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PROFIT OPTIMIZATION TAKING INTO ACCOUNT TAX BURDEN AND MARKET PRICES

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Abstact: The article discusses the idea of search for maximum value profit in conditions of taxation. Using ratio method of estimation of the tax burden on the cash flows of the enterprise managed to construct a mathematical model that allows analyzing the profit by taking the derivative.

Keywords: optimization, tax burden, profits, revenue, derivatives, extrema.

Properly installed price may be one of the leading factors of competitiveness of domestic mechanical engineering products. To do this, it is important to know the dependence of volume sales from the price of the item. In economic theory, this dependence is called elasticity of demand for a good price. This feature is measured by a coefficient of elasticity, which is defined as the ratio of sales growth to the increase in prices. Since price and demand have reciprocal trend coefficient of elasticity is negative, that is, the price increase reduces sales. In practice, however, the minus sign is usually lower. For our analysis, based on mathematical models, a minus sign is necessary to save to get correct result. According to the definition of a coefficient of elasticity can be calculated as follows [1]:

$$E = \frac{\frac{\Delta Q}{Q_0}}{\frac{\Delta P}{P_0}},$$

where ΔQ – increase sales; Q_0 - initial sales; ΔP – is the increase of the prices of the goods; P_0 – is the initial price. Coefficient of elasticity is crucial in a competitive market. Knowing the coefficient to felasticity, the original price and sales volume, we can predict the sales for our new product prices. Using the formula find projected sales in the appointment of the new price, for this will bring this expression to the linear form:

$$E \cdot Q_0 \cdot (P - P_0) = P_0 \cdot (Q - Q_0)$$

Now solve the expression obtained relative to projected sales of q:

$$Q = Q_0 \cdot (1 - E) + E \cdot Q_0 \cdot P/P_0 \qquad (1)$$

In this way we can use the formula (1) top practice: based on the original value soft price and sales volume, knowing the coefficient of elasticity, in appointing the new prices we can predict demand for a product. However, here its hould be mentioned that the formula will work with relatively small changes

in prices, since in practice the coefficient of elasticity will change, and the more the price jump, the greater the accuracy. As we analyze the sales performance of the machine-building enterprises, whose products are produced for years and has a relatively stable prices, this formula can be used successfully. To ensure satisfactory accuracy should take in to account the amendmenton inflation. The second recommendation for marketing services is to continuously track changes coefficient of elasticity, that is, a permanent monitoring of the market (feedback). An optimization problem for industry.

$$\pi_{\Sigma} = F(P) \rightarrow \max,$$

where π_{Σ}-profit remaining at the disposal of the enterprise when implementing the kind of products for any period, for example, for 1 year; R-sale price for the products. The objective function can be found from the size of proceeds for the sale of the products. In turn, gross proceeds is as follows:

$$R = Q \cdot P \qquad (2)$$

To obtain the gross profits you must subtract in direct taxes and costs. Better initially, all calculations lead to one product, and then do mnozhit' on the annual volume of realization. Gross profit per one item:

$$\pi_1 = P - P\frac{100\%}{100\% + r_{НДС}\%} - P\frac{100\%}{100\% + r_{ед}\%}\left(1 - \frac{100\%}{100\% + r_{НДС}\%}\right) - C_1, \qquad (3)$$

where $r_{ндс}$ – percent value added tax rate percentage; $r_{ед}$% - rate of single payment in percentage; C1-unit cost of product, rub. The expression (3) can record and thus:

$$\pi_1 = P \cdot k - C_1, \qquad (4)$$

where k is a coefficient that takes account of the indirect taxes. It is important that its value will not change unless change taxes. Its appearance for different type soft products and conditions of implementation mayvary. For example, if the production is for export, customs duties should be taken into account if there areexcise duties –and they should be taken into account if our products are soldin retail, yous hould consider the imposition of retail trade turnover, which may also varybyregion, etc. For each type of product, using this approach, economists, businesses can set a particular value of this coefficient. In our case, k:

$$k = 1 - \frac{100\%}{100\% + r_{НДС}\%} - \frac{100\%}{100\% + r_{ед}\%}\left(1 - \frac{100\%}{100\% + r_{НДС}\%}\right)$$

Or, after you change the value of the parameter k maybe:

$$k = \frac{100\%}{100\% + r_{НДС}\%} \cdot \frac{100\%}{100\% + r_{ед}\%} \qquad (5)$$

In addition, gross profit from the sale of these products is also taxed. Believing that taxable profit will be slightly less gross profit (for example, because a property tax, which for each enterprise will have its value), we find the coefficient, which takes into account income tax:

$$k_p = \frac{100\% - r_p\%}{100\%}, \qquad (6)$$

where r_p% - rate of tax on profits. If there are other exception sto the profit, for example, contribution sto the trust funds, local rates hall bead justed to take into account their. To simplify the definition of coefficients k and k_p, you can use the methodology proposed by the authorin [2]. Finally, then et profit of the enterpriseat realization of one product will be:

$$\pi_1 = k_p \cdot (P \cdot k - C_1) \qquad (7)$$

For alsold product soft his type, byanalogy with the formula (7), netprofit will make:

$$\pi_\Sigma = Q \cdot k_p \cdot (P \cdot k - C_1) \qquad (8)$$

To determine these lling price of the product, in which netprofit (π_Σ – target function) reaches the maximum value, take the derivative of the costs [3].Thus instead of sales volume Q substitute expression (8), preliminary simplifiedit:

$$Q = m_1 + m_2 \cdot P, \qquad (9)$$

где

$$m_1 = Q_0 \cdot (1 - E); \qquad (10)$$

$$m_2 = E \cdot Q_0 / P_0 \qquad (11)$$

Using the methods of differentiation, we find anexpression for the derivative:

$$\frac{d\pi_\Sigma}{dP} = \frac{d(k_p(m_1 + m_2 P)(Pk - C_1))}{dP} \qquad (12)$$

To find extremum points will price match derivative (12) zero. Since k_p does not depend on the prices r quite equate to zero only derived from the expression taxable profits:

$$\underline{\pi} = (m_1 + m_2 \cdot P)(P \cdot k - C_1) \qquad (13)$$

A logical continuation of the exclusion from consideration of factor k is a conclusion that the value of the optimal price does not depend on the level of taxation. That is, the value of the optimal price products depends on in direct taxes. The State, through a policy of achieving industry competitive price level, should regulate primarily in direct taxes. To obtain the derivative expressions

(13) multiply both components in brackets and sgruppiruem obtained a relatively variable P:

$$\pi = Q_0(E\frac{k}{P_0}P^2 + (k - Ek - C_1\frac{E}{P_0})P + C_1(E-1))$$

Next, take the derivative of:

$$\frac{d\pi}{dP} = Q_0(\frac{2Ek}{P_0}P + (1 - Ek - C_1\frac{E}{P_0}))$$

Because $Q_0 \neq 0$, will price match to zero only the expression in parentheses. The solution of there sulting expression will give us anexpression to determine the optimum prices. So, finally, weget the formula to determine the optimal value of the prices for this type of production in which the company'snetprofit from the sale of this product will be maximized:

$$P_{opt} = \frac{1}{2}(\frac{C_1}{k} + \frac{E-1}{E}P_0) \quad (14)$$

While the volume of sales, on the basisof formula (14):

$$Q_{opt} = Q_0 \cdot (1 - E) + E \cdot Q_0 \cdot P_{opt}/P_0 \quad (15)$$

The proposed methodology can be used to improve enterprises profitability and, hence, competitiveness.

Referents

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