

**PERFECTING THE METHODOLOGY FOR ELABORATING  
THE BUDGETS OF INDIRECT EXPENDITURES; CALCULATING  
AND ANALYZING THE DEVIATIONS FROM STANDARDS  
IN THE ROMANIAN CHARCOAL MINING INDUSTRY**

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**Abstract:** Companies' activity should permanently be carried on according to the balance relation between incomes and expenditures. Nowadays, when dealing the worldwide economic crisis, companies do not manage to maintain such a balance; the expenditures determined by manufactured production overpass the incomes resulting after selling the production. Such things happen even when certain fields are subsidized by the State budget. Under such circumstances, the problem that managers have to face is that of finding out certain methods that allow them to size and control the previously mentioned balance relation. With these in view, we consider that the *budget* can become a matching tool and especially an improvement device of the relation between expenditures and incomes; *costs budgeting* becomes a systematic economic practice that implies the carrying out of a formal process of allocating financial resources with a view of achieving the goals formulated for the following period. (JEL: G31, H72, C10)

**Key words:** indirect production expenditures, standard expenditures, fixed expenditures, variable expenditures, mixed expenditures, the budget of indirect production expenditures, amount deviation, capacity deviation, and efficiency deviation.

### **Introduction**

The budget is currently considered to be a financial plan. It is the quantitative expression of an activity plan prepared during a previous period of time as compared with the period it refers to.

Budgeting consists in displaying in a table the data resulting after making predictions. Budgets are elaborated for short periods of time, usually for a calendar year, distributed according to trimesters and months. When the problem of varying the activity occurs, the adaptation of the budget to the new circumstances is done through previously elaborating certain flexible budgets predicted for several levels of activity.

At the same time, the problem of creating within a company certain autonomous sub-systems also occurs; they are called *expenditures centers* that target the improvement of employing resources and getting a profit. An expenditure center is an identifiable function or a part of the company for which expenditures can be identified. The profit center is an extension of this idea on a larger scale where not only costs but profits too are identifiable. The *budget center* is defined as a part of an entity upon which control can be exerted and for which a budget can be elaborated [5]. Accordingly,

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one can notice that a budget center can be an expenditures center, a group of expenditures centers or can coincide with a profit center.

Accordingly, an expenditure center administrates a partial budget, a component of the yearly general budget. The attribution of responsibilities according to expenditures centers can be done hierarchically [1].

Further, in order to exemplify the above data, we are going to consider a *production department* of a coal mining unit as an expenditures center\*. A production department represents a structural sub-division administratively clearly outlined.

### The model of the costs budget of a coal mining unit

Budgets' sizing has in view not only hierarchical relations among the unit's sub-systems but also the functional ones that imply the interdependence of drawing out the budgets according to the relation inflows – outflows. Those in charge with expenditures centers prepare the data regarding the foundation of the budget's size and are responsible for its implementation. Accordingly, budgeting technique implies the carrying out of the attributes of predicting, organizing, coordinating, and controlling expenditures at the level of each center; this essentially represents costs management. Moreover costs budgets administration supports the process of communicating and elaborating tactical and strategic decisions that regulate the activity of the unit [3].

The model of the costs budget (BC) of a coal mining unit can have as a basis a relation comprising several terms, namely several partial costs budgets. Accordingly:

$$BC = BCD + BCIP + BCGA \quad (1)$$

BCD represents the budget of indirect expenditures;

BCIP represents the budget of production indirect expenditures;

BCGA represents the budget of administrating general expenditures.

We should mention that the activity of the coal mining unit given as an example does not imply retail (selling) expenditures; accordingly, the above relation does not include the budget of retail expenditures. Coal retail (selling) is done by the coal preparation units which are organized as distinct economic entities.

As the title specifies, the paper approaches the problem of elaborating the budget of production indirect expenditures (BCIP), of the calculation, and analysis of the deviations from standard indirect expenditures (fixed by the budget).

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\*In order to give an example we have considered the case of a coal mining unit.

### Elaboration of the budget of indirect production expenditures

Indirect production expenditures are also known as “common expenditures of departments”.

Within a coal mining unit, budgets of indirect production expenditures for each production department can be elaborated. The budget has as a main goal the efficient sizing of the expenditures determined by the activity of a production department.

Within this type of budget, indirect production expenditures are grouped according to three categories:

- Equipments maintenance and functioning expenditures;
- General expenditures of the department;
- Administration expenditures.

In order to elaborate BCIP one can choose the analytical procedure known in specialized works as the “procedure of individual standards” [2]. According to this procedure, the ground of calculating indirect standard production expenditures is the yearly mean of the last 2-3 years expenditures.

At the same time, in order to elaborate BCIP one should notice the content of the expenditures, their different behavior against the amount of production as well as the jobs they provide [2]. The methodology employed is different depending on whether the amount of standard production is almost equal or not with the average amount of the last 2-3 years production. Accordingly, in case standard production is almost equal with the average one, one can adopt as a standard the average indirect production expenditures correlated, at most, with the value of the stimulation factor (or inflation index). When the amount of standard production significantly differs from the amount of average production, the settling of individual standards has in view the behaviors of the different categories of expenditures as compared with the physical amount of production. These different procedures are employed for the three categories of expenditures: fixed expenditures, variable expenditures, and mixed expenditures [2].

In fact, in order to elaborate BCIP for a certain production department of a coal mining unit one should start from the accounting of the expenditures registered during the last years. Out of the accounting one is going to extract the indirect production expenditures registered during the last years and group them, from the beginning, into the three categories mentioned above.

In case of *fixed indirect expenditures*, standards determination does not raise serious problems as their relatively unchanged character against the changes of the amount of production allows the adoption of a standard of the previous year/years without any correction.

In case of *variable indirect expenditures* standards determination implies the carrying out of the following stages [2]:

- The correlation of average expenditures afferent to the mentioned period with the amount of standard production, using the following relations:

$$\overline{ch_v} = \frac{\overline{Ch_v}}{\overline{Q}} \quad \text{and} \quad Ch_{vc} = \overline{ch_v} \times Q_s \quad (2)$$

Where:

$\overline{ch_v}$  represents the average variable expenditures per product unit;

$\overline{Ch_v}$  represents the total average variable expenditures;

$\overline{Q}$  represents the average amount of production;

$Ch_{vc}$  represents the total variable expenditures correlated with the amount of production;

$Q_s$  represents the standard amount of production.

- The taking into consideration of the stimulation factor (or of the inflation index):

$$Ch_{vs} = Ch_{vc} - Ch_{vc} \times F\% \quad (3)$$

Where:

$Ch_{vs}$  represents total standard variable expenditures;

$F\%$  represents the percent of the stimulation factor.

In order to exemplify these facts we are going to notice the following data for a certain production department:

- During year N (the year the budget is elaborated for) the standard amount of coal production is estimated at 88760 tons;
- Out of the accounting of the last three years the following data can be extracted:
- The average amount of production: 84560 tons;
- The total average variable expenditures: 186390 Lei out of which:
  - Expenditures for technical revisions and maintenance of the transport means of the production department: 98520 Lei;
  - Expenditures for capital repairs of the department's transport equipments and means: 80110 Lei;
  - Expenditures for the department's environment protection: 7760 Lei;
  - The chief of the department proposes the use of a stimulation factor of 2% as he/she considers that the new level of expenditures does not imply enough efforts made by the employees in order to remain within the limits of that level.

Due to the use of the above formulae, one can determine the standards of the three categories of variable indirect expenditures. Accordingly, in case of the "expenditures for technical revisions, current repairs, and the maintenance of transport means" the result is the following one:

$$\overline{ch_v} = \frac{98520}{84560} = 1.16508 \text{ Lei/ton}$$

$$Ch_{vc} = 88760 \times 1.16508 = 103412.5 \text{ Lei}$$

$$Ch_{vs} = 103412.5 - 103412.5 \times 2\% = 101344.25 \text{ Lei}$$

The procedure is the same in case of the other expenditures, namely “expenditures for capital repairs of transport equipments and means”

( $Ch_{vs} = 82407.19 \text{ Lei}$ ) and “environment protection expenditures”

( $Ch_{vs} = 7981.72 \text{ Lei}$ ).

In case of *mixed indirect expenditures* standards determination implies the separation of the variable part from the fixed part for each expenditure and their separate treatment according to the methodology specific for fixed or variable expenditures [2]. In order to do this we are going to use the “procedure of the maximum and minimum points” and determine the following:

- The average variable expenditure per product unit:

$$\overline{ch_v} = \frac{Ch_{max} - Ch_{min}}{Q_{max} - Q_{min}} \quad (4)$$

Where:

$Ch_{max}$  represents the maximum level of mixed expenditures during the mentioned period;

$Ch_{min}$  represents the minimum level of mixed expenditures during the mentioned period;

$Q_{max}$  represents the maximum amount of production afferent to the mentioned period;

$Q_{min}$  represents the minimum amount of production afferent to the mentioned period;

- The variable part of mixed expenditures ( $Ch_v$ ):

$$Ch_v = Q_{max} \times \overline{ch_v} \quad (5)$$

- The fixed part of mixed expenditures ( $Ch_f$ ):

$$Ch_f = Ch_{max} - Ch_v \quad (6)$$

Where:

$Ch_f$  represents the total fixed expenditures.

- The correlation of variable expenditures with the amount of standard production during year N:

$$Ch_{vc} = \overline{ch_v} \times Q_s \quad (7)$$

- The use of the stimulation factor in order to determine standard total variable expenditures:

$$Ch_{vs} = Ch_{vc} - Ch_{vc} \times F\% \quad (8)$$

- Standard mixed expenditures ( $Ch_s$ ):

$$Ch_s = Ch_{vs} + Ch_f \quad (9)$$

In order to exemplify these we are going to consider the following data afferent to a production department:

- Out of the accounting afferent to the last three years the following elements result:
  - The maximum amount of production: 85750 tons;
  - The minimum amount of production: 83250 tons;
  - Mixed expenditures are given by the “labor protection expenditures” that have registered during the analyzed period a maximum level of 32000 Lei and a minimum level of 31500 Lei.
- Stimulation factor represents 2%.

Further we are going to determine the labor protection expenditures of the production department:

$$ch_v = \frac{32000 - 31500}{85750 - 83250} = \frac{500}{2500} = 0.2 \text{ Lei/ton}$$

$$Ch_v = 85750 \times 0.2 = 17150 \text{ Lei}$$

$$Ch_f = 32000 - 17150 = 14850 \text{ Lei}$$

$$Ch_{vc} = 0.2 \times 88760 = 17752 \text{ Lei}$$

$$Ch_{vs} = 17752 - 17752 \times 2\% = 17396.96 \text{ Lei}$$

$$Ch_s = 17396.96 + 14850 = 32246.96 \text{ Lei}$$

According to the above calculations one can draw out the budget of indirect production expenditures (BCIP) elaborated for a production department of a coal mining unit (table no.1).

#### Calculation and analysis of deviations from indirect production expenditures settled by the budget (standard)

Taking into account the complex character of indirect production expenditures as well as the special methodology of control of such expenditures, one can calculate three categories of deviations [2]: amount deviations, capacity deviations, and efficiency deviations.

- *Amount deviations* represent deviations of effective production indirect expenditures as compared with those registered in the *budget*. Accordingly, there are two variants that allow the calculation of this type of deviation:

- a. Deviations from the initial budget;
- b. Deviations from the recalculated budget.

*The deviations from the initial budget* represent deviations from the effective indirect expenditures as compared with those mentioned in the initial budget. They are calculated as a difference between effective expenditures and standard expenditures (of the budget).

*The deviations from the recalculated budget* are determined in order to correlate indirect production expenditures with the amount of the activity carried

out which deviates from the standard one. The recalculation is done only in case of variable and mixed expenditures as fixed expenditures are not generally influenced by the changes of production amount.

The recalculation of variable expenditures is done as follows:

$$Ch_r = \frac{Ch_b}{V_s} \times V_e \quad (10)$$

$$\text{or} \quad Ch_r = \frac{V_e}{V_s} \times Ch_b \quad (11)$$

Where:

$Ch_r$  represents recalculated expenditures;

$Ch_b$  represents expenditures according to recalculated budget;

$V_s$  represents the amount of standard activity expressed in hours;

$V_e$  represents the amount of effective activity expressed in hours.

Irrespective of the chosen variant, calculations are done for all variable indirect expenditures.

In order to exemplify we are going to use the data of table no.2 that displays the indirect expenditures of the analyzed production department afferent to a month of year N. The table displays both the effective expenditures registered by accounting and the standard ones mentioned by BCIP (budget whose elaboration methodology has been previously exhibited).

Owing to one of the relations mentioned above we can recalculate variable indirect expenditures. For example, the recalculation of "equipments maintenance and repair expenditures":

$$Ch_r = \frac{14100}{36000} \times 35500 = 13904.16 \text{ Lei}$$

Mixed expenditures are recalculated by taking into account their hour share of activity determined when budgeting and the hours of productive activity that have not been carried out. From the total budget the variable part is subtracted (corresponding to the hours of activity that have not been carried out); what we get are standard mixed expenditures (that correspond to the amount of activity effectively carried out). Accordingly, in case of labor protection expenditures we get:  $2700 - 500 \times 200 = 2600$  Lei.

After recalculating the budget, deviations are different, a fact that determines other conclusions and measures that need to be adopted.

- *Capacity deviation* shows standard indirect expenditures corresponding to the hours that have not been worked (500 hours). In order to calculate this type of deviation one should compare standard expenditures (afferent to the effective hours of productive activity) either with standard indirect expenditures of the initial budget or with standard indirect expenditures of the recalculated budget. Capacity deviation ( $A_C$ ) is calculated according to the following formula:

$$A_C = \sum_{i=1}^n Ch_{bi} - \left( \frac{\sum_{i=1}^n Ch_{bi}}{V_s} \times V_e \right) \quad (12)$$

Where:

$Ch_b$  represents the indirect expenditures according to the initial budget;

$i$  represents the type of indirect expenditures,  $i = \overline{1, n}$ .

Using the data in the previous example, first the result is going to be the following:

- Standard indirect expenditures afferent to the 36000 standard hours of activity: 73000 Lei;
- Standard indirect expenditures afferent to the effective hours of activity:  $73000/36000 \times 35500 = 71986$  Lei;
- Deviation from initial budget:

$$A_C = 73000 - 71986 = +1014 \text{ Lei}$$

In the second case (when we are going to use the data of the recalculated budget) the result is the following:

- Indirect expenditures according to the recalculated budget afferent to the 36000 standard hours of activity: 72676 Lei;
- Standard expenditures afferent to the effective hours of activity: 71986 Lei;
- Deviation from the recalculated budget:

$$A_C = 72676 - 71986 = +690 \text{ Lei}$$

- Efficiency deviation represents standard indirect expenditures afferent to the difference between the hours effectively worked and those admitted by the budget (standard) for the extracted production amount.

The formula of calculus in case of efficiency deviation is the following one:

$$A_R = \left( \frac{\sum_{i=1}^n Ch_{ti}}{V_s} \times V_e \right) - \left( \frac{\sum_{i=1}^n Ch_{bi}}{Q_s} \times Q_e \right) \quad (13)$$

Where:

$Q_s$  represents the amount of standard production;

$Q_e$  represents the volume of the production effectively extracted.

The figures are as follows:

$$A_R = \left( \frac{73000}{36000} \times 35500 \right) - \left( \frac{73000}{7396} \times 7300 \right) = -66,35 \text{ Lei}$$

We can state that in order to determine  $A_R$  from the standard expenditures afferent to the effective hours of activity one should subtract the standard



expenditures afferent to the hours admitted by the budget for the extracted production. The calculations show an improvement of the efficiency that represents 66.35 Lei saving. The results of the calculation of capacity deviations and efficiency deviations during a month of year N are displayed by table 3.

**Table 1. The budget of indirect production expenditures (BCIP)**

Explanations	Expenditures (- Lei-)	
	Average during the last 3 years	Budget (standard) afferent to year N
Activity amount (tons)	84560	88760
<b>Fixed expenditures:</b>	189162	189162
1. Salaries of management, technical, economic, service, and administration staff, social insurances contributions and unemployment fund contributions	117830	117830
2. Amortization of buildings and other corporal immobilizations	18000	18000
3. Outdated inventory objects	12100	12100
4. Heating expenditures	18480	18480
5. Lighting up electrical energy	10060	10060
6. Department's airing expenditures	506	506
7. Stuff for maintaining and cleaning the buildings and other corporal immobilizations	1232	1232
8. Water, waste water, cleaning, administration	1054	1054
9. Other fixed expenditures	9900	9900
<b>Variable expenditures:</b>	186390	191733
1. Technical revisions, current repairs, and maintenance of the department's transport means expenditures	98520	101344
2. Capital repairs of the department's transport equipments and means expenditures	80110	82407
3. Environment protection expenditures	7760	7982
<b>Mixed expenditures:</b>	31750	32247
1. Labor protection	31750	32247
<b>TOTAL</b>	<b>407302</b>	<b>413142</b>

*Source: Production department no. 1*

**Table 2. Calculation of amount deviations – June N**

Explanations	Indirect expenditures (Lei)	Deviations (+/-)	Expenditures according to	Deviations (+/-)
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	According to accounting data	According to the initial budget		recalculated budget	
<b>Manufactured production</b> (tons of coal)	7300	7396	-96	7396	-96
<b>Hours of activity</b>	35500	36000	-500	36000	-500
<b>Indirect expenditures:</b>	72700	73000	-300	72676	+24
• Salaries of management, administration staff, including social protection and insurances contributions	9800	9900	-100	9900	-100
• Equipments amortization	1500	1500	0	1500	0
• Outdated inventory objects	1000	1050	-50	1050	-50
• Other fixed expenditures	750	850	-100	850	-100
• Equipments maintenance and repairs	14300	14100	+200	13904	+396
• Driving electrical energy	1500	1300	+200	1282	+218
• Other variable expenditures	700	700	0	690	+10
• Labor protection	2650	2700	-50	2600	+50
• Share of general administration and retail expenditures	40500	40900	-400	40900	-400
Out of which:					
- Fixed expenditures	53550	54200	-650	54200	-650
- Variable expenditures	16500	16100	+400	15876	+624
- Mixed expenditures	2650	2700	-50	2600	+50

Source: Production department no.1

### Summary

Budgeting consists in displaying in a table the data resulting after making predictions. Budgets are elaborated for short periods of time, usually for a calendar year, distributed according to trimesters and months. When the problem of varying the activity occurs, the adaptation of the budget to the new circumstances is done through previously elaborating certain flexible budgets predicted for several levels of activity.

**Table 3. Calculation of capacity and efficiency deviations**

Explanations	Capacity deviation (- Lei-)
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	From non-recalculated budget	From recalculated budget	
Indirect expenditures:	+ 1014	+690	-66.35
Salaries of management, administration staff, including social protection and insurances contributions	137.50	137.50	-9.0
Equipments amortization	20.84	20.84	-1.4
Outdated inventory objects	14.58	14.58	-1.0
Other fixed expenditures	11.81	11.81	-1.8
Equipments maintenance and repairs	195.83	-0.17	-12.9
Driving electrical energy	18.06	0.06	-1.2
Other variable expenditures	9.72	-0.28	-0.7
Labor protection	37.60	-62.40	-2.5
Share of administration general expenditures	568.06	568.06	-35.85

Source: Production department no.1

## References

- [1] Călin O., Man M., Manolescu M., *Contabilitatea de gestiune și calculația costurilor*, C. F. CĂLIN "Economic Tribune" Publishing House, Bucharest 2005.
- [2] Călin O., Man M., Nedelcu M.V., *Contabilitatea managerială*, Didactic and Pedagogic Publishing House, Bucharest 2008.
- [3] Dima I. C., Man M., *Control de gestiune*, AGIR Publishing House, Bucharest 2003.
- [4] De Rongé Y., Cerrada K., *Contrôle de gestion*, Pearson Education France 2005.
- [5] Lucey T., *Costing*, DP Publication, Aldine Place, London 1993.

## **DOSKONALENIE METODOLOGII OPRACOWYWANIA BUDŻETÓW WYDATKÓW POŚREDNICH; OBLICZANIE I ANALIZA ODCHYLEŃ OD STANDARDÓW W PRZEMYSŁE WĘGLA DRZEWNEGO W RUMUNII**

**Streszczenie:** Działalność przedsiębiorstw powinna być stale utrzymywana zgodnie z prawem równowagi dochodów i wydatków. Obecnie, mając do czynienia na całym świecie z kryzysem gospodarczym, firmy nie radzą sobie z utrzymaniem takiej równowagi; wydatki określane są przez produkcję pomijając przychody wynikające ze sprzedaży produkcji. Takie sytuacje mają miejsce nawet wtedy, gdy niektóre obszary są dotowane przez budżet państwa. W takich okolicznościach, problemem dla managerów jest dobranie określonych metod pozwalających na mierzenie i kontrolę wcześniej wspomnianej równowagi. Mając to na uwadze, uważamy, że budżet może stać się narzędziem łączącym, w szczególności służącym do poprawy zależności między wydatkami i dochodami, a budżetowanie kosztów staje się systematyczną praktyką gospodarczą, która sugeruje, że prowadzenie formalnego procesu przyznawania środków finansowych połączone jest z zamierzeniem osiągnięcia celów wyznaczonych w następnym okresie.