

## Course: **Controlling and Budgeting**

**Field of study:** Economics

**Form of classes and number of hours:** lecture 30 h

**Number of ECTS credits:** 2

### **Learning outcomes:**

After reading this guide, you will understand the outline of controlling and budgeting, the meaning, function and role of controlling, the tools included in it. The second part of the guide covers operational budgeting procedures with examples.

The student will be able to prepare functional budgets, ranging from sales budget, cost budgets, cash budget, and financial statements pro forma.

### **Evaluation method of learning outcomes:**

assignments (work to be done by students), test, exam

## **Bibliography**

### **Basic and complementary literature**

- [1] Anderson R., *Money Management & Financial Budgeting 2 Books In 1: A Beginners Guide On Managing Bad Credit, Debt, Savings And Personal Finance Paperback* – March 31, Anderson, 2020.
- [2] Horngren Charles T., Datar Srikant M., Rajan Madhav V., *Cost accounting: a managerial emphasis*. 15<sup>th</sup> ed., global ed. – Boston [etc.]: Pearson Education, cop. 2015.
- [3] Drury C., *Management and cost accounting*. 8<sup>th</sup> ed. – Australia [etc.]: South-Western/ Cengage Learning, cop. 2012.
- [4] Bhimani A., Horngren Charles T., Datar Srikant M., Rajan Madhav V., *Management and cost accounting*. 6<sup>th</sup> ed. – Harlow [etc.]: Pearson Education Limited, 2015.
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- [6] Don Dayananda, R. Irons, *Capital Budgeting Financial Appraisal of Investment Projects*. Cambridge University Press 2002.
- [7] Rachlin R., *Total Business Budgeting: A Step-by-Step Guide with Forms*. 2<sup>nd</sup> edition, Wiley, 1999.

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## 1. Introduction

A financial controlling system provides information mainly for the use of management within an organisation.

Good information to be used by management for planning, control and decision making should be relevant, complete, accurate, well communicated and its cost should be lower than the benefits it is expected to provide.

Controlling can be divided into operational and strategic.

Operational controlling provides tools that help managers to run their day-to-day operations.

Cost classification is the basis for understanding the concepts that provide controlling tools. We can distinguish between many criteria such as: production and non-production costs, costs by type, costs by function, direct and indirect costs, variable and fixed costs.

Understanding the complexity of costs is important for the concept of cost objects, costs units and cost centres.

One of the most common tools that supports managers in gaining an understanding of profit and contribution is marginal costing. It provides better management information for planning and decision making.

Another costing system useful for managerial purposes is standard costing. This system requires a definition of standards for the costs of products and services. It is important to know how the standards are set. Standard cost is an estimate of unit cost used for costing planning and control. Standard costing is a control method that compares standard costs with actual results to obtain variances which are used to improve performance.

In practice, managers use variance analysis as a control method, so it is important to know the method of calculating variances and to know the causes of cost variances.

A key tool in the operation controlling is the budgeting process. It helps to communicate ideas and plans, coordinate activities, ensure the achievement of the organisational objectives, establish a system of control, motivate employees to improve their performance.

The strategic controlling helps to ensure that the business is being run as efficiently as possible. Performance measurement is a way to consider how progress towards achievement of these objectives should be measured.

The balanced scorecard is an approach to providing management with information to support the formulation and implementation of strategic policy.

This script presents these above listed topics.

## 2. The purpose and role of controlling

Controlling is a system that provides information for the use of managers in an enterprise, in particular information that is used to assist in planning and controlling activities and to support the decision-making process. Good information should be relevant, accurate, on time, unbiased.

Planning process requires establishing objectives and helps to prepare the right strategy to achieve the objectives. In practice there are several objectives, for example:

- maximising profits,
- minimising costs,
- maximising shareholder value,
- increasing market value.

## Controlling and Budgeting

If objectives have been set, the company should plan the resources used to achieve them.

Controlling provides both financial and non-financial information. Financial information includes primarily information about costs.

There are multiple criteria for classifying costs:

- direct and indirect costs,
- by function,
- fixed and variable costs,
- production and non-production costs,
- by the ability of the entity to control.

To know the cost of a product or service, it is important to identify which costs are direct and which are indirect.

A direct cost is a cost that can be entirely attributed to the product, service or project that is a subject of costing, for example: direct materials (component parts, semi-finished products, primary packaging materials), labour costs (basic hours and overtime spent working on the product), other direct costs (fuel, energy, manufacturing license).

Indirect costs or overheads are costs that can not be fully attributed to the product or service, such as costs of running a production department, warehouse costs, maintenance costs of plant and machinery.

Classification costs by function are divided as follows:

- production costs (to produce a product or service),
- administration costs (to run office departments),
- marketing and sales costs (to create demand for products and sales, distribution of products).

For management purposes, it is important to know whether costs are fixed or variable.

A fixed cost (total fixed cost) is a cost that remains the same despite changes in production, for example: manager's salary, the rent and insurance of building, depreciation of office equipment.

A step cost is a cost which is fixed but only within certain levels of activity, for example some part of manufacturing overhead such like cost of maintaining a production department.

A variable cost is a cost that varies directly with the volume of production, for example raw materials, direct labour costs, sales commission.

### Examples:

Raw materials – variable cost

Direct labour of production workers – variable costs

Manufacturing overhead – variable and fixed costs

Sales costs – variable and fixed costs

Administration overhead – fixed costs

To distinguish the fixed and variable costs in the financial accounts we can use **the high-low method**. The estimation of fixed and variable costs components is done in the following steps:

- 1) analysing the costs records from previous periods,
- 2) obtaining information about:
  - a) total costs at the highest level of activity,
  - b) total costs at the lowest level of activity,
  - c) total units at the highest level of activity,
  - d) total units at the lowest level of activity,

3) calculation of the variable unit cost as follows:

*Total cost at the highest level of activity – total cost at the lowest level of activity*

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*Total units at the highest level of activity – total units at the lowest level of activity*

4) determining the fixed cost as follows:

*Total cost at the highest level of activity – total units at the highest level of activity · variable unit cost*

*or:*

*Total cost at the lowest level of activity – total units at the lowest level of activity · variable unit cost*

**Example 1. (high-low method):**

The costs of production for the last six months have been as follows:

Months	Costs (\$)	Production units
1	110 000	7 000
2	115 000	8 000
3	111 000	7 700
4	97 000	6 000
5	100 000	6 500
6	112 000	7 800

Calculate variable cost per unit and fixed cost according the high-low method.

Calculate the expected cost if an entity plans to produce 9 000 units.

*Solution:*

The lowest output 6 000units

The lowest cost \$97 000

The highest output 8 000units

The highest cost \$115 000

Variable cost per unit =  $(115\,000 - 97\,000) / (8\,000 - 6\,000) = \$9/\text{unit}$

Fixed cost =  $\$115\,000 - 8\,000 \text{ units} \cdot \$9/\text{unit} = \$43\,000$

Or fixed costs =  $\$97\,000 - 6\,000 \text{ units} \cdot \$9/\text{unit} = \$43\,000$

Estimated costs for 9 000 units =  $9 \cdot 9\,000 + 43\,000 = \$124\,000$

**Question 1 (high-low method):**

Using the high-low method calculate the cost of manufacturing overhead if the factory plans to use 2 750 machinery units in January.

Months	Cost	Machinery Units
July	204	2 600
August	212	2 800
September	200	2 500
October	220	3 000
November	184	2 100
December	188	2 200

For the preparation of financial statements, it is important to know which costs are included in the production costs and which in non-production costs. Only production costs are valued as inventory. Non- production costs, such as administrative overheads, sales costs or financial costs are recognised in full in the income statement and have a direct impact on the profit of the period in which they are incurred.

## *Controlling and Budgeting*

The last criterion is the possibility of control by the entity – we can distinguish between controllable and uncontrollable costs.

A controllable cost is a cost controlled by the cost, profit or investment centre manager.

In practice, most variable cost can be controlled in short term, while fixed cost are out of control and there are difficult to change.

Most cost items are controllable in the long term.

### *Question 2 (classification of costs)*

Classify the following costs into criteria described:

- 1) raw materials used in production,
- 2) basic wages of direct workers,
- 3) idle time of direct workers,
- 4) overtime premium,
- 5) depreciation of production machine,
- 6) insurance of office building,
- 7) commission paid for the sales representative,
- 8) protective clothing for employees operating machinery,
- 9) basic salaries for production manager,
- 10) cost of packing cases.

## **3. Tools of operational controlling**

Costs are recorded, analysed and interpreted for both internal and external purposes (to prepare financial statements). Reporting costs in different ways is a process called costing, which is often used as a tool in operational controlling.

There are numerous costing methods, such as the traditional one used for financial accounting – absorption costing. For internal use (and also for controlling purposes) other costing methods are applied, such as: marginal costing, process costing, activity based costing (ABC costing), standard costing and others.

### **3.1. Marginal costing**

One of the most useful methods for internal and controlling purposes is marginal costing. This costing method assumes that:

- only variable costs (marginal costs) are charged as a cost of goods sold;
- the contribution is calculated as follows: sales revenue minus the variable cost of goods sold; the contribution must first cover all fixed costs and then make a profit;
- finished goods unsold (inventory) are valued at variable (marginal) cost;
- all fixed costs (both production and non-production) are treated as costs of the period in which they are incurred; they are presented on the income statement.

The method of marginal costing is presented as following:

- sales revenue,
- minus: variable costs,
- = contribution,
- minus fixed costs (100%),
- = profit/loss.

A contribution gives managers information about expected profit. Marginal costing is a good decision making support tool – the measurement of profit is based on a total contribution.

**Example 1. (absorption costing vs marginal costing):**

During the accounting period:

1. 26 000 units of product were produced and sold
2. Sales price \$15/unit
3. Cost of goods sold \$200 000 including:
  - Variable costs \$140 000
  - Fixed costs \$60 000
4. Administrative and marketing costs \$90 000 (assumed to be fixed costs)

*Task:* Calculate profit or loss and value closing inventory using:

- absorption costing method
- marginal costing method

*Solution:*

<i>Position – Absorption costing</i>		<i>Position – Marginal costing</i>	
Sales revenues	\$26 000 · 15 = \$390 000	Sales revenues	\$26 000 · 15 = \$390 000
Cost of goods sold	\$200 000	Variable cost of goods sold	\$140 000
Period costs	\$90 000	<b>Contribution</b>	\$250 000
		Fixed costs	\$150 000
<b>Profit (loss)</b>	<b>\$100 000</b>	<b>Profit (loss)</b>	<b>\$100 000</b>
<b>Closing inventory</b>	<b>\$0</b>	<b>Closing inventory</b>	<b>\$0</b>

*Question 1 (absorption costing vs marginal costing):*

An entity mass-produces product A, the costs of which amounted to:

Raw materials (variable costs)	\$20 000
Direct labour and energy:	
Valuable costs	\$5 000
Fixed costs:	\$3 125

In the current accounting period, 100 units of product A were produced and 80 units were sold at \$300 per unit.

*Task:*

Calculate profit or loss and value closing inventory using:

- Absorption costing method.
- Marginal costing method.

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<i>Position – Absorption costing</i>		<i>Position – Marginal costing</i>	
Sales revenues		Sales revenues	
Full cost of goods sold		Variable cost of goods sold	
Period costs		<b>Contribution</b>	
		Fixed costs	
<b>Profit (loss)</b>		<b>Profit (loss)</b>	
<b>Closing inventory</b>		<b>Closing inventory</b>	
<b>Cost per unit = Full production costs</b>		<b>Cost per unit = Variable production costs</b>	
<b>Production units</b>		<b>Production units</b>	

Question 2 (absorption costing vs marginal costing):

An entity manufactures product P, its variable cost per unit is 60\$/unit and its sales price \$100/unit.

Fixed costs for production of 1-70 kg are \$750. They produce 50 kg in each month in the quarter under review, and sell: 50 kg in first month, 30 kg in second month, 70 kg in third month.

Task to do:

Calculate profit or loss and value closing inventory using:

- Absorption costing method.
- Marginal costing method.

<i>Position – Marginal costing</i>	1 month	2 month	3 month	Quarter
Sales revenues				
Variable cost of goods sold				
<b>Contribution</b>				
Fixed costs				
<b>Profit (loss)</b>				
<b>Closing inventory</b>				
<b>Production units</b>				

<i>Position – Absorption costing</i>	1 month	2 month	3 month	Quarter
Sale revenues				
Full cost of goods sold				
<b>Profit (loss)</b>				
<b>Closing inventory</b>				
<b>Cost per unit = Full production costs</b>				
<b>Production units</b>				

### 3.2. Standard costing

Another useful tool in the planning and control process is standard costing. This method firstly establishes an estimate of the standard cost of product and secondly, by recording the actual costs, it is unable to measure the differences between the actual and planned costs which are called variances.

Standard costing is a control tool for managers to confirm a plan, as well as it provides information on whether certain activities need adjustment or are out of control.

In this costing it is necessary to set a standard which should include cost and profit targets. This standard is often based on current state, but an entity should make an attempt to improve current efficiency. Usually, the current standard product cost assumes some level of inefficiency, such as wastage, idle time, breakdowns.

*Example of establishing the standard product cost:*

Cost item per unit	\$/unit
Direct materials	5
Direct labour	4
<b>Total standard direct cost</b>	<b>9</b>
Variable manufacturing overhead	3
<b>Total variable production cost</b>	<b>12</b>
Fixed manufacturing overhead	4
<b>Standard full production cost</b>	<b>16</b>
Administration and sales overheads	4
<b>Standard cost of goods sold</b>	<b>20</b>

### 3.3. Cost variances

In practice, actual outputs deviate from the standards, managers should consider and analyse the differences between them. The efforts of an organisation should be aimed at achieving the set standard. Differences between actual and planned standards are called **variances** and should be subject to extensive wide control within the entity.

When the actual results are better (lower for cost, higher for revenues) than the budgeted, planned results, we obtain **a favourable variance (negative value for costs, positive value for sales)**; in the opposite case, when the actual results are worse than planned, we deal with **an adverse variance (positive value for costs, negative value for sales)**.

***(cost, sales) variances = actual figure – budgeted (planned, standard) figure***

*Examples (total variances establishing):*

Actual cost of using material X = \$7 700

Standard cost of using direct material X = \$7 500

*The variance is adverse + 200 (\$7 700 - \$7 500), because actual cost is higher (worse) than planned.*

Actual sales = \$120 000

Planned sales = \$115 000

*The variance is favourable + \$5 000, because revenues are higher (better) than planned.*

Actual fixed manufacturing overhead = \$77 000

Standard (planned) fixed manufacturing overhead = \$80 000

*The variance is favourable (negative value) – \$3 000, because real costs are lower (better) than expected.*

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In practice, variance analysis should be more complex, as we often assume a certain price or quantity of materials used, labour or machine hours when setting standards.

In the case of direct materials, we can divide total material variances into:

- material price variance,
- material usage variance.

Similarly for direct labour we can divide total labour variances into:

- a) labour rate variance,
- b) labour efficiency variance.

For variable production we can distinguish the following variances: expenditure variance

- a) efficiency variance.

In turn, for fixed costs the total variances consist of:

- a) efficiency variance,
- b) capacity variance.

#### **Example 1.**

*(cost variance analysis)*

A company manufactures product A which consists of only one material: X.

A standard use is 10 kg per 1 unit of product.

A standard price is \$5 per kilo.

The actual results are: 2500 units of product, 26 000 kg consumed, which costs \$140 000.

Calculate: total material variances and detailed price and usage variances.

Total variances:

Actual material costs = \$140 000

Standard (expected) material cost = 2 500 units · \$50/unit = \$125 000

*Total variance is +\$15 000 adverse variance*

Material price variances:

Actual cost = \$140 000

Standard cost (with standard price) = 26 000 kg · \$5/kg = \$130 000

*Material price variance is + \$10 000 adverse variance*

Material usage variance:

Actual results = 26 000 kg

Standard usage = 2 500 units · 10 kg/unit = 25 000 kg

Material usage variance = (26 000 kg– 25 000 kg) · \$5/kg = \$5 000 adverse variance

**Summary: \$15 000 = \$10 000 + \$5 000**  
**Total variance                      price variance                      usage variance**

#### **Example 2.**

*(cost variance analysis)*

The company manufactures product K, which requires 2 hours of work.

The standard rate of work is 10.

The actual results are: 2 500 units of product, 4 500 hours worked, costing \$46 000.

Calculate: the variance of total labour and detailed variances of labour rate and.

Total cost variances

Actual labour cost = \$46 000

Standard labour cost = 2 500 units · \$20/unit = \$50 000

Total labour variance is -\$4 000 favourable variance

Labour rate variance:

Actual labour rate cost = \$46 000

Standard labour rate cost = 4 500 hours · \$10/hour = 45 000\$

Labour rate variance is + \$1 000 adverse variance

Labour efficiency variance:

Actual output of labour hours = 4 500

Standard hours for actual units of product =

2 500 units · 2 hours/unit = 5 000

Labour efficiency variance = (4 500 – 5 000) · \$10/hour = - \$5 000

**Summary : - \$4 000 = + \$1 000 + (-\$5 000)**

**Total variance                      rate variance      efficiency variance**

The main reasons of cost variances are presented below.

Kind of variances	Favourable	Adverse
Material price	No discount was planned	Not expected increase in prices, purchases ad hoc
Labour efficiency	Achieving results faster than expected through better work organisation and motivation	Labour shortage, lack of training, low qualifications of employees
Overhead expenditure	More careful use of services, costs savings	Careless purchases of external services
Overhead efficiency	More efficient work	Less efficient employees

### 3.4. Budgeting process

**A budget** is a quantified plan of activities for the next accounting period. It includes planned estimated sales, production, revenues, expenses, assets, liabilities, cash flow. The budget becomes the plan that sets the objective of a given business activity.

The budgeting process is related to planning, motivation and control system.

The planning process includes:

1. defining goals (objectives),
2. determining ways of action – strategy (how to achieve an objective and how to break down a long-term strategy into smaller actions),
3. implementation of the strategy in the form of a budget (preparation of a plan with expected results regarding sales, production, revenues, costs).

## Controlling and Budgeting

The control process means:

1. measuring the actual results compared to the plan,
2. evaluation of results (analysis of advantages and disadvantages of the actions carried out, identification factors which can be improved in the next period).

The reasons for preparing budget are as follows:

- a) to achieve the objectives of the entity both for the organisation as a whole and for individual departments within the entity,
- b) to implement the planning and control process.

*Planning* is a process which forces the managers of an organisation to take a long-term view, setting goals to be achieved. This prevents accidental actions and helps to avoid risks and take advantage of the opportunities. All targets set are monitored during the accounting period and evaluated.

*Control* is a process of comparing actual results with the budget plan to identify deviations. It is important to know the causes of the differences, whether they occur due to factors controlled or uncontrolled by the company.

- c) to coordinate activities in order to integrate all efforts within an organisation to achieve expected goals,
- d) to motivate employees to improve the performance of the company; if the employees of the organisation are aware of the goals to be achieved by the company, they will act more consciously and be more aware of the result of their work; this process requires dialogue and exchange of ideas and opinions of employees, and motivation ensures greater commitment of employees and gives incentives to improve their future performance
- e) to evaluate the results of the activities by comparing the actual results with the expected results, thus providing a basis for the evaluation of all employee activities.

In order to determine planning and control activity and to improve the budgeting process, it is important to select cost centres, revenue centres, profit centres and investment centres. They are all centres of responsibility.

A cost centre is a place where costs are recorded and analysed. A cost centre can be not only any department of a company, but also a group of machines or a single machine if it is possible to allocate cost to it. In the cost centre costs are recorded according to cost units – products, services, projects, orders.

The revenue centre is responsible for revenue and its objective is to maximise sales revenue. In an entity, sales department is often a revenue centre.

Profit centres are the places in an entity responsible for costs and revenues, for the way revenues are obtained and costs are incurred.

In practice, a number of cost centres form a single profit centre. The profit centre manager is responsible for purchasing and sales, so in this centre both revenues and costs are recorded in this centre. In small companies, the whole organisation is usually one profit centre.

The investment centre is the most complex centre responsible for costs, revenue, profit and capital investment. The manager of this centre makes decision not only on how to maximise profit, but also on the purchase or leasing of buildings, machinery and on how to invest surplus cash to achieve the expected return on investment.

Budgets can be prepared on different bases, namely:

- static basis,
- flexible basis.

**Static budget** takes into consideration only the planned volume of production and is not adjusted during the accounting period to verify costs, revenues for the actual level of activity that was achieved during the period. This budget does not show what the costs or revenues should be at the actual level of activity.

**Flexible budget** includes various planned outputs that change with the level of activity (especially the actual level). In other words, this budget indicates what revenues and costs should be for the actual level of activity.

### Example 1.

*(static vs flexible budget):*

An entity has prepared a cost production budget, assuming 5 000 units of the product.

Number of products	5 000 units
Direct raw materials	\$15 000
Direct labour	\$20 000
Overhead	\$17 500

This entity has produced only 2 000 units, recording the following costs:

Direct raw materials	5 500
Direct labour	8 500
Overhead	7 700

To control whether the planned costs are achieved we can flex this budget and convert the costs into the actual production level.

Number of products	5 000 units (expected level)	2 000 units (actual level)
Direct raw materials	\$15 000	\$6 000
Direct labour	\$20 000	\$8 000
Overhead	\$17 500	\$7 000

Now we can calculate the variances:

Number of products	2 000 units (budget)	2 000 units (actual)	Variance
Direct raw materials	\$6 000	\$5 500	500 (F)
Direct labour	\$8 000	\$8 500	500(A)
Overhead	\$7 000	\$7 700	700 (A)
<b>Total costs</b>	<b>\$21 000</b>	<b>\$21 700</b>	<b>700 (A)</b>

### Example 2.

*(high-low method, variances)*

Flexible budget of manufacturing overhead is presented below.

Content	Production capacity				
	80	90	100	110	120
Machine hours	12 000	13 500	15 000	16 500	18 000
Manufacturing overhead (\$)	180 000	192 000	202 000	212 000	222 000

Actual manufacturing overhead in the current accounting period is

- manufacturing overhead      \$220 000,
- actual production capacity    116%.

**Task:**

- 1) calculate variable and fixed cost using the high-low method,
- 2) calculate total variances of total costs.

**Solution**

The lowest number of machine hours 12 000	The lowest cost	\$180 000
The highest number of machine hours 18 000	The highest cost	\$222 000

Variable cost per unit =  $(222\ 000 - 180\ 000) / (18\ 000 - 12\ 000) = \$7/\text{unit}$

Fixed cost =  $222\ 000 - 7 \cdot 18\ 000 = \$96\ 000$

Or fixed costs =  $180\ 000 - 7 \cdot 12\ 000 = \$96\ 000$

Calculating actual number of machine hours

100% --> 15 000 hours

116% --> x hours -->  $x = 17\ 400$  hours

Estimated costs for 17 400 hours =  $7 \cdot 17\ 400 + 96\ 000 = \$217\ 800$

Actual cost = \$220 000

Total variances =  $\$220\ 000 - \$217\ 800 = 2\ 200$  --> adverse variance

**Question 1 (high-low method, variances)**

XYZ manufactures a single product A. Its manufacturing overhead budget with direct work hours is as follows.

Item	Manufacturing overhead (\$)		
	Production capacity		
	90%	100%	110%
Direct work hours	10 800	12 000	13 200
Manufacturing overhead (\$)	148 000	160 000	172 000

Actual manufacturing overhead in the current accounting period is

- manufacturing overhead      \$157 000,
- actual production capacity    98%.

**Task:**

- 1) calculate variable and fixed cost using the high-low method
- 2) total variances of total costs.

**4. Preparing the master budget**

The main budget (master budget) is prepared on the basis of the estimated sales volume and then the estimated volume of production is planned. The production budget should be based on sales expectations, while the purchases budget should be based on production requirements.

The most important formulas in budget preparation are as follows:

*Sales budget (in \$) = expected unit sale · selling price*

*Production budget (in units) = expected sales unit + closing inventory – opening inventory*

*Direct material budget (in \$) = standard unit material usage per product · standard unit price of material*

*Direct labour budget (in \$) = units of product · hours per unit · labour rate per hour*

*Variable manufacturing overhead budget = units of product · number of labour (or machine) hours · rate per hour (labour or machine rate)*

*Cost of finished goods = direct materials + direct labour + variable manufacturing overhead + fixed manufacturing overhead*

*Material purchase budget (in \$) = [closing inventory (in units) + production units – opening inventory (in units)] · unit price material*

*Cost of goods sold = opening inventory (in \$) + cost of finished goods – closing inventory (in \$)*

### **The master budget**

The purpose of the master budget is to prepare pro forma financial statements:

- ✓ a statement of financial position (balance sheet) which includes estimates of assets, capital and liabilities,
- ✓ profit or loss statement – P/L statement) which includes expected revenues and costs,
- ✓ cash flow statement covering planned cash inflows and outflows.

### **Example 1.**

*(master budget)*

The company manufactures two products Alpha and Beta, for the production of which it uses the same raw materials A, B. The company has estimated the following:

- a) expected sales price 32 for Alpha, 44 for Beta
- b) budgeted sales are 4 500 for Alpha, 4 000 for Beta
- c) inventory of finished goods at the beginning of the year are 900 for Alpha, 200 for Beta. At the end of the year, the company plans to hold an inventory of 400 for Alpha, 1 200 for Beta. The unit cost of finished goods from the previous year is \$20 for Alpha and \$28 for Beta.
- d) raw material inventory is 1100 units for Alpha, 6 000 units for Beta at 1<sup>st</sup> January, and the company plans to hold 600 units for Alpha, 1000 units for Beta at 31<sup>st</sup> December. Planned cost of raw materials per unit is \$1,50 for Alpha, \$1 for Beta.
- e) the standard use of raw materials and standard units of direct labour is:

	Alpha	Beta
Material A	1.5 units	0.5 units
Material B	2.0 units	4.0 units
Direct labour	6 hours	9 hours

- f) the standard rate of direct labour is \$1,60/unit for each product.
- g) the standard (expected) product preparation time is 15 minutes in production department 1 and 12 minutes in production department 2– for product Alpha, 24 minutes in production department 1 and 18 minutes in production department 2 for product Beta.
- h) fixed manufacturing overhead is based on machine running time and they amount to (except of depreciation):

	Production department 1	Production department 2
Expenses	\$39 500	\$18 650

The depreciation rate is 5% and the company uses the straight-line method. All machines are worth \$100 000 in Department 1 and \$87 000 in Department 2. In July, the company plans to purchase a new machine worth \$20 000\$ used in Department 1. At the end of the year, it plans to purchase land for new plant.

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i) expected cash receipts and payments in every quarter is presented below:

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Sales cash receipts	\$70 000	\$100 000	\$100 000	\$40 000
Cash payments	\$50 000	\$129 000	\$226 000	\$25 000

j) the statement of financial position from the previous year

	Debit \$	Credit \$
<b>Assets</b>	<b>212 050</b>	
<b>Non-current assets</b>	<b>157 000</b>	
Land and buildings	45 000	
Plant and equipment at cost	187 000	
Less accumulated depreciation	(75 000)	
<b>Current assets</b>	<b>55 050</b>	
Raw materials	7 650	
Finished goods	23 600	
Receivables	19 500	
Cash	4 300	
<b>Equity and liabilities</b>		<b>212 050</b>
<b>Capital</b>		<b>205 250</b>
Share capital		150 000
Retained profit		55 250
<b>Current liabilities</b>		<b>6 800</b>
Payables		6 800

Task:

Prepare:

- 1) Sales budget.
- 2) Production (in units) and purchase budget.
- 3) Budget for direct materials.
- 4) Direct labour budget.
- 5) Manufacturing overhead budget.
- 6) Budget for cost of goods sold.
- 7) A budgeted statement of profit or loss.
- 8) Cash budget.
- 9) A budgeted statement of financial position.

*Sales budget*

Product	Market demand Units (expected sales unit)	Selling price \$	Sales value \$
Alpha	4 500	32.00	144 000
Beta	4 000	44.00	176 000

Total sales value = 144 000 + 176 000 = 320 000\$

The expecting total sales value of both products for a period from 1<sup>st</sup> April 20X7 - 31<sup>st</sup> March 20X8 is \$320 000.

*Manufacturing budget*

	<b>Alpha Units</b>	<b>Beta Units</b>
<b>Sales requirement</b>	4 500	4 000
<b>(Decrease)/increase in finished goods inventory</b>	(500)	1 000
<b>Production requirement</b>	4 000	5 000

The company needs to manufacture 4 000 units of Alpha and 5 000 units of Beta to meet its sales targets.

*Total manufacturing hours budget (it is useful for manufacturing overhead budget)*

<b>Product</b>	<b>Units</b>	<b>Hours per unit Department 1</b>	<b>Total hours Department 1</b>	<b>Hours per unit Department 2</b>	<b>Total hours Department 2</b>
<b>Alpha</b>	4 000	0.25	1 000	0.20	800
<b>Beta</b>	5 000	0.40	2 000	0.30	1 500
<b>Total</b>	9 000	-	3 000	-	2 300

The total number of hours required for production is 3000 hours for **Department 1** and 2300 hours for **Department 2**.

*Budget for direct materials usage*

	<b>Material</b>	<b>Calculation</b>	<b>Result</b>
<b>Alpha:</b>	A	4 000 x 1.5 kg	6 000
	B	4 000 x 2.0 kg	8 000
<b>Beta:</b>	A	5 000 x 0.5 kg	2 500
	B	5 000 x 4.0 kg	20 000
<b>Total</b>	A	6 000 + 2 500	8 500
	B	8 000 + 20 000	28 000
<b>Cost of materials</b>	A	8 500 x \$1.5	\$12 750
	B	28 000 x \$1	\$28 000

To produce the planned amount of Alpha and Beta, it is necessary to use material A for the sum of \$12 750 and material B for the sum of \$28 000.

*Direct labour budget*

<b>Product</b>	<b>Production Units</b>	<b>Hours per unit</b>	<b>Total hours</b>	<b>Rate per hour \$</b>	<b>Cost \$</b>
Alpha	4 000	6	24 000	1.60	38 400
Beta	5 000	9	45 000	1.60	72 000

Total direct labour = 38 400 + 72 000 = \$110 400

The direct labour budget for a period from 1<sup>st</sup> April 20X7 - 31<sup>st</sup> March 20X8 is \$38 400 for Alpha and \$72 000 for Beta.

Controlling and Budgeting

Manufacturing overhead budget

		Faculty 1 [\$]	Faculty 2 [\$]
Machinery installed	Manufacturing overhead	39 500	18 650
	Depreciation costs	$100\,000 \cdot 0.05 = 5\,000$	$87\,000 \cdot 0.05 = 4\,350$
New machine	Depreciation costs	$20\,000 \cdot 0.05 \cdot 6/12 = 500$	-
Total manufacturing overhead		$39\,500 + 5\,000 + 500 = 45\,000$	$18\,650 + 4\,350 = 23\,000$
Total machine hours		3.000 hrs	2.300 hrs
Absorption rate per machine hour		$45\,000/3\,000 = \$15$	$23\,000/2\,300 = \$10$

Total manufacturing overhead for **production departments** are \$45 000 and \$23 000 correspondingly. In this case, the absorption rate per machine will be \$15 per hour for **Department 1** and \$10 per hour for **Department 2**.

Cost of finished goods

	Calculation	Alpha( \$)	Calculation	Beta (\$)
Direct material A	$1.5\text{ kg} \cdot \$1.50$	2.25	$0.5\text{ kg} \cdot \$1.50$	0.75
Direct material B	$2.0\text{ kg} \cdot \$1.00$	2.00	$4.0\text{ kg} \cdot \$1.00$	4.00
Manufacturing overhead Assembling dep.	12 mins at \$10 per hr	2.00	18 mins at \$10 per hr	3.00
Production cost per unit	-	19.60	-	28.15

Production cost per product Alpha is \$19.60 and \$28.15 per 1 unit of Beta.

Budget for direct material purchase

	Material A kg	Material B kg
Closing inventory required	600	1 000
Production requirements	8 500	28 000
Total amount required	$600 + 8\,500 = 9\,100$	$28\,000 + 1\,000 = 29\,000$
Less opening inventory	1 100	6 000
Purchase requirements	$9\,100 - 1\,100 = 8\,000$	$29\,000 - 6\,000 = 23\,000$
Cost per unit	\$1.5	\$1
Purchase costs	$8\,000 \cdot 1.5 = \$12\,000$	\$23 000

During a planning period, 8 000 kg of material A and 23 000 kg of product B must be purchased. The budget for direct material purchase is \$12 000 for material A and \$23 000 for material B.

**Budget for cost of goods sold** (using FIFO)

	Alpha			Beta		
	Units	\$ per unit	Total \$	Units	\$ per unit	Total \$
Opening inventories	900	20	18 000	200	28	5 600
Production cost	4 000	19.6	78 400	5 000	28.15	140 750
Total amount of products	4 900	-	96 400	5 200	-	146 350
Less closing inventories	400	19.6	7 840	1 200	28.15	33 780
Cost of sales	$4\,900 - 400 = 4\,500$	-	$96\,400 - 7\,840 = 88\,560$	$5\,200 - 1\,200 = 4\,000$	-	$146\,350 - 33\,780 = 112\,570$

Total cost of goods sold for Alpha is \$88 560 and \$112 570 for Beta.

*Cash budget for year to 31.3.X8*

	Quarter 1 \$	Quarter 2 \$	Quarter 3 \$	Quarter 4 \$	Total \$
<b>Receipts</b>	70 000	100 000	100 000	40 000	310 000
<b>Materials</b>	7 000	9 000	10 000	5 000	31 000
<b>Labour</b>	33 000	20 000	11 000	15 000	79 000
<b>Other costs and expenses</b>	10 000	100 000	205 000	5 000	320 000
<b>Total Payments</b>	50 000	129 000	226 000	25 000	430 000
<b>Receipts less payments</b>	20 000	(29 000)	(126 000)	15 000	-
					(120 000)
<b>Opening cash balance</b>	4 300	24 300	(4 700)	(130 700)	4 300
<b>Closing cash balance</b>	24 300	(4 700)	(130 700)	(115 700)	(115 700)

*Budgeted statement of profit or loss for year to 31.3.X8*

	Alpha (\$)	Beta (\$)	Total \$
<b>Sales</b>	144 000	176 000	320 000
<b>Less cost of sales</b>	88 560	112 570	201 130
<b>Gross profit</b>	55 440	63 430	118 870

*Budgeted statement of financial position*

	Debit \$	Credit \$
<b>Assets</b>	420 170	
<b>Non-current assets</b>	347 150	
Land and buildings	225 000	
Plant and equipment at cost	207 000	
Less accumulated depreciation	(84 850)	
<b>Current assets</b>	73 020	
Raw materials	1 900	
Finished goods	41 620	
Receivables	29 500	
<b>Equity and liabilities</b>		420 170
<b>Capital</b>		293 720
Share capital		150 000
Retained profit		143 720
<b>Current liabilities</b>		126 450
Payables		10 750
Bank overdraft		115 700

**The balance sheet is based on the fundamental equation:**

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

**A cash budget is a budget of cash inflows and outflows.**

Cash receipts = inflows

Cash payments = outflows

## Controlling and Budgeting

Net profit and cash are not the same, examples to support this statement:

1. Purchase of fixed assets example: we buy machine for \$ 20 000 and depreciation is charged at 10% of the cost.

Depreciation charge (cost) = \$2 000 → it will reduce profit

Cash \$20 000

2. Sales of fixed assets

We sell a \$15 000 asset for \$11 000

Loss = \$4 000

Cash = \$11 000

### Example 2.

(Cash budget)

Position	May	June
Sales	\$30 000	\$40 000
Gross profit	30%	30%
Closing trade payables as a percentage of costs of goods	50%	50%
Opening inventory	0	0
Closing inventory	0	0

How much money should be budgeted for payments to suppliers in June?

Position	May	June
Sales	\$30 000	\$40 000
Gross profit	\$9 000	\$12 000
Cost of goods	\$21 000	\$28 000
Trade payables	\$10 500	\$14 000

Opening payables in June: \$10 500

Purchases in June: \$28 000

Closing payables in June: \$14 000

Amount paid in June: \$10 500 + \$28 000 - \$14 000 = \$24 500

### Example 3.

(cash budget)

A small company started the business at 1<sup>st</sup> January. At the beginning, there was \$15 000 in its bank account. The company can have a credit balance on it. Prepare a cash budget for the first half of the year, if:

- a) current running expenses are \$1 600 per month,
- b) the owner takes out \$1 600 for his private use,
- c) the customers are credited for two months, while the company receives one month credit on every purchase,
- d) expected sales is 5 000 units every month and sales price is \$50 per unit,
- e) the company bought a machine for \$6 000 and it will pay for it at the end of May,
- f) monthly purchases are \$200 000.

Please complete the table with the amounts of cash payments and receipts and calculate the cash surplus or shortfalls for the period January to June.

Position	Jan	Feb	Mar	Apr	May	Jun
<b>Payments</b>						
Suppliers						
Running expenses						
Drawings						
<b>Receipts</b>						
<b>Receivables</b>						
<b>Surplus (shortfall)</b>						
<b>Opening balance cash</b>						
<b>Closing balance cash</b>						

## 5. Project requirements

### Requirements for crediting the course (self to do work, project)

Prepare budget for 12 months, assuming that:

1. the company manufactures two products,
2. both products are manufactured by the same category of labour,
3. the company holds finished goods both at the beginning and at the end of each month (you assume a percentage of sales for next month),
4. the products are manufactured from two materials and one type of material is common to these products,
5. the company maintains material inventory both at the beginning and at the end of each month (you assume a percentage of production for next month),
6. the products pass through one production department.

### Task:

Prepare:

- 1/ sales budget,
- 2/ production (in units) and purchase budget,
- 3/ budget for direct materials,
- 4/ direct labour budget,
- 5/ manufacturing overhead budget (with separately variable and fixed costs),
- 6/ budget for cost of goods sold,
- 7/ a budgeted statement of profit or loss.

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