

Chapter Four

Standard Costing, Flexible Budgeting and Variance Analysis Introduction

4.1 Static and Flexible Budget

4.1.1 Static Budget

The static budget is the budget that is based on this projected level of output, prior to the start of the period. In other words, the static budget is the “original” budget. The static budget variance is the difference between any line-item in this original budget and the corresponding line-item from the statement of actual results. Often, the line-item of most interest is the “bottom line”: total cost of production for the factory and other cost centers; net income for profit centers.

A static budget is a budget prepared for only one level of activity. It is based on the level of output planned at the start of the budget period. The master budget is an example of a static budget.

4.1.2 Flexible Budget

A flexible budget is developed using budgeted revenues or cost amounts based on the level of output actually achieved in the budget period. Flexible budget is developed at the end of the period. The flexible budget variance is the difference between any line-item in the flexible budget and the corresponding line-item from the statement of actual results.

A key difference between a flexible budget and a static budget is the use of the actual output level in the flexible budget. Static budget variance does not give much information about the variances between actual results and budgeted amounts for each line item. Hence one has to prepare flexible budget.

The difference between budget and actual result can be favorable or unfavorable based upon the impact of the discrepancy on the overall profitability of the firm. If the variance has an increasing effect on the operating income as compared to the budgeted amount, it is said to be **favorable variance**. On the other hand **unfavorable or adverse variance**

occurs when the variance has a decreasing effect on the operating income relative to the budgeted amount.

Variances assist managers in their planning and control decisions. It enables to exercise Management by Exception (MBE), which is the practice of concentrating attention on areas not operating as expected and giving less attention to areas operating as expected. Managers regularly pay attention to areas with large variances. Variances are also used in performance evaluation. For example Production line managers in a manufacturing company may have quarterly efficiency incentives linked to achieving a budgeted amount of operating costs.

For example we can take example from Gore. Assume Gore manufactures and sells different project. Budgeted variable cost per product are as follows

- Direct material cost	Birr 65
- Direct manufacturing labor	26
- Variable manufacturing overhead	24
Total variable costs	<u>115</u>

If budgeted selling price is Birr 155 per product and expected fixed cost is to be Birr 286,000 within a relevant range between 9,000 and 13,500 products. What is the static budget operating profit if static budget is based on selling of 13,000 products for 2017? What is the actual operating profit if ABC business produced and sold 10,000 products at 160 each with actual variable costs of 120 per product and fixed manufacturing costs of Birr 300,000?

	Static Budget	Flexible Budget	Actual Result
	2,015,000		
Revenue	00	1,550,000	1,600,000
Variable Costs	<u>(1,495,000)</u>	<u>(1,150,000)</u>	<u>(1,200,000)</u>
	520,000	400,000	400,000
Contribution Margin	00	00	00
Fixed costs	<u>(286,000)</u>	<u>(286,000)</u>	<u>(300,000)</u>
Budgeted Operating Profit	<u>234,000</u>	<u>114,000</u>	<u>100,000</u>

A static-budget variance is the difference between an actual result and a budgeted amount in the static budget.

	Actual Result	Static Budget	Static Budget Variance
Revenue	1,600,000	2,015,000	415,000 U
		<u>(1,495,00</u>	
Variable Costs	<u>(1,200,000)</u>	<u>0)</u>	295,000 F
Contribution Margin	400,00	520,000	120,000 U
	0		
Fixed costs	<u>(300,000)</u>	<u>(286,000)</u>	14,000 U

A favorable variance is a variance that increases operating profit relative to the budgeted amount. An unfavorable variance is a variance that decreases operating profit relative to the budgeted amount. A favorable variance for revenue items means that actual revenues exceeded budgeted revenues. A favorable variance for cost items means that actual costs were less than budgeted costs.

	Actual Result	Flexible Budget	Flexible Budget Variance
Revenue	1,600,000	1,550,000	50,000 F
	<u>(1,200,0</u>	<u>(1,150,0</u>	
Variable Costs	<u>00)</u>	<u>00)</u>	50,000 U
	400,	400,	
Contribution Margin	000	000	0 U
Fixed costs	<u>(300,000)</u>	<u>(286,000)</u>	14,000 U
Budgeted Operating Profit	<u><u>100</u></u>	<u><u>114</u></u>	
	<u>,000</u>	<u>,000</u>	14,000 U

Sales Volume Variance

The sales-volume variance is the difference between the static budget for the number of units expected to be sold and the flexible budget for the number of units that were actually sold. The only difference between the

static budget and the flexible budget is the output level upon which the budget is based.

	Flexible Budget	Static Budget 2,015,0	Sales Volume Variance
Revenue	1,550,000 <u>(1,150,00</u>	00 <u>(1,495,00</u>	465,000 U
Variable Costs	0) 400,0	0) 520,0	345,000 F
Contribution Margin	00	00	120000 U
Fixed costs	<u>(286,000)</u>	<u>(286,00</u>	
Budgeted Operating Profit	<u>114,</u> <u>000</u>	<u>234,</u> <u>000</u>	0 U 120000 U

1.1. Standard Costing

1.2.1 Setting Direct Materials Standards

The standard quantity per unit defines the amount of direct materials that should be used for each unit of finished product, including an allowance for normal inefficiencies, such as scrap and spoilage. The standard price per unit defines the price that should be paid for each unit of direct materials and it should reflect the final, delivered cost of those materials.

1.2.2 Setting Direct Labor Standards

Direct labor quantity and price standards are usually expressed in terms of labor-hours or a labor rate. The standard hours per unit defines the amount of direct labor-hours that should be used to produce one unit of finished goods. The standard rate per hour defines the company's expected direct labor wage rate per hour, including employment taxes and fringe benefits.

1.2.3 Setting Variable Manufacturing Overhead Standards

The standard hours per unit for variable overhead measures the amount of the allocation base from a company's predetermined overhead rate that is required to produce one unit of finished goods. The standard rate per unit that a company expects to pay for variable overhead equals the variable portion of the predetermined overhead rate.

1.2. Controllability and variance analysis

A standard cost card shows the standard quantity (or hours) and standard price (or rate) of the inputs required to produce a unit of a specific product. The standard cost per unit for all three variable manufacturing costs is computed the same way. The standard quantity (or hours) per unit is multiplied by the standard price (or rate) per unit to obtain the standard cost per unit.

Standard Cost Card-Variable Manufacturing Costs

Inputs	(1) Standard Quantity or Hours	(2) Standard Price or Rate	Standard Cost (1) × (2)
Direct materials	3.0 pounds	\$4.00 per pound	\$12.00
Direct labor	0.50 hours	\$22.00 per hour	11.00
Variable manufacturing overhead	0.50 hours	\$6.00 per hour	<u>3.00</u>
Total standard cost per unit			<u>\$26.00</u>

Therefore, the following data was available for the month of June:

Planned output in June	2,100 statues
Actual output in June	2,000 statues
Actual direct materials cost in June*	\$24,700
Actual direct labor cost in June	\$22,680
Actual variable manufacturing overhead cost in June	\$7,140

1.2.1. Direct material

The direct material variance is the difference between the standard cost of materials resulting from production activities and the actual costs incurred. The direct material variance is comprised of two other variances, which are:

- (a) **A price variance** is the difference between the actual amount paid for an input and the standard amount that should have been paid, multiplied by the actual amount of the input purchased.
- (b) **A quantity variance** is the difference between how much of an input was actually used and how much should have been used for the actual level of output and is stated in dollar terms using the standard price of the input.

The standard quantity allowed (when computing direct materials variances) or standard hours allowed (when computing direct labor and variable manufacturing overhead variances) refers to the amount of an input that should have been used to manufacture the actual output of finished goods produced during the period. It is computed by multiplying the actual output by the standard quantity (or hours) per unit. The standard quantity (or hours) allowed is then multiplied by the standard price (or rate) per unit of the input to obtain the total cost according to the flexible budget.

(1) Actual Quantity of Input, at Actual Price (AQ × AP)	(2) Actual Quantity of Input, at Standard Price (AQ × SP)	(3) Standard Quantity Allowed for Actual Output, at Standard Price (SQ × SP)
6,500 pounds × \$3.80 per pound = \$24,700	6,500 pounds × \$4.00 per pound = \$26,000	6,000 pounds* × \$4.00 per pound = \$24,000
Materials price variance = \$1,300 F		Materials quantity variance = \$2,000 U
Spending variance = \$700 U		

*2,000 units × 3.0 pounds per unit = 6,000 pounds.
F = Favorable; U = Unfavorable.

Materials Price Variance:

$$\text{Materials price variance} = (AQ \times AP) - (AQ \times SP)$$

$$\text{Materials price variance} = AQ(AP - SP)$$

$$\text{Materials price variance} = 6,500 \text{ pounds } (\$3.80 \text{ per pound} - \$4.00 \text{ per pound})$$

$$\text{Materials price variance} = \$1,300 \text{ F}$$

Materials Quantity Variance:

$$\text{Materials quantity variance} = (AQ \times SP) - (SQ \times SP)$$

$$\text{Materials quantity variance} = SP(AQ - SQ)$$

$$\text{Materials quantity variance} = \$4.00 \text{ per pound } (6,500 \text{ pounds} - 6,000 \text{ pounds})$$

$$\text{Materials quantity variance} = \$2,000 \text{ U}$$

where:

AQ = Actual quantity of inputs purchased and used in production

SQ = Standard quantity of inputs allowed for the actual output

AP = Actual price per unit of the input

SP = Standard price per unit of the input

1.3.2 Direct labor

The direct labor (DL) variance is the difference between the total actual direct labor cost and the total standard cost.

Direct labor variance = Total actual DL cost - Total standard DL cost

Standard Cost Variance Analysis—Direct Labor

(1) Actual Hours of Input, at Actual Rate ($AH \times AR$)	(2) Actual Hours of Input, at Standard Rate ($AH \times SR$)	(3) Standard Hours Allowed for Actual Output, at Standard Rate ($SH \times SR$)
1,050 hours $\times$ \$21.60 per hour = \$22,680	1,050 hours $\times$ \$22.00 per hour = \$23,100	1,000 hours* $\times$ \$22.00 per hour = \$22,000
Labor rate variance = \$420 F		Labor efficiency variance = \$1,100 U
Spending variance = \$680 U		

*2,000 units $\times$ 0.5 hours per unit = 1,000 hours.
F = Favorable; U = Unfavorable.

Labor Rate Variance:

$$\text{Labor rate variance} = (AH \times AR) - (AH \times SR)$$

$$\text{Labor rate variance} = AH(AR - SR)$$

$$\text{Labor rate variance} = 1,050 \text{ hours } (\$21.60 \text{ per hour} - \$22.00 \text{ per hour})$$

$$\text{Labor rate variance} = \$420 \text{ F}$$

Labor Efficiency Variance:

$$\text{Labor efficiency variance} = (AH \times SR) - (SH \times SR)$$

$$\text{Labor efficiency variance} = SR(AH - SH)$$

$$\text{Labor efficiency variance} = \$22.00 \text{ per hour } (1,050 \text{ hours} - 1,000 \text{ hours})$$

$$\text{Labor efficiency variance} = \$1,100 \text{ U}$$

where:

AH = Actual quantity of labor-hours used in production

SH = Standard quantity of labor-hours allowed for the actual output

AR = Actual rate per direct labor-hour

SR = Standard rate per direct labor-hour

1.2.2. Overheads

Factory overhead is most commonly defined as "manufacturing costs that are not classifiable as direct material or direct labor."

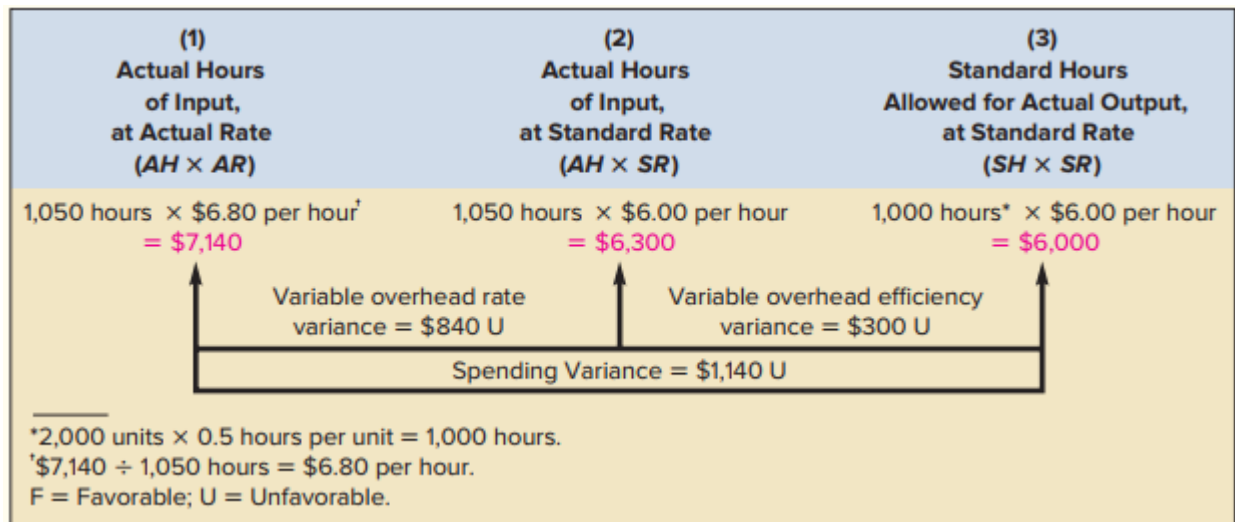
Factory overhead costs include indirect materials, indirect labor, and factory expenses. In standard costing, predetermined amounts are used to facilitate better control and faster recording of costs. Standard costing allows management to determine areas that deviate from established standards, to be able to investigate and take corrective actions.

Factory overhead costs are better analyzed when they are segregated into variable and fixed.

Variable Factory Overhead Variance

The computation and analysis of variable factory overhead (VFOH) is pretty much similar to that of direct labor. The only difference is the rate applied. Also, variable overhead rates may use direct labor hours or machine hours as its base.

Standard Cost Variance Analysis—Variable Manufacturing Overhead



Variable Overhead Rate Variance:

Variable overhead rate variance = $(AH \times AR) - (AH \times SR)$
 Variable overhead rate variance = $AH(AR - SR)$
 Variable overhead rate variance = 1,050 hours (\$6.80 – \$6.00)
 Variable overhead rate variance = \$840 U

Variable Overhead Efficiency Variance:

Variable overhead efficiency variance = $(AH \times SR) - (SH \times SR)$
 Variable overhead efficiency variance = $SR(AH - SH)$
 Variable overhead efficiency variance = \$6.00 per hour (1,050 hours – 1,000 hours)
 Variable overhead efficiency variance = \$300 U

where:

AH = Actual quantity of labor-hours used in production

SH = Standard quantity of labor-hours allowed for the actual output

AR = Actual rate per labor-hour

SR = Standard rate per labor-hour (Variable portion of the predetermined overhead rate)

Fixed Factory Overhead Variance

The computation for fixed factory overhead (FFOH) variance is similar to that of variable factory overhead. Note, however, that fixed factory overhead amounts are almost always given in total figures (thus, it may or may not require additional computations).

FFOH variance = Total actual FFOH cost - Total standard FFOH cost

1.4 Measuring Mix and Yield Variances

1.4.1 Sales variances

The idea of variance analysis can be extended to areas other than production. For example, an analysis can be made on why actual revenue differed from budgeted revenue. This variance is known as sales variance.

The sales variance is the difference between the budgeted revenue and actual revenue. We will take example from ABC Company to illustrate. ABC Manufacturing Company produces and sales three different products, **X**, **Y** and **Z**. The Company Budgeted to sell 20,000 units of its products. The company's budgeted sales of 20,000 units represent 40% of the market share. The details for the budgeted and actual data for a given year are as follows:

	Budgeted Data				Actual Data			
Product	Selling Price per Unit	Quantity	Sales Mix	Total Revenue	Selling Price per Unit	Unit Volume	Sales Mix	Total Revenue
X	25	2,000	0.1	50,000	20	4,000	0.1818	80,000
Y	40	8,000	0.40	320,000	45	10,000	0.4545	450,000
Z	30	10,000	0.50	300,000	30	8,000	0.3637	240,000
		20,000		670,000		22,000		770,000

(a) Sales Volume Variance

The sales volume variance is the difference between the static budget and the flexible budget.

Sales volume variance sometimes called variance due to change on number output level. For example, sales volume variance in above ABC Company's example is change on output with budgeted price.

$$\begin{aligned}
 \text{Sales Volume Variance} &= (\text{Actual Unit} - \text{Budgeted Unit}) * \text{Budgeted Price} \\
 &= (22,000 - 20,000) * 95 \\
 &= 2000 * 95 = 190,000 \quad \text{Favorable.}
 \end{aligned}$$

(b) Sales Mix Variance

Sales mix variance is the difference between a companies' budgeted sales mix and the actual sales mix that the firm sells to customers. [Sales mix](#) is defined as the proportion of each product a business sells, relative to total sales. Sales mix affects total company profit, because some products generate higher [profit margins](#) than others. Sales mix variance includes each [product line](#) sold by the firm.

Sales mix variance = (Actual all units sold * (Actual sales mix % - budgeted sales mix %) * B. price)

Thus, sales mix variance of ABC Company is:

$$\begin{aligned}
 X &= (22000 * (0.1818 - 0.10) * 25) = 44,990 \quad \text{F} \\
 Y &= (22000 * (0.4545 - 0.40) * 40) = 47,960 \quad \text{F} \\
 Z &= (22000 * (0.3637 - 0.50) * 30) = 89,958... \text{ U... } \mathbf{2992 \text{ F}}
 \end{aligned}$$

Sales Quantity Variance

Sales-quantity variance is the difference between two amounts: (1) the budgeted amount based on actual quantities sold of all products and the budgeted mix, and (2) the amount in the static budget (which is based on the budgeted quantities to be sold of all products and the budgeted mix).

SQV = (A. all units sold - B. all units sold) * B. sales mix % * B. sales price

$$\begin{aligned}
 \text{SQV for } X &= (22,000 - 20,000) \times 0.10 \times 25 = 5,000\text{F} \\
 Y &= (22,000 - 20,000) \times 0.40 \times 40 = 32,000\text{F} \\
 Z &= (22,000 - 20,000) \times 0.50 \times 30 = 30,000\text{F} \dots 67,000
 \end{aligned}$$

F

1.4.2 Market-size and Market-Share Variance

The **market-size variance** is the difference in budgeted contribution margin at budgeted market share caused solely by *actual market size in units* being different from *budgeted market size in units*. The formula for computing the market size variance is as follows:

$$\begin{aligned}
 \text{MSV} &= (\text{AMS} - \text{BMS}) * \text{BMS}h * \text{BCM} \\
 &= (20,000 - 22,000) * 0.4 * 30 \text{ birr} \\
 &= 24,000 \text{ U}
 \end{aligned}$$

The market-share variance is the difference in budgeted contribution margin for actual market size in units caused solely by actual market share

being different from budgeted market share. The formula for computing the market share variance is as follows:

$$\begin{aligned}\text{MSHV} &= \text{AMS} * (\text{AMSh} - \text{BMSH}) * \text{BCM} \\ &= 22,000 * 30 * (0.367 - 0.4) \\ &= \text{Br } 21780\text{U}\end{aligned}$$

Dear student's market size and market share variance analysis focus on the following example:

ABC company have a budgeted sales level of 12000 units at a budgeted contribution margin of birr 32 per unit. The company in this year loses its market share from budgeted percentage of 20% to 16% from total market size of 12,000 units and 10,000 units respectively. The market share and market size variance are:

$$\begin{aligned}\text{MSHV} &= \text{AMS} * (\text{AMSh} - \text{BMSH}) * \text{BCM} \\ &= 10,000 * (0.16 - 0.20) * 32 \\ &= 12,800 \text{ Unfavorable}\end{aligned}$$

$$\begin{aligned}\text{MSV} &= (\text{AMS} - \text{BMS}) * \text{BMSH} * \text{BCM} \\ &= (10,000 - 12,000) * 0.2 * 32 \\ &= -2000 * 0.2 * 32 \\ &= 12,800 \text{ Unfavorable}\end{aligned}$$