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Reflection of the Efficiency of the Fixed Capital (Fixed Means) Into The Factories' Profit

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Abstract:

During the progress of any human activity, efficiency may be considered as a relationship between the efficiency effect obtained and the corespondent consumption of resources. The degree of reflection of of effiency of fixed in the profit of the enterprise constitutes an important aspect of the effiency of the enterprise activity. The enterprise system, prepared of an economic activity, builds its technical structura by means of fixed assets.

The main way of reflecting the fixed (real) capital into profit is its efficiency, practically the efficiency of the industrial equipments involved in the goods' making. In fact, through efficiency it is emphasized the technical, technological progress as a tendency and request of society's development. Concerning the efficiency of equipments and tools, it is distinguished on one hand the average efficiency, and on the other hand the marginal efficiency. [1]

The physical efficiency (where it is performed) or the value efficiency on unit, of the used factor, are expressed by the relations: $\bar{r} = \frac{Q}{Nu}$ or $\bar{r} = \frac{Q}{Tu}$ what, abstractly speaking, is equivalent to the expression of the production function $\bar{r} = \frac{Q}{x} = \frac{f(x)}{x}$ where "x" means the production factor "the fixed capital".

The second, that is the marginal efficiency, means the increase of physical or value production on an additional unit of the used factor (the fixed capital). Thus, marginal efficiency is equal to the relation between the production's variation (ΔQ) and the variation of the used factor that expresses, in fact, the effort factor (Δx).

This means that, for the production function Q = f(x) the marginal efficiency is equal to $\frac{\Delta Q}{\Delta x}$. For illustrating the marginal efficiency we admit the situation:

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Table nr.1

Changing factor x_i	**Obtained production Q - lei**	**Average efficiency $\bar{r} = \frac{Q}{x_i}$ lei**	**Marginal efficiency $r_m = \frac{\Delta Q}{\Delta x_i}$ lei**	**Coefficient of production's elasticity $E = \frac{r_m}{\bar{r}}$**
0	0	0	0	
1	20	20	20	1,00
2	50	25	30	1,2
3	100	33,3	50	1,5
4	180	45	80	1,78
5	225	45	45	1
6	250	41,7	25	0,60
7	271	38,7	21	0,54
8	271	33,9	0	0
9	255	28,3	-16	-0,56
10	237,5	23,8	-17,5	-0,74

Note: "x" factor can represent effort units made of 1000 working hours.

Monitoring the values' reaction Q, $\frac{Q}{x}$, $\frac{\Delta Q}{\Delta x}$, E there are noticed the followings:

▪ the evolution of the effort factor „x" from 1 to 4 causes a bigger and bigger increase of the production's volume (Q) with every additional unit of the effort (in the sense mentioned below). This means that in the respective area it is also circumscribed the area of the increasing efficiencies. The situation is also emphasized by the values of the elasticity coefficient of the production (1-1,78).

▪ the volume of the production continues to increase, but slowly, while the marginal efficiency is decreasing, and when the production's volume reaches the maximal value (271) the marginal efficiency is equal to "Q", after which it takes negative values. [2]

So, upon the above mentions, the following conclusions can be drawn:

▪ before the maximal value of $\bar{r}$ it results $r_m \rangle \bar{r}$, meaning that in this area the average efficiency of the x_1 factor is increasing, what denotes its sub-optimal use

▪ at the maximal value of $\bar{r}$, it appears the equality $\bar{r} = r_m$ ($\bar{r}$ is maximal, when its coefficient is null $\frac{\Delta \bar{r}}{\Delta x_i} = 0$.

This means that the x_i factor is optimally used technically speaking. In the context there are mentioned two things:

▪ the area of decreasing efficiencies remains in the managerial interest space because, beside taking into consideration the physical-value relation, there are taken into account also other variables (request: keeping of a market etc.);

▪ the area of negative efficiencies defined through the values of the marginal efficiency and of the elasticity coefficient is excluded from the efficiency calculation of the variable factor (in this case, the fixed means) at the economic agent level. [3]

Concerning the elasticity coefficient it is underlined that it eases the understanding of the correlation between the dinamics of the variable factor and that of the average and marginal efficiency of this coefficient. The analytic calculation of this coefficient is:

$$E = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta x_i}{x_i}} = \frac{\Delta Q}{\Delta x_i} \cdot \frac{x_i}{\bar{r}}$$

[1]

It is mentioned that in the marginalism theory applied in the field, it is more of a conceptual-managerial feature and less of a feature of rigorous practical use.

Remaining in the context of the implication of concept of marginal efficiency of the real fixed capital's use (even though in practice a big reticence exists), it can be identified also a connection with the profit. This would mean that to the aria of increasing efficiency it is correspondent also an aria of the increase of the profit afferent to the resulted production (the manufactured goods or the sold goods).

Practically, the estimation of the profit in the mentioned conditions would result on the basis of the relation:

$$(Q_n - Q_{n-1}) \cdot \overline{pr}_{n-1}$$

[2]

where:

Q_n – production corresponding to a "scale" of „x_i" effort;

$\overline{pr}_{n-1}$ - profit at 1 leu production in the scale of the effort "n-1".

We admit that in the moment 3 of the effort ($x_i = 3$) the profit at 1 leu production is 0,10 lei, it means that as a result of the moment 4, hence of the additional increase of the effort, the profit would also increase with: (180 – 100) . 0,10 = 8 lei.

Turning back to the mechanism of the reflection of the average efficiency into the profit's amount, this could be thus revealed:

$$\Delta P = Tu_1 \cdot \left(\overline{r_1} - \overline{r_0}\right) \cdot \overline{pr_0}$$

[3]

$$\Delta P = \overline{M}f_1 \cdot \frac{\overline{M}fa_1}{\overline{M}f_1} \cdot \frac{Tu_1}{\overline{M}fa_1} - \left(\frac{Qf_1}{Tu_1} - \frac{Qf_0}{Tu_0}\right) \cdot \overline{pr}_0$$

[4]

where:

$\overline{M}f_1$ - the volume of the total fixed means;

$\frac{\overline{M}fa_1}{\overline{M}f_1}$ - the technological composition of the fixed means;

$\frac{Tu_1}{\overline{M}fa_1}$ – the extensive use of the active fixed means;

$\left(\frac{Qf_1}{Tu_1} - \frac{Qf_0}{Tu_0}\right)$ - the hour average efficiency of the use of fixed means;

$\overline{pr}_0$ - the average profit at 1 leu goods manufacturing. [4]

For illustration there are used the data:

Table No.2

Criterion no.	Indexes	P_{n-1}	P_n
1.	Manufacturing of goods - lei	1.600.000	2.500.000
2.	Working time of industrial equipments - hours	800.000	1.000.000
3.	Hour average efficiency – lei	2	2,5
4.	Amount of the profit afferent to goods manufacturing (possible profit) – lei	160.000	300.000
5.	Average profit of 1 leu goods manufacturing	0,10	0,10
6.	Average value of fixed means - lei from which: active fixed means - lei	400.000 200.000	500.000 300.000
7.	Active fixed means at 1 leu of total fixed means (weight)	0,50	0,63
8.	Relation between working time and average value of the active fixed means (a form of expressing the use of the working time)	4	3,33

Upon the first modality, in the modification of the possible profit, the efficiency of the fixed capital's use (fixed means) is reflected with:

$$1.000.000 \cdot (2,5-2) \cdot 0,10 = +50.000 \ lei$$

[5]

Upon the second modality:

$$50.000 \cdot \frac{300.000}{500.000} \cdot \frac{1.000.000}{300.000} \cdot (2,5-2) \cdot 0,10 =$$
$$= 50.000 \cdot 0,6 \cdot 3,333 \cdot 0,5 \cdot 0,10 = +50.000 \ lei$$

[6]

Starting with the values of the variables from P_n it can be perfomed, basing on sensitivity's principles, the incidence of the efficiency of the fixed means (the real fixed capital) in P_{n-1} taking into account its level determined on increasing factors and on the basis of possible estimation.

In the first case, by talking into account P_{n+1}, an efficiency (in comparable prices) of 3 lei, in the other given conditions, would be transformed in a profit, equivalent to:

$$Tu \cdot (\bar{r}_{n+1} - \bar{r}_n) \cdot \overline{pr}_n = 1.000.000 \cdot (3-2,5) \cdot 0,12 = +60.000 \ lei$$

[7]

In case of possible estimation with the function: y = a + b(t) it would be thus acted:

Table No.3

n	y	t	t^2	y^t	f(t)
1	17	-5	25	-85	20,394
2	12	-3	9	-36	21,459
3	17,5	-1	1	-17,5	22,523
4	19	1	1	19	23,587

n	y	t	t^2	y^t	f(t)
5	23	3	9	69	24,652
6	25	5	25	125	25,714
$\sum$	116	0	70	74,5	x

$$a = \frac{\sum y}{n} = \frac{116}{6} = 19,33$$

[8]

$$b = \frac{\sum y \cdot t}{\sum t^2} = \frac{74,5}{70} = 1,0643$$

[9]

For n = f the hour average efficiency will be of 19,33 + (1,0643 · 7) = 26,78 lei the square average deviation.

Thus, the possible reflection into profit of the efficiency in P_{n+1}, is estimated at 1.000.000 · (2,68 – 2,5) · 0,12 = 21.600 lei ± the profit of the square average deviation.

Because it is about an effect of profit nature, it is obvious that through this, the efficiency of the fixed capital (fixed means) can be found in a chain of economic financial performances. [5]

As example, there are reminded:

a) efficiency of exploiting assets:

$$\frac{Tu_1 \cdot \left(\bar{r}_1 - \bar{r}_0\right) \cdot \overline{pr}_0}{Ae_1}$$

[10]

b) efficiency of fixed means;

$$\frac{Tu_1 \cdot \left(\bar{r}_1 - \bar{r}_0\right) \cdot \overline{pr}_0}{\overline{M}f_1}$$

[11]

c) efficiency of exploiting circulating assets;

$$\frac{Tu_1 \cdot \left(\bar{r}_1 - \bar{r}_0\right) \cdot \overline{pr}_0}{Ace_1}$$

[12]

d)efficiency of permanent capital;

$$\frac{Tu_1 \cdot \left(\bar{r}_1 - \bar{r}_0\right) \cdot \overline{pr}_0}{Cp_1}$$

[13]

e)efficiency of work caracterized on the basis of a profit on an employer;

$$\frac{Tu_1 \cdot \left(\bar{r}_1 - \bar{r}_0\right) \cdot \overline{pr}_0}{\overline{N}s_1}$$

[14]

f)capacity of self-financing and paying of capital etc. [6]

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