

## THE ANALYSIS OF PRODUCTION EFFECTIVENESS VIA THE APPRAISAL OF CHANGES IN PRODUCTION UTILITY

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### **Keywords:**

production effectiveness, hierarchy level of production process, investment attractiveness, low risks.

### **Abstract:**

The production effectiveness is a one of the major factor, which is taken into consideration for making decision about investment for any hierarchy level of production process. For process of making investment decision we have to define in which hierarchy level of production will be reached the maximum effectiveness. The paper presents the new methodology for appraisal of profitability and investment attractiveness of production process via using the criteria "production utility". The final aim of methodology is to achieve the maximum investment effectiveness in industry production.

The production effectiveness is a one of the major factor, which is usually taken into consideration for making decision about the investment for any hierarchy level of production process. We need the comprehensive systematic analysis to define in which hierarchy level of production will be reached the maximum effectiveness. The production effectiveness is clearly illustrated by figure of relation of production utility and production basic cost. Line, divided the graph coordinate - is consisted by the points of zero profitability. The production effectiveness can be easy determined by the relationship of the curve of effectiveness and line of zero profitability. If the figure of effectiveness situate on coordinate plane below the line of zero profitability, the effectiveness will be negative.

Also, at presented figure easy to determinate in which point the curve of effectiveness cross the line of zero profitability, and in which hierarchy level of production the surplus of effectiveness will achieve the maximum.



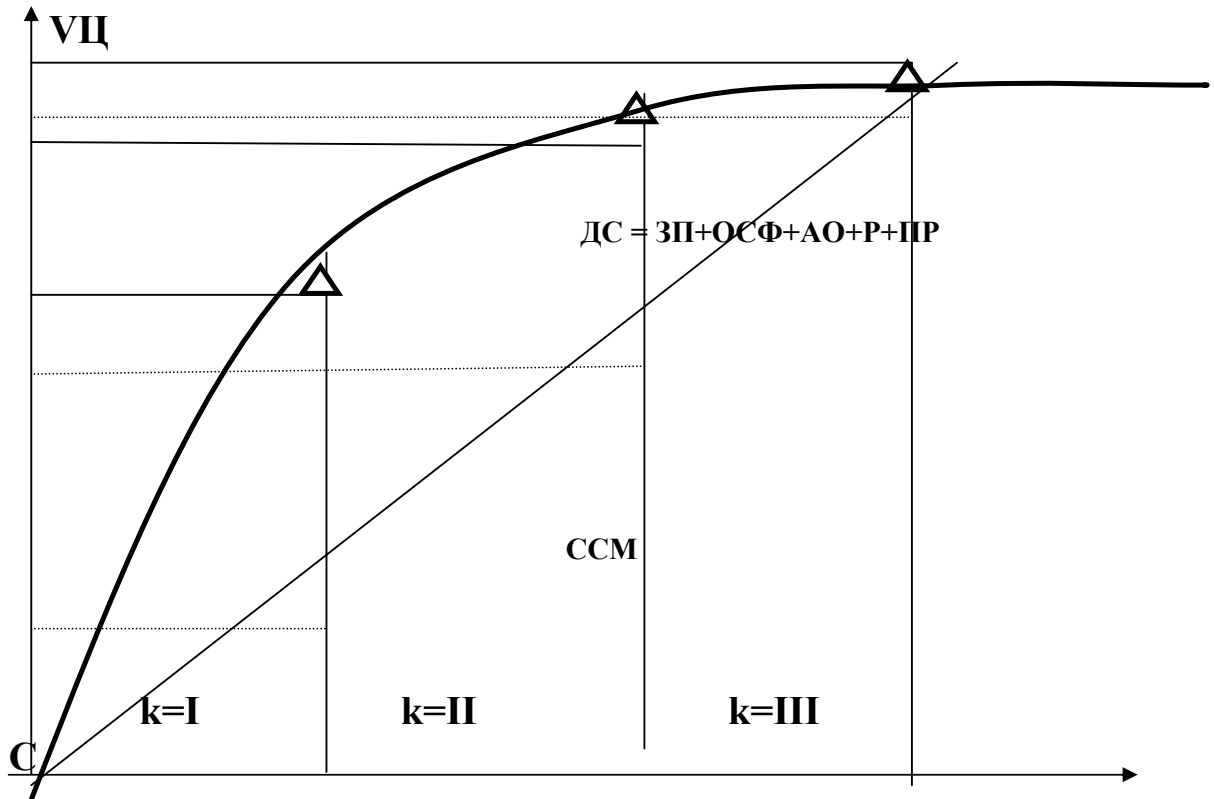


Fig.1. Changes in production utility ( $\Pi$ ) multiplied by production capacity ( $V$ ) as the function of production basic cost ( $C$ ).

The price of goods:

$$CT = CCM + 3\Pi + OC\Phi + AO + P + \Pi P$$

$CT$  - price of goods

$CCM$  - price of raw materials

$3\Pi$  - workers' salary

$OC\Phi$  - payments in social funds

$AO$  - sum of depreciations

$P$  - taxes being paid from profit, including the interests for credits and etc.

$\Pi P$  - profit



Price DC

$$DC = 3\Pi + OC\Phi + AO + PP$$

$$DC = CT - CCM$$

$$C = CCM + 3\Pi + AO$$

At figure 1 is shown changes in production utility ( $\Pi$ ) multiplied by production capacity ( $V$ ) as the function of production basic cost ( $C$ ). The three hierarchy levels of production also are also shown. The changes in production utility as the function of production basic cost in the production processes for moving to next hierarchy level is represented. – point of zero profitability.

Our aim is to work out the methodology of comprehensive systematic analysis for production process at enterprise.

The function's surplus from point of zero profitability to point at curve of effectiveness is the rate of profitability for goods.

$$V_k \Pi_k \tag{1}$$

- profitability at k-point hierarchy level of production process

$$\Sigma V_k \Pi_k \tag{2}$$

- integral component in the profitability of goods, at k- point hierarchy level of production process

subtraction

$$\Sigma V_k \Pi_k - \Sigma V_{k+1} \Pi_{k+1} = \Delta \Sigma V \Pi \tag{3}$$

is the surplus in the profitability of goods for moving to next level of production process.

This figure shows the intensity surplus for function of production utility at various hierarchy levels. We are introducing the coefficient of profitability:

coefficient of profitability shows the rate of profitability at any point and characterizes the condition of production process.

$$P_k = \frac{V_k \Pi_k}{C_k} \tag{4}$$

$$C_k = \Sigma Q_j \Pi_j + T_{\text{жк}} + T_{\text{об}} \tag{5}$$



where:

$V_k$  - volume of producing goods by enterprise at k- hierarchy level

$P_k$  - profitability of production at k - hierarchy level

$C_k$  - production basic cost at k - hierarchy level

$Q_j$  - intensity of consumption by society for j-goods

$\Pi_j$  - utility j-goods for society

$Q_i$  - intensity of consumption by society for i-goods

$\Pi_k$  - utility k-goods of enterprise

$T_{\kappa}$  - utility of direct labor's expenses at enterprise (including taxis)

$T_{ob}$  - utility of labor's expenses at enterprise (including taxis)

coefficient  $T_{\kappa}$  includes the payments in salary fund, coefficient  $T_{ob}$  includes the tax on property, sum of depreciation, tax on roads using.

$$\Delta P = \frac{\Delta \sum Q \Pi}{\Delta C} \quad (6)$$

The coefficient of profitability shows the rate of profitability for production process. The limit of this ratio will be a limit of the ratio surplus for function of production utility over the surplus of production basic cost. Or derivative function of production utility  $F(C)$ . ( $\lim \Delta \Pi / \Delta C$ ).

So we have introduced the function of production condition (1) and the function of production process (2). For analyses  $F(C)$  function are taken into consideration the amount of derivative at points, coincided to various hierarchy levels, or the amount of surplus for production utility as the function of the amount of production basic cost.

Let's chose the coefficient of profitability as a key for production process analysis, and fulfill the sensitivity analysis of production process, as the function of various factors.

The consequence for sensitivity analysis is following:

1. The choice of the key factor of effectiveness (it should be a factor, which we have to improve with using the investment)
2. The choice of uncertain factors (unstable factors)
3. Putting the nominal determination for uncertain factors



4. The calculation of key factor for all chosen limits of uncertain factors.

Conclusions:

1. For systematic analysis of enterprise we have to analyze the figure of changes in production utility multiplied by production capacity as the function of production basic cost.

2. Thus, for process of function analysis we have to take into consideration the amount of derivative at various points and the surplus of derivative for moving to various hierarchy levels.

3. We can define the rate of profitability for production process at any hierarchy levels with using the surplus amount of derivative.

4. The coefficient of profitability is the key factor of production effectiveness, with using it can be determined the most sensitive hierarchy level and the most investment attractive.

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