THE FLEXIBLE BUDGET– BASIC TOOL OF THE MANAGEMENT CONTROL IN THE ECONOMIC ENTITIES

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Abstract: In the content of this article we emphasize the importance of flexible budgeting of expenses for an economic entity. We focused on indirect costs of production, since they include both variable costs and fixed costs, and the way of their budgeting is different. In the first part of the paper we illustrate how to prepare a flexible budget for more predictable levels of activity, and in the second part, we show how to recalculate budgeted expenses for the actual volume of activity. The budget recalculated for the actual volume of activity allows the comparison, in the correct way, of expenditure forecast to those actually incurred, expenses that relate to the same volume of activity.

Key words: budget; deviations; costs; control; levels of activity.

JEL Classification Codes: M41, L210

1. INTRODUCTION

Any activity requires knowledge of both the objectives to be attained, to be carried out, as well as the resources required to achieve those objectives. To cope with environmental changes, enterprises must increase their degree of monitoring and control of the business.

Forecasting tools are the inevitable starting point of the control process. The instruments used include the budget as a management tool and as a method of management. H. Bouquin mentioned that the budget is necessary ,,in order to lead, to manage the complex information system of an enterprise, in order to satisfy the imperative need to predict" (Bouquin, 1994).

2. FLEXIBLE BUDGET FOR DIFFERENT LEVELS OF ACTIVITY

We may prepare budgets which vary according to the volume of activity, while maintaining at the same time a link between them, i.e. the assumptions relating to expenditure behavior (unit cost for variable costs and total cost for fixed costs) for each of these budgets remain the same. In this case, we are talking about flexible budget in opposition with the fixed budget. The latter is drawn up for a single volume of the activity and shall be valid only for this volume. Its usefulness is thus reduced in relation to that of flexible budget (Brault & Giguère, 2003).

Flexible budget is a forecast of expenditure of a centre of analysis established for different assumptions of the activity level. The flexible budget of expenditure shall be adapted to foreseeable changes which may arise in the volume of activity carried out by the enterprise, adapts to several different volumes of work units (Epuran et al., 1999).

A condition is however essential in the implementation of the flexible budget: must be known the costs behavior in relation to the volume of activity. In a flexible budget we will find

two kinds of costs: variable costs and fixed costs. If there are semi-variable costs, they will be decomposed into fixed and variable. Variable costs are expenses of which overall value has a tendency to follow the behavior of the activity volume expressed in units of work. As work units can be used to assess the workload of a centre for analysis and budgeting indirect costs: number of hours of operation of the equipment (machine hours), number of hours of direct labor (man hours), the volume of production obtained (when production is homogeneous and can be summed). Fixed costs are expenses which remain rather constant in relation to the volume of activity (for example, linear depreciation is the same regardless of the number of units of work). Semi-variable expenses are expenses which have a fixed part and a part which varies in relation to the volume of activity.

For budgeting the expenditure must be taken into account the following aspects:
- fixed costs remain the same regardless of the level of activity;
- variable costs correlate with the volume of work.

The flexible expenditure budgets present indirect expenses of the place of costs for which they shall be drawn up in respect of the different levels of activity within a given period considered as relevant for the following year.

The methodology of preparation is the following:
a) identifying the range within which it is considered that activity will vary during the period under budgeting;
b) determining the spending behavior depending on which they are included in the category: fixed, variable or semi-variable;
c) expenditures are budgeted for each activity level so:

c.1) fixed costs remain the same at all levels of activity;

c.2) variable costs are calculated according to the relationship:
$$CV_x = cv_u \times A_x \qquad (1)$$
where:

CV_x – variable costs budgeted for level of activity x;

cv_u – variable cost of the unit of work;

A_x – volume x of activity (number of units of work).

Another way of determining variable costs consist of costs related to the maximum degree of activity (100%) with different degrees of activity (X%) of retained budget range.
$$CV_x = CV_{max} \cdot X\% \qquad (2)$$

c.3) semi-variable costs are budgeted based on the formula:
$$CS_x = (A_x \times cv_u) + Ch_f \qquad (3)$$
where:

CS_x – semi-variable costs budgeted for the level x of activity;

A_x – volume of activity corresponding the degree x of activity;

cv_u – unitary variable part of semi-variable cost;

Ch_f – fixed part of semi-variable cost, in the absolute amount.

We intend to illustrate the preparation of flexible budget of the indirect production costs for a production facility. We start from the volume of activity and from the indirect costs from the previous year, presented in Table 1. The operating unit used is the number of hours worked.

For the year N+1, following estimates made by management control department, it was concluded that the volume of planned activity will be within the range of 70% - 100% of the maximum activity level which is 704.122 hours. Company decides flexible budgeting for levels of activity 70%, 80%, 90%, 100%.

We begin with the preparation of the budget for the maximum level of activity.

Fixed costs budgeted for the year N+1 remains at the same level of the previous year.

Table 1. Level of indirect production costs from year N

Crt. no.	Name of the cost	Values N
I.	**Volume of activity (hours)**	**576.100**
1.	**Fixed costs**	**597.091**
1.1.	Maintenance expenses under contracts	183.593
1.2.	Depreciation	330.085
1.3.	Metrology taxes	11.021
1.4.	Expenses with technological developments, new products	17.439
1.5.	Other fixed costs	54.953
2.	**Variable costs**	**658.009**
2.1.	Equipment repair	225.637
2.2.	Electricity for driving purposes	64.552
2.3.	Transportation costs	274.509
2.4.	Other variable costs	93.311
3.	**Semi-variable costs**	**149.811**
3.1.	Wages	121.604
3.2.	Costs with labour protection	8.898
3.3.	Costs with phone, fax	19.309
II.	**Total indirect production costs**	**1.383.920**
III.	**Indirect costs per hour of activity**	**2,4**

Variable costs for N+1 are determined by correlating actual variable costs per unit of the reference period with the volume of budgeted activity. Calculation steps are:
- determining the variable costs per unit in the reference period:

$$cv_u = \frac{CV_N}{H_N} \qquad (4)$$

where:

cv_u - variable costs per hour of activity;

CV_N - total variable costs of the reference period;

H_N - volume of activity expressed in hours in the reference period.

- determining the budgeted variable costs:
$$CV_b = cv_u \times H_b \qquad (5)$$
where:

CV_b – budgeted variable costs;

H_b – volume of activity in the budget.

First are going to be calculated costs for the maximum activity level (table 2).

Table 2. Variable costs budgeted for the maximum level of activity

Crt. no.	Name of the cost	Equipment repair	Electricity for driving purposes	Transportation cost	Other variable costs
1	Variable costs from previous year (lei)	158.907	64.552	274.509	93.311
2	Volume of activity from the previous year (hours)	576.100	576.100	576.100	576.100
3	Unit variable costs from the previous year (lei/h) (1/2)	0,3916	0,1120	0,4765	0,1620
4	Budgeted volume of activity (hours)	704.122	704.122	704.122	704.122
5	*Budgeted indirect variable costs (lei) (3 x 4)*	*275.734*	*78.862*	*335.514*	*114.068*

Then, for the other levels of activity, variable costs are going to be determined based on the relationship:

$$CV_x = CV_{max} \cdot X\% \qquad (6)$$

where:

CV_x – variable costs budgeted for level of activity x;

CV_{max} – variable costs related to the maximum level of activity;

X - levels of activity.

In the following it is exemplified the calculation of costs with equipment repair for different levels of activity:

- for activity level 100%: CV_{100} x100% = 275.734 lei h.
- for activity level 90%: CV_{100} x 90% = 275.734 lei x 90% = 248.160 lei.
- for activity level 80%: CV_{100} x 80%= 275.734 lei x 80% = 220.608 lei
- for activity level 70%: CV_{100} x 70%= 275.734 lei x 70% = 193.014lei.

Budgeting variable costs can be carried out also by weighting variable cost per hour of activity with the volume of activity expressed in hours:

$$CV_x = cv_u \times A_x \qquad (7)$$

where:

CV_x – variable costs budgeted for level of activity x;

cv_u – variable cost per hour of activity;

A_x – activity volume corresponding to level x.

X – levels of activity;

The activity volume corresponding to activity levels is:

$$A_x = A_{max} \times X\% \qquad (8)$$

where: A_{max} – maximum activity level.

- for activity level 100%: A_{100} x100% = 704.122 h.
- for activity level 90%: A_{100} x 90% = 704.122 h x 90% = 633.710 h.
- for activity level 80%: A_{100} x 80%= 704.122 h x 80% = 563.298 h.
- for activity level 70%: A_{100} x 70%= 704.122 h x 70% = 492.885 h.

Costs with equipment repairs for different activity volumes:

- for activity level 100%: A_{100} x cv_u = 704.122 h x 0,3916 lei/h = 275.734 lei
- for activity level 90%: A_{90} x cv_u = 633.710 h x 0,3916 lei/h = 248.160 lei
- for activity level 80%: A_{80} x cv_u = 563.298 h x 0,3916 lei/h = 220.608 lei
- for activity level 70%: A_{70} x cv_u = 492.885 h x 0,3916 lei/h = 193.014 lei.

For the other variable costs, calculations are similar. Their centralization, by predictable levels of activity, is found in Table 3.

Table 3. Other variable costs for different volumes of activity

Predictable operating levels	Electricity for driving purposes	Transportation cost	Other variable costs
100%	78.862	335.514	114.068
90%	70.976	301.963	102.661
80%	63.090	268.411	91.254
70%	55.203	234.860	79.848

Semi-variable costs are budgeted starting from their fixed and variable part from the previous year. To this end we can use the method of maximum and minimum points. The steps are:

1. Determining the unit rate representing the variable part of semi-variable costs, by applying the following formula:

$$ch_v = \frac{(CS\,max.\ CS\,min.)}{(H\,max.\ H\,min.)} \qquad (9)$$

where:

ch_v – unitary variable part of semi-variable costs;

CS max. – maximum semi-variable costs;

CS min. – minimum semi-variable costs;

H max. – maximum volume of activity;

H min. – minimum volume of activity.

2. Determining the total variable part of actual semi-variable costs from a previous period, according to the following formula:

$$Ch_v = H_e \times ch_v \qquad (10)$$

where:

Ch_v – variable part of actual semi-variable costs;

H_e – actual volume of activity from the previous period;

ch_v – unitary variable part of semi-variable costs.

3. Determining the fixed part of semi-variables costs according to the formula:

$$Ch_f = CS_e - Ch_v \qquad (11)$$

CS_e – semi-variable costs from the previous period;

Ch_f – fixed part of actual semi-variable cost.

4. Budgeting the two categories of expenditures, according to the methodology specific to variable costs, fixed respectively, presented above.

5. Calculation of semi-variable costs budgeted by summing the two sizes resulting from the calculation.

$$CS_b = Ch_{vb} + Ch_{fb} \qquad (12)$$

CS_b – budgeted semi-variable costs;

Ch_{vb} – variable part of budgeted semi-variable cost;

Ch_{fb} – fixed part of budgeted semi-variable cost.

As in the case of the variable costs, first will be calculated the costs for a maximum activity level, and then for the other levels of activity. The applicable relationship is:

$$CS_x = (H_x \times ch_v) + Ch_f \qquad (13)$$

where:

CS_x – semi-variable costs budgeted for level of activity x;

H_x – volume of activity related to level x;

ch_v – unitary variable part of semi-variable cost;

Ch_f – fixed part of semi-variable cost in absolute amount.

For the determination of the variable and fixed part of semi-variable costs within the department, the management and control department of the company considers as significant the data of the last five months until the date of budgeting (Table 4).

Table 4. Unitary variable rate of semi-variable costs

Name of the cost	July	Aug.	Sep.	Oct.	Nov.	Unitary rate of semi-variable costs
Volume of activity (hours)	42.778	45.234	45.353	47.712	48.006	-
Wages (lei)	9.960	10.019	10.025	10.121	10.134	(10.134 – 9.960) / (48.006 – 42.778) = 0,0333
Costs with labour protection (lei)	687	706	707	737	741	(741 – 687) / (48.006 – 42.778) = 0,0103
Costs with telephone, fax (lei)	1.554	1.573	1.575	1.605	1.609	(1.609 – 1.554) / (48.006 – 42.778) = 0,0105

To determine the fixed part of the semi-variable costs is using data from November N (Table 5):

Table 5. Determination of the fixed part of semi-variable cost

Name of the cost	Volume of activity (hours)	Unitary rate of variable cost (lei/h)	Variable costs in Nov. (lei)	Total semi-variable costs in Nov (lei)	Fixed costs per month (lei)	Fixed costs per year (lei)
0	1	2	3 = 1 x 2	4	5 = 4 - 3	6 = 5 x 12
Wages	48.006	0,0333	1.599	10.134	8.535	102.420
Costs with labor protection	48.006	0,0103	494	741	247	2.964
Costs with telephone, fax	48.006	0,0105	504	1.609	1.105	13.260

For budgeting semi-variable costs for different levels of activity the next relation applies:
$$CS_x = (A_x \times cv_u) + Ch_f \qquad (14)$$

The unitary variable and fixed part of the semi-variable cost are retaken from Table 7. For wages, the calculations are:
- for activity level 100%: $(A_{100} \times cv_u) + Ch_f$ = 704.122 h x 0,0333 lei/h + 102.420 lei = 125.867 lei
- for activity level 90%: $(A_{90} \times cv_u) + Ch_f$ = 633.710 h x 0,0333 lei/h + 102.420 lei = 123.523 lei
- for activity level 80%: $(A_{80} \times cv_u) + Ch_f$ = 563.298 h x 0,0333 lei/h + 102.420 lei = 121.178 lei
- for activity level 70%: $(A_{70} \times cv_u) + Ch_f$ = 492.885 h x 0,0333 lei/h + 102.420 lei = 118.833 lei.

For the other semi-variable costs, calculations are similar.
After the budgeting calculation for indirect costs for different levels of activity, it may be made the flexible budget for the department under analysis (Table 6).

3. RECALCULATED BUDGET FOR THE REAL ACTIVITY

For the budget control, the budget revised or adjusted is recalculated:
- based on the real activity;
- preserving rules that the initial budget was founded on.
Recalculated budget is prepared at the end of the period, when the actual level of activity is known. Comprising both variable and fixed costs, flexible budget recalculated for the actual volume of activity is expressed as an equation of the form:
$$BC_r = cv_u \times A_r + CF \qquad (15)$$
where:
BC – expense budget recalculated to the actual volume of activity;
cv_u – unit variable cost of the work unit;
A_r – volume of the real activity expressed in units of work;

CF – total amount of fixed costs.

Table 6. Flexible budget for indirect production costs for N+1

Crt. no.	Name of the cost	Values budgeted N+1			
		100%	**90%**	**80%**	**70%**
I.	**Volume of activity (hours)**	704.122	633.710	563.298	492.885
1.	**Fixed costs**	**597.091**	**597.091**	**597.091**	**597.091**
1.1.	Maintenance expenses under contracts	183.593	183.593	183.593	183.593
1.2.	Depreciation	330.085	330.085	330.085	330.085
1.3.	Metrology taxes	11.021	11.021	11.021	11.021
1.4.	Expenses with technological developments	17.439	17.439	17.439	17.439
1.5.	Other fixed costs	54.953	54.953	54.953	54.953
2.	**Variable costs**	**804.178**	**723.760**	**643.363**	**562.925**
2.1.	Equipment repair	275.734	248.160	220.608	193.014
2.2.	Electricity for driving purposes	78.862	70.976	63.090	55.203
2.3.	Transportation costs	335.514	301.963	268.411	234.860
2.4.	Other variable costs	114.068	102.661	91.254	79.848
3.	**Semi-variable costs**	**156.736**	**152.928**	**149.119**	**145.309**
3.1.	Wages	125.867	123.523	121.178	118.833
3.2.	Costs with labor protection	10.216	9.491	8.766	8.041
3.3.	Costs with phone, fax	20.653	19.914	19.175	18.435
II.	**Total indirect production costs**	**1.558.005**	**1.473.779**	**1.389.573**	**1.305.325**
III.	**Indirect costs per hour of activity**	**2,21**	**2,33**	**2,47**	**2,65**

Assuming that the real activity of the enterprise in the period under analysis was 600.000 hours, the budget recalculated for the actual activity is:

1. Fixed costs recalculated remain identical to those of the initial budget.

2. Variable costs are recalculated based on the actual volume of activity:

$$CV_r = cv_u \times A_r \qquad (16)$$

- Equipment repairs: 0,3916 lei/h x 600.000 h = 234.960 lei
- Electricity: 0,1120 lei/h x 600.000 h = 67.200 lei
- Transportation costs: 0,4765 lei/h x 600.000 h = 285.900 lei
- Other variable costs: 0,1620 lei/h x 600.000 h = 97.200 lei

3. Semi-variable costs are recalculated taking into account their fixed and variable part:

$$CS_r = cv_u \times A_r + CF \qquad (17)$$

- Wager: 0,033 lei/h x 600.000 h + 102.420 lei = 122.400 lei
- Costs with labor protection: 0,0103 lei/h x 600.000 h + 2.964 lei = 9.144 lei
- Costs with telephone, fax: 0,0105 lei/h x 600.000 h + 13.260 lei = 19.560 lei

The budget recalculated for the actual volume of activity, for the department under analysis, is presented in Table 7.

4. CONCLUSION

Following the above analysis we can conclude that the concept of cost budgeted (default) can lead to confusion. It can be:
- budgeted cost for budgeted production;
- budgeted cost for actual production quantity (recalculated cost).

In the case of static (fixed) budget, at the end of the period, when deviations are calculated in relation to provisions, budgeted amounts are not adjusted according to the actual level of

activity in the period under budget. In this case, the difference: actual cost of the actual production – pre-established cost of budgeted production is less significant because it compares the cost associated with two different production volumes.

Table 7. Budget recalculated for the indirect production costs for N+1

Crt. no.	Name of the cost	Recalculated values
I.	**Actual volume of activity (hours)**	**600.000**
1.	**Fixed costs**	**597.091**
1.1.	Maintenance expenses under contracts	183.593
1.2.	Depreciation	330.085
1.3.	Metrology taxes	11.021
1.4.	Expenses with technological developments	17.439
1.5.	Other fixed costs	54.953
2.	**Variable costs**	**685.260**
2.1.	Equipment repair	234.960
2.2.	Electricity for driving purposes	67.200
2.3.	Transportation costs	285.900
2.4.	Other variable costs	97.200
3.	**Semi-variable costs**	**151.104**
3.1.	Wages	122.400
3.2.	Costs with labour protection	9.144
3.3.	Costs with phone, fax	19.560
II.	**Total indirect production costs**	**1.433.455**
III.	**Indirect costs per hour of activity**	**2,39**

In the case of flexible budget, at the end of the period, budgeted amounts are adjusted (recalculated) according to the actual level of activity. The difference: actual cost of the actual production – pre-established cost of actual production is significant for the management control and must be analyzed. Budget recalculated for the actual volume of activity allows a fair comparison of the pre-established costs with the actual costs related to the same volume of activity. It can thus be analyzed and controlled the resource efficiency, accurately identify the causes of deviations, neutralizing the effect of changes in the activity.

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