

Understanding Variance Analysis

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Examiner: Formation 2 Management Accounting

It often appears that students who experience difficulties with variance analysis do so because they have focused on learning off variance formulae in isolation, rather than on developing a good understanding of what these variances represent and how they fit within the context of comparing actual performances to standards and budgets. In this article the performance of a fictional company called Example Ltd is examined in order to demonstrate the links between variances generated through comparisons of actual and budgeted performance, and variances which many students may be more accustomed to determining using formulae. In doing so the article is intended to assist students in developing a greater understanding of basic variance analysis.

Example Ltd – Standards, Budgeted Results and Actual Results for 2011

Example Ltd budgeted to produce and sell 1,000 units of Product A in 2011. The standard selling price per unit was €160. The budgeted expenditure on fixed production overheads for 2011 was €36,000. The company uses a standard absorption costing system and absorbs fixed production overheads on the basis of direct labour hours. As the company budgeted to generate 3,000 standard hours of output the fixed overhead absorption rate was set at €12 per hour (€36,000/3,000 hours).

The standard absorption cost per unit of Product A was as follows:

Direct materials	2kg @ €20 per kg	€40
Direct labour	3hrs @ €15 per hr	€45
Fixed overheads absorbed	3hrs @ €12 per hr	<u>€36</u>
Standard absorption cost per unit		€121

On the basis of this information, the following budget was drawn up for Example prior to the commencement of the 2011 financial year.

Sales	1,000 units @ €160	€160,000
Direct materials	2,000kg @ €20 per kg	€40,000
Direct labour	3,000hrs @ €15 per hr	€45,000
Fixed overheads absorbed	3,000 hrs @ €12 per hr	<u>€36,000</u>
		€121,000
Profit		€39,000

The actual results reported for Example Ltd in respect of 2011 were as follows:

Sales	900 units @ €165	€148,500
Direct materials	1,700kg @ €22 per kg	€37,400
Direct labour	2,800hrs @ €14 per hr	€39,200
Fixed overheads absorbed	2,700 hrs @ €12 per hr	€32,400
Fixed overheads underabsorbed		<u>€5,100</u>
		€114,100
Profit		€34,400

(Note: Actual expenditure on fixed production overheads equals the sum of the fixed production overheads absorbed and the fixed production underabsorbed. Therefore actual expenditure amounted to €37,500 [€32,400 + €5,100])

Absorption of Fixed Production Overheads under Standard Absorption Costing

In reviewing the actual results presented on the previous page, students may be surprised or even confused to note that although 2,800 direct labour hours were worked the value of fixed overheads absorbed was determined by multiplying 2,700 hours by the standard overhead absorption rate of €12 per hour. This is because under standard absorption costing overheads are absorbed on the basis of standard hours of output, rather than on actual hours of input. As 900 units were produced and the standard number of direct labour hours per unit is 3, the volume produced amounted to the equivalent of 2,700 (900 units @ 3 hrs per unit) standard hours of output.

Comparison of the Budgeted Results with the Actual Results

On the basis of the information presented on the previous page, it is apparent that the actual profit achieved of €34,400 is lower than the original budgeted profit of €39,000. Management will be interested in identifying the factors which led to the difference between the original budgeted profit and the actual profit reported. However the original budgeted profit was based on a different volume of sales and production than that actually achieved. Therefore it is not useful to simply compare the income and expenses budgeted in respect of 1,000 units as presented in the original static (or fixed) budget to the actual levels of income and expenses reported in respect of 900 units. One way to determine the extent to which the difference between the actual and budgeted profit may be attributed to the actual level of activity having differed from the budgeted level of activity is by preparing a flexible budget (flexed for the actual level of activity).

Example Ltd – Performance Report - 2011

	Original Static (Fixed) Budget 1,000 units €	Variance €	Flexible Budget 900 units €	Variance €	Actual Results 900 units €
Sales	160,000		144,000	4,500F	148,500
Direct materials	(40,000)		(36,000)	1,400A	(37,400)
Direct labour	(45,000)		(40,500)	1,300F	(39,200)
Fixed production overheads absorbed	(36,000)		(32,400)		(32,400)
Profit before under/over absorption	39,000	3,900A	35,100		39,500
Fixed overheads (under)/over absorbed	0	3,600A	(3,600)	1,500A	(5,100)
Profit	39,000	7,500A	31,500	2,900F	34,400

When preparing a flexible budget, expenditure in respect of fixed costs is never flexed. This is because fixed costs are not affected by changes in activity levels. Accordingly €36,000 in fixed production overheads are deducted in calculating the profit figure both in the original static budget and in the flexible budget. However,

whereas in the original static budget all of the €36,000 in fixed production overheads are presented as being absorbed, only €32,400 (2,700 standard hours of output @ €12 per hour) of the fixed production overheads are presented as absorbed overheads in the flexible budget. The remaining €3,600 in fixed production overheads (€36,000 – €32,400) are presented in the flexible budget as fixed production overheads underabsorbed.

A review of the variances presented in the performance report on Page 2 provides insights into factors which contributed to the difference between the budgeted profit in the original static budget and the actual profit reported.

The difference between the €39,000 profit per the original static budget and the €31,500 profit per the flexible budget is due to the combined effect of selling 100 fewer units than originally budgeted and producing 300 fewer standard hours of output than the level budgeted when the fixed overhead absorption rate was determined. In effect comparisons between the original static budget and the flexible budget enable the effects of differences between budgeted and actual volumes to be quantified.

The difference between the €31,500 profit per the flexible budget and the €34,400 profit actually reported reflects the impact of the difference between the budgeted and actual selling price for the 900 units actually sold and of differences between the budgeted costs and actual costs incurred in respect of producing those 900 units.

As the sales revenue listed in the flexible budget and the actual results both relate to a volume of 900 units, the favourable variance of €4,500F must reflect that a selling price higher than that originally budgeted was achieved. Similarly the variances presented in respect of material and labour must reflect that the material and labour costs actually incurred in respect of producing the 900 units differed from those budgeted. The fact that the fixed production overheads underabsorbed listed in the actual results exceeded those reported for the same production volume in the flexible budget indicates that the actual expenditure must have exceeded the budgeted level by €1,500.

Links Between the Variances Reported in the Performance Report and Those Computed When Formulae Are Used For Variance Analysis

The variances presented in the performance report above are all variances which may also be computed using formulae.

Variances between the Original Static Budget and the Flexible Budget

The 3,900A variance which occurs between the figures presented for profit before under/over absorption is known as the sales volume variance. Given that in Example Ltd the standard profit per unit is €39 (€160-€121) this variance could also have been calculated as follows:

(Actual sales quantity – budget sales quantity) x standard profit margin
(900 – 1,000) x €39 = €3,900A.

The 3,600A variance between the figures listed for fixed production overheads (under)/over absorbed is known as the fixed overhead volume variance. Given that in Example Ltd the standard overhead absorption rate is €12 per unit this variance could also have been calculated as follows:

(Standard hours of actual output – budget hours of output) x fixed overhead
absorption rate per hour
(2,700 – 3,000) x 12 = €3,600A

Variances between the Flexible Budget and the Actual Results

The €4,500F variance between the sales revenue figures is known as the sales price variance. Given that the standard selling price for Example Ltd was €160 and the actual selling price per unit was €165 this variance could also have been calculated as follows:

$$\begin{aligned} & (\text{AP} - \text{SP}) \times \text{actual sales volume} \\ & (\text{€165} - \text{€160}) \times 900 = \text{€4,500F} \end{aligned}$$

The €1,400A variance between the figures listed in respect of the cost of direct material represents the total material cost variance. Given that the standard quantity per unit is 2kg and the standard price per kg is €20, while €22 per kg was the price paid for the 1,700kg used, this variance could also be computed as follows:

$$\begin{aligned} & (\text{AQ} \times \text{AP}) - (\text{SQ} \times \text{SP}) \\ & (1,700\text{kg} \times \text{€22}) - ([900 \times 2\text{kg}] \times \text{€20}) = \text{€1,400A} \end{aligned}$$

This total material cost variance may be further analysed into a material price variance and a material usage variance.

The material price variance may be calculated as:

$$\begin{aligned} & (\text{AP} - \text{SP}) \times \text{AQ} \\ & (\text{€22} - \text{€20}) \times 1,700\text{kg} = \text{€3,400A} \end{aligned}$$

The material usage variance may be calculated as:

$$\begin{aligned} & (\text{AQ} - \text{SQ}) \times \text{SP} \\ & (1,700\text{kg} - [900 \times 2]) \times \text{€20} = \text{€2,000F} \end{aligned}$$

When calculating these materials variances it is important to remember that the standard quantity figure incorporated into the calculations should be based on standard quantity for the ACTUAL ACTIVITY LEVEL (i.e. 900 units in the case of Example Ltd).

The €1,300F variance between the figures listed in respect of the cost of direct labour represents the total labour cost variance. Given that the standard labour hours per unit is 3 hours and the standard rate per labour hour is €15, while €14 per hour was paid for the 2,800 hours actually worked, this variance could also be computed as follows:

$$\begin{aligned} & (\text{AH} \times \text{AR}) - (\text{SH} \times \text{SR}) \\ & (2,800 \times \text{€14}) - ([900 \times 3] \times \text{€15}) = \text{€1,300F} \end{aligned}$$

This total labour cost variance may be further analysed into a labour rate variance and a labour efficiency variance.

The labour rate variance may be calculated as:

$$\begin{aligned} & (\text{AR} - \text{SR}) \times \text{AH} \\ & (\text{€14} - \text{€15}) \times 2,800 \text{ hours} = \text{€2,800F} \end{aligned}$$

The labour efficiency variance may be calculated as:

$$\begin{aligned} & (\text{AH} - \text{SH}) \times \text{SR} \\ & (2,800 - [900 \times 3]) \times \text{€15} = \text{€1,500A} \end{aligned}$$

When calculating these labour variances it is important to remember that the standard hours figure incorporated into the calculations should be based on standard hours for the ACTUAL ACTIVITY LEVEL (i.e. 900 units in the case of Example Ltd).

Given that the flexible budget and the actual results are both constructed on the basis of an output level of 900 units or 2,700 standard hours of output, the level of fixed production overheads is the same in the flexible budget and the actual results. Therefore no variance is reported in respect of this item.

The difference between the level of fixed production overheads underabsorbed reflected the fixed overhead expenditure variance. Given that actual expenditure on fixed production overheads was €37,500 and budgeted expenditure was €36,000, this variance could also be computed as follows:

{A Exp – B Exp)

$$(€37,500 - €36,000) = €1,500A$$

Having worked through this article you should now have a greater understanding of basic variance analysis. To reinforce this it would be useful to attempt, under examination conditions, relevant past paper questions.