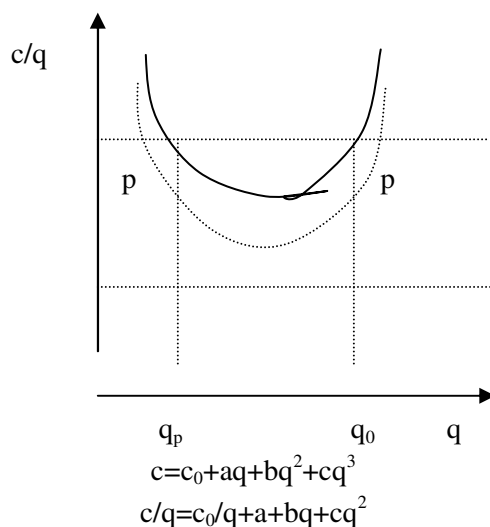

$$c=c_0+bq$$
$$c/q=c_0/q+b$$

$$c=c_0+bq+cq^2$$
$$c/q=c_0/q+b+cq$$

Picture.3.Curve of average unitary costs unitary costs

Picture.4. Curve of average

$$c=c_0+aq+bq^2+cq^3$$
$$c/q=c_0/q+a+bq+cq^2$$

Picture. 5. Curve of average unitary costs

On the graph on see that in picture no. 4 and in picture no. 6 is displaying the second breakeven. This is very hard to obtain because it suppose a level of production too high. In all of three presented cases too, on see that on the term the cost has a typical form by "U" and this tell us the point were the company use her self the capacity on the best (the cost are minimum).

For example, we suppose that the relative cost level may be descript by function:

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$$Y=a+bx+cx^2+dx^3$$

where:

y – the cost

x- the sales

With help of mathematic methods we will obtain the marginal trend: $\delta y / \delta x = a / x+b+cx+3dx^2$

and medium trend : $y / x=a / x+b+cx+dx^2$

In to the last equation we see two components of the global cost :

- the fixed part of the cost, c_0 : $c_0=a / x+b$

- the variable part of the cost, c_I : $c_I=cx+dx^2$

If on put the condition like the partial derivative reference to "x" to be "0" we will obtain that level of the rate of turnover for witch the variable costs are minimum:

$$\delta c_i / \delta x=c+2dx=0$$

$$\text{So: } x=(-c) / 2d$$

In the other order for a rate of turnover $x=(-c) / 2d$ the level of profit of the firm is the best.

In this mode was analyzed the optimum dimensioning of one of the production company from Gorj department of Rumania. After what it was applied the methodology and was effected the calculations it was obtain the following relation:

$$y / x=1,217 / x+1,1145 – 1,0197794x+0,0011557x^2$$

witch descript the medium trend of cost at this company.

In this way the extreme point of the sales is determinate like be:

$$x=(-c) / 2d=1,0197794 / 2 \text{ x } 0,0011557=441,2 \text{ mild lei}$$

This value of x=441,2mild lei represent the level of the direct selling for witch the variable cost is minimum when this evolution reference to sales following a function descript by relation:

$$y=a+bx+cx^2+dx^3 \ .$$

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