EFR summary

Intermediate Accounting, FEB12007X

2024-2025

Lectures 1 to 12

Weeks 1 to 7

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Details

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Intermediate accounting – IBEB – FA Lecture 1 - Intro & Recap lecture

Introduction and basic concepts

Types of financial statements

1. **Balance sheet**: snapshot of a firm's assets and liabilities at a given point in time
2. **Income statement**: statement on the firm's revenue and expenses over time
3. **Cash flow statement**: statement on how the cash account has changed between two dates
4. **Shareholders' equity statement**

Accrual-based accounting

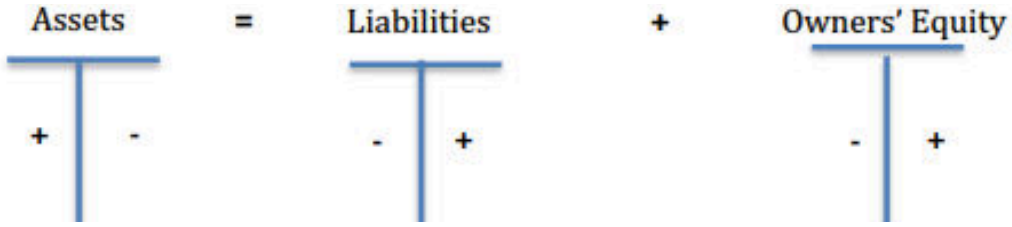
In the accrual basis of accounting, expenses follow revenues and are identified in the period when the economic activity occurs.

Accrual perspective: Earnings = Cash flow + accruals

1. **Accrual principle:** Revenue recognition and matching principle
2. **Deferrals**
    - Prepaid Expenses: expenses that have been paid by the company before they are consumed (e.g., prepaid insurance). These are assets
    - Unearned Revenues: cash that has been received before the company's obligations in the transaction have been fulfilled (e.g., payment in advance for a year-long gym membership). These are liabilities.
3. **Accruals**
    - Accrued Revenues: a product or service has been successfully delivered, but payment has not yet been received. These are assets
    - Accrued Expenses: resources that have been used but not yet paid for. These are liabilities

Debit and credit

Conventional accounting is done with T-accounts, where the left side is called debit and the right side is called credit.



Every debit must have a corresponding credit in another account, since all t-accounts must balance in the general ledger.

Intermediate Accounting – IBEB – FA Lecture 2, week 2
Cash Flow Statement

Cash flow statement

Cash: includes cash in hand and checking accounts
Cash equivalents: short-term, highly liquid investments that are both:

- readily convertible to known amounts of cash.
- near their maturity that they present an insignificant risk of changes in value (e.g., due to changes in interest rates). Generally, investments with original maturities of three months or less qualify under this definition.

Purpose of cash flow statement

- Provide information about a company's cash receipts and cash payments during a period
- Provide cash-basis information about the company's operating, investing, and financing activities

Types of cash flow

Operating activities (involve income statement items):

- Derived from the main business activities
- Cash receipts from sales or cash payments to suppliers and employees
- Returns from loan (interest) and equity securities (dividends)

Investing activities (Involves changes in investments and non-current asset items):

- Buying and selling of fixed assets (PPE)
- Purchase or sale of debt/equity securities from other entities

Financing activities (Involves changes in equity and non-current liability Items):

- Share capital and dividends
- Long-term loans and bond issues

Change in cash = Cash from operations + cash from investments + cash from financing

Convention in our course:	Interest paid	Interest received	Dividends paid	Dividends received	Taxes paid
	OPE	OPE	FIN	OPE	OPE

Preparation of the cash flow statement

Steps:

1. Determine change in cash.
2. Determine net cash flow from operating activities.
3. Determine net cash flows from investing and financing activities.

There are two ways of calculating potential cash flow from operating activities:

1. **DIRECT METHOD:** Potential cash flow = Cash revenues - Cash expenses
2. **INDIRECT METHOD:** Potential cash flow = Net income + non-cash expenses - non-cash revenues

Indirect method

Net income = CFO + accruals => CFO = Net income - accruals

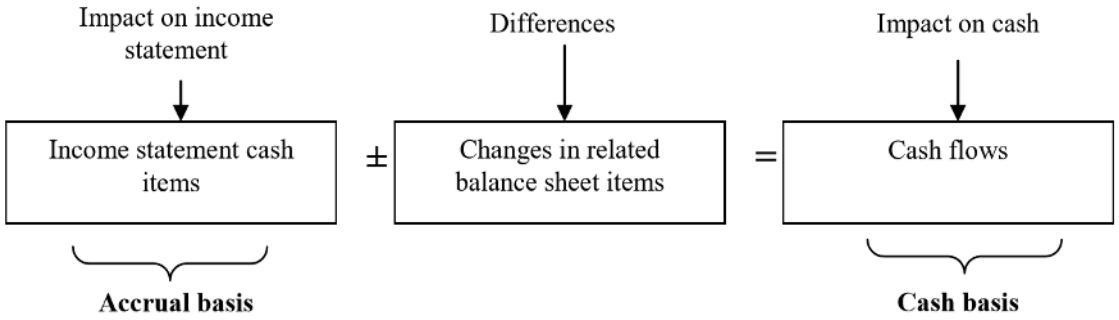
Non-current accruals: Depreciation and Deferred income tax

Current accruals: changes in current operating assets and liabilities:

- Accounts receivables: Increase in AR is subtracted from NI to get CFO
- Prepaid expenses
- Inventory
- Accounts payable: Increase in AP is added to NI to get CFO

Direct method

It can be illustrated through the following equation:



Intermediate Accounting – IBEB – MA Lecture 1, week 3
Cost terms & Absorption versus Variable Costing Systems

Cost Terms and Concepts

Managerial Accounting

Managerial accounting is used for internal decision making and is forward-looking, so there are no regulatory requirements for layout or content. The main aim is to understand how value is created in a company in order to make better decisions.

Financial Accounting

Financial accounting is used for external communication and is backward-looking. This type of communication is needed because ownership and control in corporations are separate. Separation of ownership and control can lead to agency problems, which is why investors and other creditors need to possess the same information as the managers. Ensuring that third parties have full information also helps to combat adverse selection and moral hazard problems.

Cost Object

Anything for which costs can be measured, such as the cost of a department of the firm, or a project, product, or service.

Cost Allocation System

Two stages

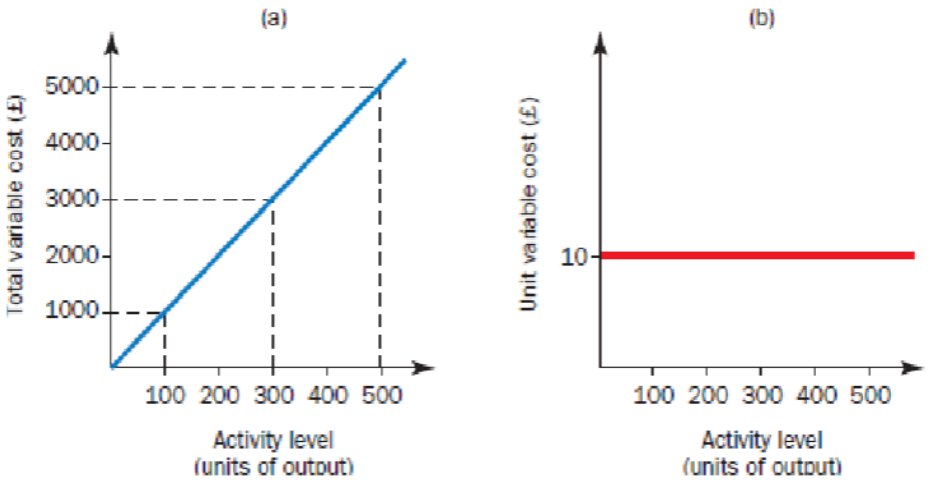
1. **Classifying costs** into categories
    - Behavior
    - Traceability
    - Function
    - Relevance

2. **Cost Assignment** to cost objects. There are two types of costs, direct costs and indirect costs.

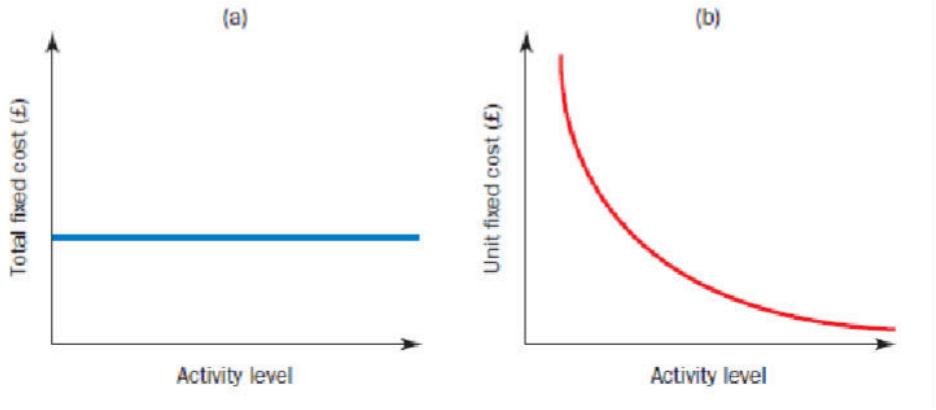
Categories

Behaviour: how the cost changes with activity level

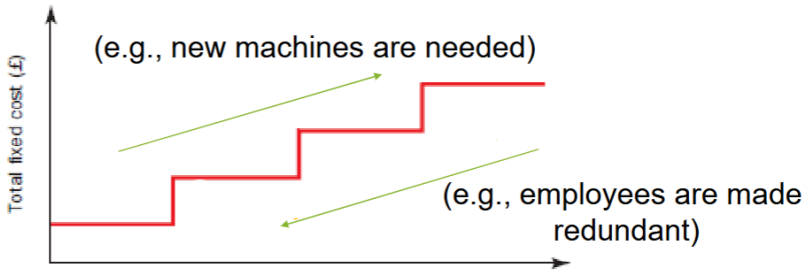
1. Variable costs: change with the total level of activity or volume of operations (e.g., material)



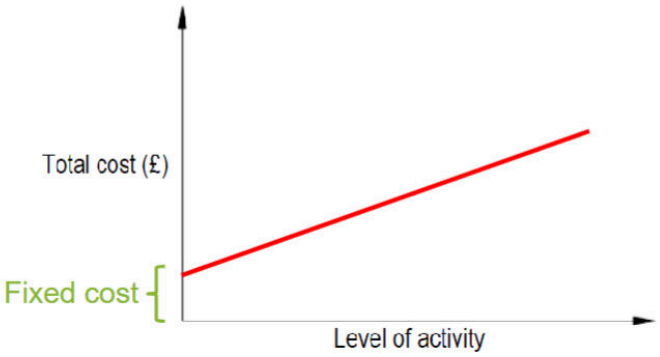
2. Fixed costs: remain constant regardless of the size of operations (e.g. rent or depreciation)



3. Semi-fixed costs (step-fixed costs): Fixed within specific activity levels, for example, being fixed only over a relevant range.



4. Semi-variable costs: mixed costs that are composed of both fixed and variable costs (e.g., labor cost that includes a fixed wage and a variable bonus)



Note: in the long run, ALL costs are variable, but they are fixed when looking at a specific time frame.

Traceability: how easily/accurately costs can be allocated

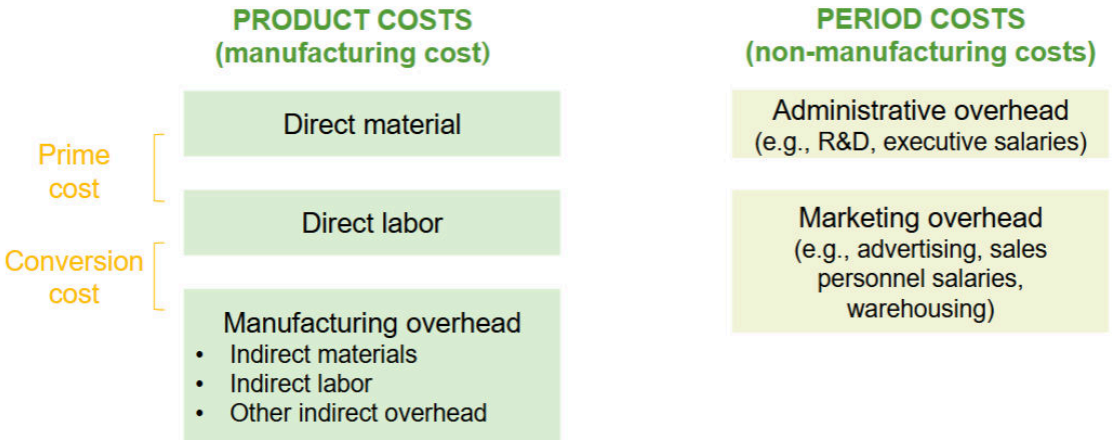
1. Direct costs: costs incurred for one cost object and can be accurately traced back (Golden rule: you can physically observe the amount of material and labour used).
    - Direct material cost
    - Direct labor cost (production employees)

2. Indirect costs: costs incurred for more than one cost object. A cost allocation process is needed.
    - Indirect material costs (cleaning or repair material)
    - Indirect labor costs (administration or maintenance)
    - Other expenses (factory rent)

Distinction:

- Sometimes, direct costs are treated as indirect since it's not cost effective to trace costs directly (e.g: the number of nails used in a desk, as the cost is likely insignificant)
- The distinction also depends on the cost object. A cost can be treated as direct for one cost object but indirect for another.

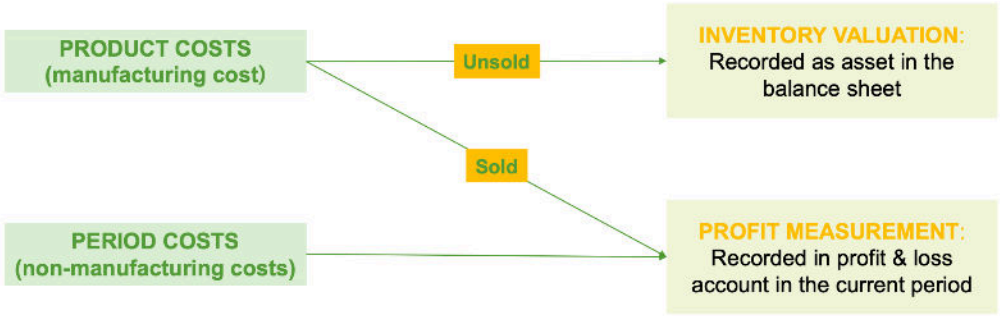
Function: the extent to which the cost is relevant for profit measurement or inventory valuation.



1. Product / Manufacturing cost
    - Direct material
    - Direct labour
    - Manufacturing overhead
        - Indirect material and labor
        - Depreciation of equipment
        - Factory rent and utilities

2. Period / Non-manufacturing cost:
    - Administrative overhead
    - Marketing overhead
    - Office rent (not factory rent)

Note: Every business has period costs, even if NO production takes place.



Product cost

- Unsold: They are treated as inventory on the balance sheet (matching principle: costs should be recorded as assets if they are expected to bring future economic benefits).

- Sold: They become cost of goods sold in the income statement (matching principle: product costs are matched with revenues when the product is sold).

Period cost: Always treated as expenses in the income statement when incurred.

Merchandise (purchase goods for resale without changing their basic form)
- Product cost = cost of goods purchased
- Period cost = all other costs (e.g: selling, admin, and distribution)
- COGS = beginning merchandise inventory + purchases during the period - closing merchandise inventory

Service (don't have finished good inventory since it's not possible to store services, but they may have WIP e.g, incomplete legal case or consultancy project)
- Product cost = DM (if applicable), DL, and overhead assigned to the cost object, typically the client or customer
- Cost of services sold (COGS equivalent) = beginning WIP + cost assigned to clients during the period - closing WIP

Costs/Revenue Relevance: The extent to which costs are relevant for making a particular decision.

1. Relevant revenue/costs: Future costs and revenues that will be changed by a decision
   Note: NOT all future costs are relevant, but all relevant costs are future costs.
2. Sunk Costs: Costs that have already occurred and cannot be changed by any decision
3. Opportunity Costs: measures the benefits that are lost or sacrificed when a certain action is chosen and an alternative action is given up.
4. Avoidable cost: future costs that may be saved by not adopting an alternative
5. Unavoidable cost: future costs that can't be saved whether or not an alternative is adopted
6. Incremental (differential) cost: difference between the costs of each alternative action
   - Difference with marginal cost: marginal represents the additional cost/revenue of one extra unit, whereas incremental represents the additional cost/revenue of a group of additional units

Example

Assume that Tesla must decide between producing electric car batteries themselves or buying them from another supplier firm. Based on the following annual figures, what should Tesla decide?

	MAKE	BUY	
Variable manufacturing costs	5,000,000 EUR	0 EUR	relevant
Fixed costs	10,000,000 EUR	10,000,000 EUR	irrelevant
Purchase price	0 EUR	25,000,000 EUR	relevant
Total relevant costs	-5,000,000 EUR	-25,000,000 EUR	

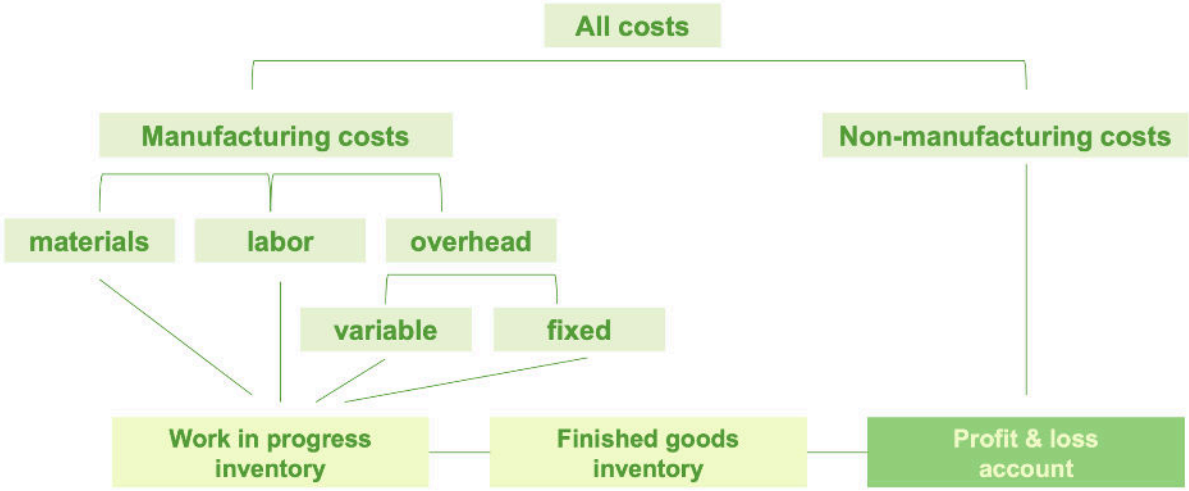
Absorption vs Variable Costing System

The 2 different costing systems differ in the treatment of fixed manufacturing overhead costs, which leads to **different profits**.

Absorption / Full Costing

Absorption costing: both variable and fixed MOH are recorded as inventory costs.

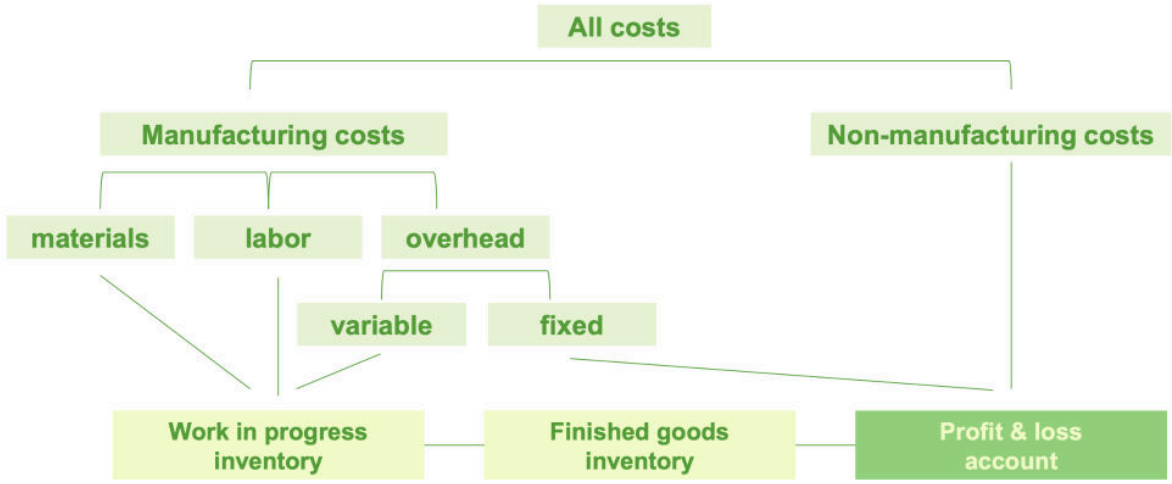
When the product is sold, they're included as COGS in the income statement (follow revenue) => **Fixed MOH is included in product cost and inventory valuation**



Variable / Direct Costing

Variable costing: only variable expenses are recorded as inventory costs.

Fixed MOH is immediately included as period expense in the income statement (don't follow revenues) => **Fixed MOH is not part of the product cost or inventory valuation (period costs)**



Summary

	Absorption Costing	Variable Costing
Included in product cost	- Direct materials - Direct labour - Variable and fixed MOH	- Direct materials - Direct labour - Variable MOH only
Fixed MOH treatment	Treated as part of the inventory cost	Treated as period cost
COGS includes	Variable + Fixed MOH	Only variable costs
Impact on profit if inventory changes	Profit is higher when inventory increases, as some fixed costs are deferred in inventory	Profit is lower when inventory increases, as all fixed costs are expensed immediately

Note: Variable costing uses a contribution margin, whereas absorption costing uses a gross margin in the income statement.

Example

Hello Knitty Factory produces and sells a single type of scarves. The following figures are available:

(in units)	PERIOD 1	PERIOD 2	PERIOD 3
Opening inventory	0	0	1,000
Production	1,000	3,000	1,000
Sales	1,000	2,000	2,000
Closing inventory	0	1,000	0

	EUR
Unit selling price	50
Manufacturing costs	
▪ Variable manufacturing costs per unit produced	20
Direct materials	*11*
Direct labor	*6*
Variable manufacturing overhead	*3*
▪ 12,000 EUR fixed manufacturing overhead per period (for a normal capacity of 1,000 units)	12
Non-manufacturing costs	
▪ Variable selling & administrative expenses per unit sold	4
▪ Fixed selling & administrative expenses per period	7,000

fixed = overhead rate

$\frac{12{,}000}{1{,}000}$

(1) Profit and loss (P&L) account based on VARIABLE COSTING:

	PERIOD 1	PERIOD 2	PERIOD 3
sales	**50,000** (1,000 x 50)	**100,000** (2,000 x 50)	**100,000** (2,000 x 50)
– variable COGS	**20,000** (1,000 x 20)	**40,000** (2,000 x 20)	**40,000** (2,000 x 20)
opening inventory	*0*	0	*20,000(1,000 x 20)*
production	*20,000 (1,000 x 20)*	*60,000 (3,000 x 20)*	*20,000 (1,000 x 20)*
- ending inventory	*0*	*20,000 (1,000 x 20)*	*0*
– variable non-manufacturing costs	4,000 (1,000 x 4)	**8,000** (2,000 x 4)	**8,000** (2,000 x 4)
= contribution margin	**26,000**	**52,000**	**52,000**
– fixed manufacturing overhead	**12,000**	**12,000**	**12,000**
– fixed non-manufacturing costs	**7,000**	**7,000**	**7,000**
= net operating income	**7,000**	**33,000**	**33,000**

(1) Profit and loss (P&L) account based on ABSORPTION COSTING:

	PERIOD 1	PERIOD 2	PERIOD 3
sales	**50,000** (1,000 x 50)	**100,000** (2,000 x 50)	**100,000** (2,000 x 50)
– COGS	**32,000** (1000 x 32)	**64,000** (2,000 x 32)	**64,000** (2,000 x 32)
opening inventory	*0*	*0*	*32,000 (1,000 x 32)*
production	*32,000 (1,000 x (20+12))*	*96,000 (3,000 x 32)*	*32,000 (1,000 x 32)*
- ending inventory	*0*	*32,000 (1,000 x 32)*	*0*
–/+ under- or over-absorption of fixed overhead	*I*	**24,000** ((3,000 – 1,000) x 12)	*I*
= gross margin	**18,000**	**60,000**	**36,000**
– non-manufacturing costs	**11,000** (4 x 1,000 + 7,000)	**15,000** (4 x 2,000 + 7,000)	**15,000** (4 x 2,000 + 7,000)
= net operating income	**7,000**	**45,000**	**21,000**

Absorption Costing: Four Denominator Levels

Under absorption costing, it requires an estimation of fixed overhead rates to assign per unit. Thus, it requires an allocation base to help estimate these costs:

1. **Theoretical capacity (maximum):** this means production which is at full speed of what is physically possible, all the time.
2. **Practical capacity:** production at maximum capacity, but considering unavoidable disruptions, holidays, maintenance time, etc.
3. **Normal capacity:** satisfies what customers on average demand over multiple time periods.
4. **Master-budget capacity:** the most expected capacity utilisation that will occur in the next budget period.

Example

Hello Knitty Factory provides us with the following figures concerning their different capacity levels:

CAPACITY LEVELS	*(in units)*
Theoretical capacity	4,000
Practical capacity	3,000
Normal capacity	1,000
Budgeted capacity	1,500

Assume that actual activity and actual fixed manufacturing overhead equal 1,000 units and 12,000 EUR, respectively

	FIXED MANUFACTURING OVERHEAD RATE (EUR/unit)	ALLOCATED TO PRODUCTS (EUR)	UNDER- OR OVER-ABSORPTION OF FIXED OVERHEAD (EUR) (cost of unused capacity)	F/A	TOTAL (EUR)
Theoretical capacity	(12,000 / 4,000) = 3	(3 x 1,000) = 3,000	((4,000 – 1,000) x 3) = 9,000	A	12,000
Practical capacity	(12,000 / 3,000) = 4	(4 x 1,000) = 4,000	((3,000 – 1,000) * 4) = 8.000	A	12,000
Normal capacity	(12,000 / 1,000) = 12	(12 x 1,000) = 12,000	((1,000 – 1,000) * 12) = 0	/	12,000
Budgeted capacity	(12,000 / 1,500) = 8	(8 x 1,000) = 8,000	((1,500 – 1,000) * 8) = 4,000	A	12,000

Profit comparison

Variable costing: Profit is a function of sales volume only
Absorption costing: Profit is a function of sales and production volume

- **Production > Sales**: profit absorption costing > profit variable costing (inventories increase)
- **Production < Sales:** profit absorption costing < profit variable costing (inventories decrease)

- **Production = sales**: profit absorption costing = profit variable costing (NO change in inventories)

If production exceeds sales and variable costing records all of the fixed costs as period costs, then unsold inventory will be treated as an expense on the income statement. Hence, profit will be lower in comparison with absorption costing, where only the fixed costs associated with sold goods are recorded as expenses.

Similarly, when sales exceed production, more of the fixed costs are expensed under absorption costing than with variable costing because variable costing would again record the produced goods.

Intermediate Accounting – IBEB – MA Lecture 2, week 3
Cost Allocation

Cost Assignment

Job Costing

This is when firms offer unique individual products or at least small batches of unique products to their customers. Usually, these products are tailored to meet the specific needs of each customer. This means that they will have their own characteristics and costs, thus must assign costs for each product individually.

Example: Erasmus University wants to order chocolates for their students to wish them good luck with their exams. They will place a custom order.

Process Costing

This is when large volumes of similar products are produced. Thus, these products are identical, and the costs will be the same

Example: Tony's Chocolonely produces the salted caramel chocolate bar. It is produced in mass production and on a continuous basis. There is no need to assign costs individually, as they have identical characteristics and costs.

Direct Tracing vs Cost Allocations

Direct Costs

These costs include direct labour and material and can be accurately and immediately linked (directly traced) to an individual cost object. Remember that you can physically observe exactly how much direct material or labour is needed.

Indirect costs

Indirect costs are costs related to a cost object but that cannot be traced to it. We cannot use direct measures.

Example: electricity costs or heating costs of the factory. We do not know exactly the quantity and the costs that are associated with the specific quantity that is consumed by each object manufactured. Therefore, we need a cost allocation process where surrogate/alternative measures are used.

Note: costs are first treated as assets because we expect that these costs will generate future revenue. They are first registered as work in progress or finished goods. It is only when a product is sold that it is treated as an expense in the profit/loss account.

Cost Drivers or Cost Allocation Basis

Any factor that causes a change in the cost of manufacturing products or offering services.

1. **Volume-related:** depends on the number of units manufactured (labour/machine hours, labour costs)
2. **Non-volume-related:** do NOT depend directly on units manufactured (number of setups, number of inspections)

Note: for accurate cost assignment, cost drivers should be significant determinants of costs. There should be a **causal relationship** between the cost driver and the size of the costs.

Allocation of Indirect Costs to Cost Objects

There are two ways to allocate indirect costs:

1. **Traditional Costing System - Arbitrary Allocations:** cost drivers are NOT always a significant determinant of cost. Less accurate cost assignment but are still very popular in practice.
2. **Activity-Based Costing System - Cause & effect Allocations:** focus on cost drivers that significantly determine the amount of costs so that we have an accurate cost assignment.

Note: under a traditional costing system, the accuracy of cost assignment will be lower, but it is a less expensive system. This is because higher accuracy requires gathering information and keeping information up to date, which is more costly (higher operating costs).

Apply the rule: **marginal benefit > marginal cost of making the system more accurate.**

Factors Impacting Benefit-Cost Tradeoff:

- **Size of the indirect cost:** if indirect costs are low compared to toilet cost, then a traditional costing system can still be very accurate.
- **Cost of gathering information:** if the cost of gathering/keeping information is low, then it is best to work with the activity-based costing system.
- **Product diversity:** if more different products are manufactured, the they will consume costs in different ways. Thus, activity-based costing is better suited.
- **Why do we need cost allocation?**
    - If we need it for managerial decision-making purposes => activity-based costing
    - If we need it to capture the value of inventory/COGS => traditional costing

Traditional Costing System

Assume that *Tony Chocolonely* produces **two unique types of chocolate bars (standard vs. premium chocolate bar)** made to Erasmus School of Economics' specifications. The following budgeted figures are available:

	STANDARD	PREMIUM	TOTAL
Production and sales	10,000	5,000	15,000
Direct materials (EUR)	2	4	40,000
Direct labor hours (hours)*	0.2	0.5	4,500
Direct labor costs (EUR)	1.6	4	36,000
Machine hours X	0.5	1.5	12,500
Machine hours Y	1.0	1.0	15,000
Indirect costs or manufacturing overhead (EUR)			225,000

Plant-wide (Blanket) Overhead Rate

The use of a single budgeted overhead rate for the organization as a whole. An overhead rate tells us how overhead costs are charged based on the chosen cost driver, thus, it is calculated as follows:

$$Budgeted\ Overhead\ Rate\ = \frac{total\ budgeted\ manufacturing\ overhead}{total\ budgeted\ amount\ of\ the\ cost\ driver}$$

The overhead rate is used for the factory as a whole which leads to multiple disadvantages because within an organization products often pass through many different departments. Thus by using a single rate you assume that all products go through these departments in a similar way (**assume that product diversity is low**). This does not coincide with reality, therefore, it is not commonly used in practice.

Example:

Cost assignment of 225,000 EUR manufacturing overhead using direct labor hours as cost driver:

Budgeted plant-wide overhead rate: $= \frac{225{,}000 \text{ EUR manufacturing overhead}}{4{,}500 \text{ direct labor hours}}$

$= 50 \text{ EUR per direct labor hour}$

	STANDARD	PREMIUM
Direct materials	2	4
Direct labor costs	1.6	4
Manufacturing overhead	10 *(0.2 x 50)*	25 *(0.5 x 50)*
TOTAL COSTS PER UNIT **TOTAL COSTS**	13.6 136,000	33 165,000

Most likely, premium bars use departmental resources in different ways, in the sense that it requires going through more departments (needs more processing). Thus, we must look at other systems.

2-Stage Allocation Process: Traditional

This works best when product diversity is high. This is when cost objects will consume overhead costs in different ways. The difference from this process to others is how we treat manufacturing overhead.

1st Stage: assign manufacturing overhead to production cost centers/pools (typically departments).

- Some are first allocated to a service cost center that renders essential support in the production process, but they are not directly related to production (these costs are reallocated to production centers).

2nd Stage: compute separate overhead rates for each production cost centre, then use cost drivers to allocate all the costs assigned to different production cost centres (1st Stage) to the cost objects.

- Traditional costing system: typically volume-based cost drivers (hours)

Example:

1st Stage

Allocate 225,000 EUR manufacturing overhead to production centres (i.e., production, packaging and quality department) (*STEP 1*):

	MANFACTURING OVERHEAD	COST DRIVER TO PRODUCTION COST CENTRES	AREA (SQ. METRES)
Indirect wages and supervison			
production department	10,000	Direct	280,000
packaging department	10,000	Direct	80,000
quality department	5,000	Direct	40,000
Lighting and heating	200,000	**Area**	

BUDGETED OVERHEAD RATE

$$= \frac{200{,}000}{280{,}000+80{,}000+40{,}000}$$

= **0.50 EUR** per sq. metre

	PRODUCTION COST CENTRES OVERHEAD
PRODUCTION	150,000 (*10,000* + *280,000* x*0.50*)
PACKAGING	50,000 (*10,000* + *80,000* x *0.50*)
QUALITY	25,000 (*5,000* + *40,000* x *0.50*)
	225,000

Cost Allocation, MA Lecture 2 (slide 15)

Note that indirect wages are direct for departments but indirect for cost objects. We know how much wage we have paid in each department, but we do not know how much labour from each department was used for each cost object.

2nd Stage

Allocate overhead in production centres to cost objects (*STEP 2*):

	PRODUCTION COST CENTRES OVERHEAD (1)	COST DRIVER TO COST OBJECTS (2)		BUDGETED PRODUCTION COST CENTRE OVERHEAD RATES (3) = (1) / (2)
PRODUCTION	150,000	Machine hours X	12,500	12 EUR per machine hour
PACKAGING	50,000	Machine hours Y	15,000	3.33 EUR per machine hour
QUALITY	25,000	Direct labor hours	4,500	5.56 EUR per labor hour

	STANDARD	PREMIUM
Direct materials	2	4
Direct labor costs	1.6	4
Production	6 (*12 x 0.5*)	18 (*12 x 1.5*)
Packaging	3.33 (*3.33 x 1.0*)	3.33 (*3.33 x 1.0*)
Quality	1.11 (*5.56 x 0.2*)	2.78 (*5.56 x 0.5*)
COST PER UNIT	14.04	32.11
TOTAL COSTS	140,400	160,550

We can see that a premium chocolate bar consumes more overhead in the production and the quality department. This is not observable when using only one overhead to allocate all manufacturing overhead to our cost objects.

2-Stage Allocation Process: Activity-Based Costing Systems (ABC)

In this process, overheads are allocated to each major activity related to manufacturing a cost object, which is called activity cost center.

Activities are defined as the aggregation of many different tasks that share the same goal and cause the consumption of resources. Example: purchasing components, scheduling production, set-up machines, quality inspection.

The main difference is that ABC systems usually have more cost centers/pools than the traditional costing systems. This is because within a specif department multiple activities can be performed resulting in more activity cost centers than production cost centers under a traditional costing system.

1st Stage: identify activities with a reasonable level of aggregation based on cost-benefit criteria and then use **resource cost drivers** to allocate each cost object to the activity cost centers.

- resource cost drivers: measure the quantity of resources consumed by an activity.

2nd Stage: use **activity cost drivers** to assign the cost within each activity cost center to different cost objects.

- Activity cost drivers: can be volume or non-volume-based
- Results in a more accurate assignment of costs.

Example

1st Stage:

Assume that **budgeted overhead of 225,000 EUR** is caused by the following **activities** (*Step 1*) and activities have the following activity cost drivers:

	OVERHEAD IN ACTIVITY COST CENTRES	ACTIVITY COST DRIVERS
PURCHASING	30,000	Number of purchase orders
MACHINE SET-UP	100,000	Number of set-ups
MAINTENANCE	20,000	Machine hours X
PACKAGING	50,000	Machine hours Y
QUALITY INSPECTION	25,000	Number of first item inspections
	225,000	

2nd Stage:

The following figures are also known:	STANDARD	PREMIUM	TOTAL
Production and sales	10,000	5,000	15,000
Number of purchase orders	2	4	40,000
Number of set-ups	1	6	40,000
Machine hours X	0.5	1.5	12,500
Machine hours Y	1.0	1.0	15,000
Number of first item inspections	4	10	90,000

Allocate overhead in activity centres to cost objects (*STEP 2*):

	ACTIVITY COST CENTRE OVERHEAD (1)	TOTAL AMOUNT OF ACTIVITY COST DRIVER (2)	BUDGETED ACTIVITY COST DRIVER RATES (3) = (1) / (2)
PURCHASING	30,000	40,000	0.75 EUR per purchasing order
MACHINE SET-UP	100,000	40,000	2.5 EUR per set-up
MAINTENANCE	20,000	12,500	1.6 EUR per machine hour X
PACKAGING	50,000	15,000	3.33 EUR per machine hour Y
QUALITY INSPECTION	25,000	90,000	0.28 EUR per inspection

BUDGETED ACTIVITY COST DRIVER RATES (3) = (1) / (2)
0.75 EUR per purchasing order
2.5 EUR per set-up
1.6 EUR per machine hour X
3.33 EUR per machine hour Y
0.28 EUR per inspection

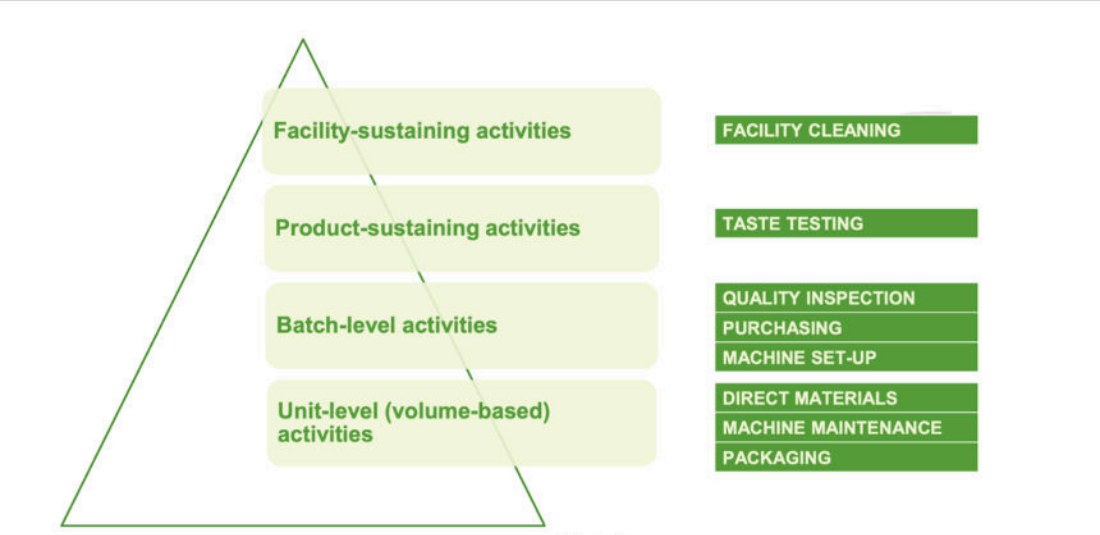
	STANDARD	PREMIUM
Direct materials	2	4
Direct labor costs	1.6	4
Purchasing	1.5 (*0.75 x 2*)	3 (*0.75 x 4*)
Machine set-up	2.5 (*2.5 x 1*)	15 (*2.5 x 6*)
Maintenance	0.80 (*1.6 x 0.5*)	2.40 (*1.6 x 1.5*)
Packaging	3.33 (*3.33 x 1*)	3.33 (*3.33 x 1*)
Quality controls	1.12 (*0.28 x 4*)	2.80 (*0.28 x 10*)
TOTAL COSTS PER UNIT TOTAL COSTS	12.85 128,500	34.53 172,650

Note that the premium chocolate bar is more complex, and the costs associated with the complexity are better captured by the ABC system, as it shows which activities are the most cost-intensive.

Activity hierarchies

- **Facility-sustaining activities:** support the organization as a whole
  - Unavoidable & irrelevant => do NOT allocate to products
- **Product-sustaining activities:** support an entire product line
- **Batch-level activities:** performed each time a batch of goods is produced

- **Unit-level (volume-based) activities:** performed each time a unit of the product/service is produced



Over/Under Absorption of Manufacturing Overheads

Under/over absorption arises if allocated overhead </> actual overhead.

Intermediate Accounting – IBEB – FA Lecture 3, week 3 - Equity

Initial Public Offering (IPO)

For a firm to become publicly owned, it raises capital by issuing shares in an initial public offering (IPO). After the IPO, shares are able to be traded freely in the open market. The capital it earns is part of contributed capital and does not need to ever be paid back to investors in the IPO.

Advantages:

- Raise capital
- Monetize investments of early private investors
- Become a traded enterprise

Disadvantages:

- Greater costs
- Disclosure requirements
- Stronger agency problems

Equity

Share Types

Shares represent residual corporate interest that:

- They bear the risks of losses
- Receive the benefits of success
- There are NO guaranteed dividends/assets upon dissolution

Some companies offer two or more classes of shares (dual shares):

1. **Ordinary Shares (Class A)** - represent the basic ownership interest. Each share has rights/privileges:
    - Sharing profits and losses in proportion to ownership (the number of shares owned)
    - Sharing proportionately in management of the firm (voting rights)
    - Sharing proportionately in the assets that the firm owns, in case it has to be liquidated (assets have to be sold to satisfy creditors)
    - Sharing proportionately in the issuing of any new shares of the same class (called the pre-emptive right)

2. **Preference Shares (Class B)** - sacrifice certain basic rights in return for other special rights:
    - Preferred dividends (cumulative/non-cumulative)
    - NO voting rights (Not always)
    - Alternatively, more voting rights per share
    - Convertible into ordinary shares
    - Callable by firm: The firm has the option to repurchase the bond/share before maturity at a preset price.

Note: Within a given class of shares, each share exactly equals every other share. Dual shares (a mix of both types of shares) are NOT always allowed.

Key Components of Equity

Equity = Assets - Liabilities = Residual interest in the firm's assets after deducting all liabilities.

Primary Sources of Equity:

1. Contributed Capital
   - Ordinary shares account: The par or nominal value of common stock issued.
   - Preference shares account: For preferred stock, if issued.
   - Share Premium: Any amount paid by shareholders above the nominal value of the shares.

2. Retained Earnings Account:

3. Treasury Shares Account:
   - This account reflects the shares the company has repurchased
   - Treasury shares are held by the company and do not receive dividends or voting rights.
   - They are recorded as a negative number in equity, reducing total shareholders' equity.

Key Steps to Issue Shares

1. The applicable governmental agency must authorize the share issuance/IPO

2. The company hires investment banks (underwriters and legal consulting firms) to get guidance for the process.
   - Contact institutional investors
   - Helps with road shows and disclosure requirements

3. Underwriters have to determine the IPO price based on the demand from institutional investors.

4. On the day of the IPO, the shares are traded at the stock exchange. As a private investor, you may then start trading shares in the secondary market.

Par/Non Par value shares

1. Par Value Shares - Company has to maintain 2 separate accounts for both preference and ordinary shares:

- **Share Capital Account** = nominal share capital = par-value of shares = no. of shares x par value
- **Share Premium Account** = the excess over par value

The par value has no relation to the fair value and is usually a very low amount.

2. Non-Par Value Shares - Company maintains just one account (share capital)

Example: Journal entries for a 0.01 euro par-value of 1,000,000 ordinary shares at 20 euros.

	Debit	Credit
Cash	20,000,000	
Share capital - ordinary account		10,000
Share premium - ordinary account		19,990,000

Note: if there was no-par value, just credit the full amount to share capital.

Costs of Issuing Shares: Direct costs e.g, underwriting costs, accounting/legal fees, printing costs, taxes, ...

These costs reduce the total equity raised, so they are debited from the share premium account, instead of being recorded as expenses in the income statement.

Lump-Sum Sales

Lump-sum sale: When two or more classes of securities are issued for a single payment.

1. Proportional Method

Allocate lump sum on a proportional basis of fair values.

E.g., shares issued for lump sum of $30,000 – 1,000 ordinary shares ($10 par value, $20 fair value) and 1,000 preference shares ($10 par value, $12 fair value)

FV ordinary shares (1,000 x $20)	=	$20,000
FV pref. shares (1,000 x $12)	=	$12,000
Total	=	$32,000

Allocation to:

Ordinary shares = 20/32 (or 62.5%) x $30,000 = **$18,750**

Pref. shares = 12/32 (or 37.5%) x $30,000 = **$11,250**

Journal entry

	Debit	Credit
Cash	30,000	
Share Capital—Ordinary		10,000
Share Premium—Ordinary		8,750
Share Capital—Preference		10,000
Share Premium—Preference		1,250

2. Incremental Method

Allocate first to securities with known fair value, then the rest to the class without fair value.

Lump-sum receipt	=	$30,000
Ordinary (1,000 x $20)	=	$20,000
Balance	=	$10,000

→ Balance is allocated to preference shares

	Debit	Credit
Cash	30,000	
Share Capital—Ordinary		10,000
Share Premium—Ordinary		10,000
Share Capital—Preference		10,000
Share Premium—Preference		0

Non-Cash Transactions

Shares in non-cash transactions are issued in exchange for services or property.

Important:

- Records shares at fair value of goods/services
- **If fair value cannot be measured reliably, record at the fair value of shares**
- If both are unavailable: use alternative valuation methods (example: market data/discounted cash flow approach). Avoid using book/par/stated values

	Debit	Credit
Goods	Fair Value	
Share Capital		Par-value
Share Premium		FV - (par-value)

Share Buybacks

Share buybacks: once shares have been issued a company can re-acquire them.

Benefits/Incentives:

- Provide tax-efficient distributions of excess cash to shareholders
- Increase earnings per share and return on equity
- Provide shares for employee compensation contracts or to meet potential merger needs

- Better fight hostile takeover attempts or to reduce the number of shareholders
- Make a market in the shares

After re-acquiring:

- Retire the shares
    - Cancelation
    - Reduction in the number of issued shares
    - Technically have the status of all authorized and issued shares (company does NOT need to seek approval from its shareholders)
- Hold the shares in the treasury account
- Treasury shares may be re-issued

Treasury shares are NOT an asset!

- Reduction in assets and equity because a company cannot own itself
- No voting rights
- The same as unissued ordinary shares

Treasury Shares

There are two methods to record them: **Cost Method** and **Par-Value Method** but most require the first one.

1. **Cost Method:** accounts for the cost of buying back the shares
    - Purchase cost defines the accounting value
    - Debit treasury shares account
    - Credit cash account
    - Report treasury shares account - **contra-equity** account as a deduction from equity on the balance sheet

Selling treasury Shares

When selling treasury shares, accounting depends on price:

1. Selling price = cost of the re-acquisition
2. Selling price > cost of re-acquisition
3. Selling price < cost of re-acquisition

At cost:	Cash (BS)	X	
	Treasury shares (BS)		X
Above cost (X+Y):	Cash (BS)	X+Y	
	Treasury shares (BS)		X
	Share Premium - Treasury (BS)		Y
Below cost (X-Y):	Cash (BS)	X-Y	
	Share Premium - Treasury (BS)*	Y	
	Treasury shares (BS)		X

[*Only if there is a credit balance in "Share Premium – Treasury". Otherwise: debit any additional excess of cost over selling price to the "Retained Earnings".]

Example 1: Sale of treasury above cost

Pacific acquired 10,000 treasury shares at $11 per share. It now sells 1,000 shares at $15 per share on March 10. Pacific records the entry as follows:

	Debit	Credit
Cash	15,000	
Treasury Shares		11,000
Share Premium- Treasury		4,000

Example 2: Sale of treasury shares below cost

Pacific sells an additional 1,000 treasury shares on March 21 at $8 per share, it records the sale as follows:

	Debit	Credit
Cash	8,000	
Share Premium - Treasury*	3,000	
Treasury Shares		11,000

* **ONLY if there is a credit balance in "Share Premium - Treasury," otherwise debit any additional excess of cost over selling price to Retained Earnings.**

Dividends

Companies want to share their profits with the shareholders through dividends. Only few companies pay dividends in amounts = legally available retained earnings:

- Maintain agreements with creditors (debt covenants)
- Finance growth/expansion
- Smooth out dividend payments
- Build up a cushion against possible losses

Additionally, companies may voluntarily NOT pay a dividend. A reason for this could be that they want to internally finance their growth and expansion strategy. In exchange, dividend shareholders expect an even stronger share price performance to compensate for the lack of dividends.

Types of Dividend

Dividends reduce retained earnings by the same amount

- Total equity is reduced proportionally
- Part of the firm's value is distributed among the owners

1. Cash Dividends

Declaration Date: create current liability against retained earnings

	Debit	Credit
Retained Earnings	x	
Dividends Payable		x

Record Date: there is no journal entry; you only record the transaction
Payment Date: pay cash and reduce liability

	Debit	Credit
Dividends Payable	x	
Cash		x

Remember: a firm can issue preference shares together/instead of ordinary shares. Companies usually issue preference shares with a par value (dividend preference as a percentage of the par value).

2. Property Dividends

Example: Firm A declares a property dividend and transfers equity investments to shareholders. The fair value (FV) of the equity investment is 2 million and the book value (BV) is 1.25 million.

Declaration Date: restate at fair value, then entry to record dividend

	Debit	Credit
Equity Investment	750,000	
Unrealized Holding Gain/Loss (Income)		750,000
Retained Earnings	2,000,000	
Property Dividends Payable		2,000,000

Payment Date

	Debit	Credit
Property Dividends Payable	2,000,000	
Equity Investments		2,000,000

3. Liquidating Dividends:

Key difference to cash/property dividends:

- NOT based on retained earnings
- Reduce share premium/capital accounts

Example: Firm B issues liquidating dividends (X), half = income (Retained Earnings) and half = return on capital (Share Premium).

Declaration Date

	Debit	Credit
Retained Earnings	½ X	
Share Premium	½ X	
Dividend Payable		X

Payment Date

	Debit	Credit
Dividends Payable	X	
Cash		X

4. Share Dividends:

Distribute its own shares proportionally to stake what shareholders already have (ONLY par-value method)
Book value of equity remains unchanged => shifting between Retained Earnings (decrease) and Share Capital (increase)

Declaration Date

	Debit	Credit
Retained Earnings	Par value	
Share Dividend Distributable (EQ)		Par value

Payment Date

	Debit	Credit
Share Dividend Distributable (EQ)	Par value	
Share Capital		Par value

Note: At the end of the day, the total value of equity remains unchanged!

Share Splits

Assume that a company does not pay any dividends, instead increases its retained earnings, and uses the funds for its growth strategy. In this situation, the share price reflects the growth, sales, and earnings over time. This may cause the share price to become less accessible to investors. This is when share splits are useful.

Share split: split already existing shares to have more shares at a lower price.

Example: 4-for-1 split of 100,000 shares at 100 euros => 400,000 shares at 25 euros.

- There are NO journal entries
- Just a note to record the increased number of shares and the change in the par value per share

Share Split vs Share Dividends

- Share dividends also increase the number of shares outstanding
- It does NOT decrease par value per share, but does increase the total par value of shares.
- Only with the cash dividend is the company able to reduce the total equity.

Equity Presentation

Statement of Changes in Equity

For each component of equity, make a reconciliation between carrying the amount at the beginning and at the end of the period. Separately disclosing changes from:

- profit/loss
- Each item of "other comprehensive income"
- Transaction with shareholders

OCI = other comprehensive income

- Income that does NOT go through P&L, but directly to equity
- NO effect on net income and retained earnings
- CI = comprehensive income = net income + OCI

Intermediate accounting – IBEB – FA Lecture 4, week 4 - Dilutive Securities & EPS

Terminology & Definitions

Liabilities:

- An obligation arising from past events, with settlement that is expected to result in outflow of resources.
- Non-current: not payable with a year (bonds)
- Current: payable within a year (accounts payable)

Bonds:

- Past event - firm issues bonds to raise money (debt financing)
- Obligation/outflow: bondholders in return expect payments of
    - Principal at a designed maturity date (face/par/maturity value)
    - Period interest at specified rate (interest/stated/coupon rate)

Valuation of bonds at issuance: this is the tricky part

- Present Value approach to assess what bondholders are willing to pay
    - Considers the time value of money
    - Discount the principal and interest payment
    - Discount rate: market rate of interest reflects the interest rate on similar bonds in the market, and thus the opportunity bondholders have besides the purchase of the bond they are focused on.
- Default case: *Market rate = interest rate => PV = Face value => bonds issued at par value.*

Example: Bonds Issued at Par (Face) Value

- **Company ABC:** Issues **3-year** bonds with face value of **€3,000,000**
  - Interest (stated) rate = **5%**; Market rate of interest (discount factor) = **5%**
  - Principal is repaid at maturity; interest is payable annually at year-end
- **PV (bond)** = PV of principal + PV of interest = **€3,000,000**

€3,000,000 / $(1+0.05)^3$ = **€2,591,512.8**	$(150{,}000/1.05) + (150{,}000/1.05^2) + (150{,}000/1.05^3)$ = **€408,487.2**

* Interest payment = 150,000 = 3,000,000 * 0.05

- **Journal entry at time of issuance:**

Cash (proceeds)	3,000,000	
Bonds payable (PV of bond)		3,000,000

- **Journal entry at year-end (end of year 1/2):***

Interest expense	150,000	
Cash		150,000

- **Journal entry at maturity (end of year 3):**

Interest expense	150,000	
Cash		150,000
Bonds payable	3,000,000	
Cash		3,000,000

* If interest payment is not at year-end but (at beginning of) next year: "Debit Interest expense X, Credit Interest payable X" at year-end and "Debit Interest payable X, Credit Cash X" next year!

NB: We will discount cash flows directly in lecture, tutorials, and exam (we don't use "PV factors" as in textbook)

*Cash (proceeds) of the bond issuance will be 3m euros as bondholders will NOT agree to anything above this given the opportunities in the market, and the issuing firm will NOT agree to receive anything below this amount given the precedents of the market.

Example: Bonds Issued at Discount

- **Bonds sell** at Par, below (at discount), or above (at premium)
  - At Par (or at face value) → Market rate = Interest rate → PV = Face value
  - Below (at discount) → Market rate > Interest rate → PV < Face value
  - Above (at premium) → Market rate < Interest rate → PV > Face value
- **Example Company ABC:**
  - Same as before, but: Interest rate = **5%**; Market rate of interest = **6%**
- **PV (bond)** = PV of principal + PV of interest = **€2,919,809.64**

€3,000,000 / $(1+0.06)^3$ = **€2,518,857.85**	$(150{,}000/1.06) + (150{,}000/1.06^2) + (150{,}000/1.06^3)$ = **€ 400,951.79**

* 150,000 = 3,000,000 * 0.05

- **Journal entry at time of issuance**

Cash (proceeds)	2,919,809.64	
Bonds payable (PV of bond)		2,919,809.64

- **Journal entry at year-end?**
  - Effective-Interest Method to amortize difference in PV vs. Face value
    - Amortization of discount → bond interest expenses ↑
    - Amortization of premium → bond interest expenses ↓

Based on Principal: 3,000,000 x 5%

Schedule of bond amortization:
Effective-interest method to amortize discount
(3-year, 5% bonds sold to yield 6%)

Present value of bond (t0): PV (Principal) + PV(Interest)

Date	*Cash paid*	*Interest expense*	*Discount amortized*	*Carrying amount*
1/1/2023		2,919,809.64 x 6%		**€ 2,919,809.64**
12/31/2023	**€ 150,000**	€ 175,188.58	€ 25,188.58	€ 2,944,998.22
12/31/2024	€ 150,000	€ 176,699.89	€ 26,699.89	€ 2,971,689.11
12/31/2025	€ 150,000	€ 178,301.89	€ 28,301.89	**€ 3,000,000**
	€ 450,000	€ 530,190.36	**€ 80,190.36**	

Diff. in Principal & PV (discount): 3 Mio. - 2,919,809.64

- **Journal entry at year-end (Dec. 31, 2023):**

Interest expense	175,188.58		
Cash			150,000
Bonds payable			25,188.58

- **Journal entry at maturity (Dec. 31, 2025):**

Interest expense	178,310.89		
Cash			150,000
Bonds payable			28,301.89
Bonds payable	3,000,000		
Cash			3,000,000

*The present value of the bond is lower than the face value. The 2.9m euros reflects the amount the bondholders are willing to pay, given that the market rate is higher than its stated interest rate and that they could earn the 6% in an alternative investment with a similar risk profile.

*The tricky part is that you need to account for the fact that the present value of the bond and hence the precedes at issuance differ from the face value of the bond. This is why you use the **Effective-Interest Method**.

- The company promises to pay back 3m euros at the end of the 3 years, thus, at maturity, when dissolving the bonds payable accounts that it reflects the bonds at their face value.

Economic Intuition: Effective-Interest Method and Schedule of Bond Amortization

- Bondholders pay less than Principal (or face) value of a bond, but still demand to be paid the Principal value at maturity
- This means that, effectively, real interest expenses are higher than cash payments made to bondholders
- Firm itself compensates for this over time by calculating real interest expenses (market rate * carrying value of the bond)

    - Difference between these real interest expenses and actual interest payments are added to the carrying value of bond on balance sheet
- This ensures that the firm takes into account the real interest costs of bonds, and that bond's carrying value is adjusted to its face value at maturity

Convertible Bonds: Issuance

Bonds (debt) that can be changed into other corporate securities (shares/equity).

Reasons for Investors to Buy:

- Benefit of bonds = guaranteed interest and principal
- Holder has the option to change it for shares

Reasons for Corporations to Issue:

- Raise equity capital without giving up more ownership control than necessary
- Obtain debt financing at cheaper rates
- Tax advantages (interest expense lowers taxable income)

Accounting Treatment:

- Cannot simply use accounting rules that were used to recognize bonds, must come up with a method that also considers the conversion rate.
- To value compound instruments, companies use the **"with-and-without"** method
    - Convertible debt is treated as a compound instrument

With-and-without Method

Splits the total FV of convertible bonds into two components: liability and equity (reflects the conversion rate) with the help of three key steps at the date of issuance:

FV of convertible bond - FV of liability component = FV of equity component

1. Determine total **FV of convertible bond** = proceeds received upon issuance
2. Determine **FV of liability component** by computing net present value of all contractual future cash flows discounted at the market rate of interest (the rate the company would pay on a similar non-convertible bond).

3. Subtract FV of liability component from FV of convertible bond to arrive at the **equity component**

Example: Issuance of Convertible Bond

- **Example**: *Bayer* issues **2,000 convertible bonds** at Jan 1, 2019
  - Bonds have 4-year term with **interest rate of 6%** (payable annually on Dec. 31) and are issued **at par** with **face value of €1,000** per bond
  - **Market rate of interest** on similar non-convertible debt is **9%**
  - Each bond is convertible into **250 ordinary shares** with €1 par value
- **Step 1:** FV convertible bond (proceeds) = 2,000*€1000 = **€2 Mio.**
- **Step 2:** PV liability component = PV of principal + PV of interest

€2,000,000 / $(1+0.09)^4$ = **€1,416,860**	120,000 / 1.09 120,000 / 1.09^2 120,000 / 1.09^3 120,000 / 1.09^4 **= € 388,766**

→ PV of liability component = **€1,416,860 + = € 388,766 = €1,805,626***

*Note: PV of liability component is below face value of €2 million (because interest rate of bond is lower than market rate-related discount factor: 6% < 9%). Discount reflects conversion right attached to bond (= equity component).

- **Step 3:** FV equity = FV convertible bond - PV liability component
  = €2,000,000 - €1,805,626 = **194,374**
- **Journal entry** at time of issuance:

Cash	2,000,000	
Bonds Payable*		1,805,626
Share Premium—Conversion Equity		194,374

* Due to amortization of discount each reporting period, at maturity, bonds payable = €2,000,000

- **Share premium – conversion equity:**
  - Does not not represent ownership (e.g., voting rights) for bond holders
  - Represents what bondholders are willing to pay for option to convert
  - Assume: Bayer Group issued their convertible bonds with a face value of $1,000 per bond **at 99% (instead of "at par-value")**:
    - Total proceeds: 2,000 * €1000 * 0.99 = **€1,980,000**
    - FV of liability component same
    - FV equity component: €1,980,000 – €1,805,626 = **€174,374**

based on face value: 2,000,000 x 6%

discount bond: 6%<9%
1,805,626 → 2,000,000

SCHEDULE OF BOND AMORTIZATION
EFFECTIVE-INTEREST METHOD
6% BOND DISCOUNTED AT 9%

Date	Cash Paid	Interest Expense	Discount Amortized	Carrying Amount of Bonds
1/1/19				€1,805,626
12/31/19	€120,000	€162,506	€42,506	1,848,132
12/31/20	120,000	166,332	46,332	1,894,464
12/31/21	120,000	170,502	50,502	1,944,966
12/31/22	120,000	175,034*	55,034	2,000,000

*€13 difference due to rounding.

based on carrying value:
1,805,626 x 9%

*Note that interest on the bond is 6%, while market rate is 9%. Bond is selling for a **discount** (less than face value), amortized over time. Recall the effective interest method (video 1).*

Journal entry **December 31, 2019**:

Interest expense	162,506	
Cash		120,000
Bonds payable		42,506

Convertible Bonds: Settlement

4 scenarios:

1. Repurchase at maturity

- Bondholders do NOT have any intent to convert
- Conversion option has NO value to bondholder anymore
- You do NOT have to pay them for giving up conversion option
- Amount originally allocated to equity as Share Premium - Conversion Equity does not disappear.
    - It is transferred to Share Premium - Ordinary account (but it can also remain)

Bayer Example (same as previous)

Bonds Payable	2m	
Cash		2m

Share Premium - Conversion Equity	194,374	
Share Premium - Ordinary		194,374

2. Conversion at maturity

Bayer Example

Bonds Payable	2m	
Share Capital - Ordinary		0.5m (2000 bonds * 250 shares * €1 par)
Share Premium -Ordinary		1.5m (2m - 0.5m)

*Note: the amount originally allocated to equity of 194,374 euros is transferred to Share Premium - Ordinary account (this is a shift within equity).

3. Conversion before maturity

- Assume that Bayer converts its bonds into ordinary shares on December 31, 2020 (2 years after the issuance), thus we need to determine the carrying value of the bond:

SCHEDULE OF BOND AMORTIZATION
EFFECTIVE-INTEREST METHOD
6% BOND DISCOUNTED AT 9%

Date	Cash Paid	Interest Expense	Discount Amortized	Carrying Amount of Bonds
1/1/19				€1,805,626
12/31/19	€120,000	€162,506	€42,506	1,848,132
12/31/20	120,000	166,332	46,332	1,894,464
12/31/21	120,000	170,502	50,502	1,944,966
12/31/22	120,000	175,034*	55,034	2,000,000

*€13 difference due to rounding.

Transaction for Issuing Shares:

Bonds Payable	1,894,464	
Share Capital - Ordinary		0.5m
Share Premium - Ordinary		1,394,464

Shift the Value of Equity:

Share Premium - Conversion Equity	194,374	
Share Premium - Ordinary		194,374

In case Bayer pays bondholders 50,000 euros to induce conversion (they may do this if they want to reduce interest costs or approve some debt to equity ratios). This is often called a **sweetener** to induce conversion and can be in the form of additional shares or cash.

Conversion Expense	50,000	
Cash		50,000

4. Repurchase before maturity

A bit more complex than the previous cases, so you should know what information is needed for calculations.

1. Determine **fair value of the (entire) convertible debt instrument** => price for which the instrument is bought back (market prices at December 31, 2020) = A
    - From example: A = 1,965,000

2. Determine **fair value of the liability component** on the repurchase day => PV of similar non-convertible bond with 2-year term = B
    - From example: B = 1,904,900

3. Get **book (carrying) value of liability component** = C
    - From example: C = 1,894,464

4. Determine **gain/loss on sale** = D = B-C
    - From example: D (loss on sale) = 1,904,900 - 1,894,464 = 10,436
    - If the difference is **negative = gain** (MV of liability < BV of liability)
    - If the difference is **positive = loss** (MV of liability > BV of liability)

    1. Determine the **fair value of the equity component** = E = A-B
    - E = 1,965,00 - 1,904,900 = 60,100

Bonds Payable	1,894,464	
Share Premium - Conversion Equity	60,100	
Loss on Repurchase	10,436	
Cash		1,965,000

Convertible Preference Shares

These types of shares include the option to convert preference into ordinary shares.

=> More appealing to risk-averse investors who prefer a more fixed and stable income stream and would like to have the possibility to become an ordinary shareholder to benefit from the upside potential of the company.

Accounting Treatment:

- Reported as part of equity
- Unless mandatory redemption exists: investors can require issuing firm to repurchase shares at stated price
- Redeemable (callable): issuing firms can repurchase shares at stated price
- Shift within equity from Share Premium/Capital - conversion equity/preference to Share Premium/Capital - ordinary
- Upon conversion/repurchase the company does NOT need to record gain/loss because there are no gains or losses when considering transactions between existing shareholders.

Example: Morse issues 1,000 convertible and callable preference shares. Issue price per share = $200. Par value per share = $1. Each share can be converted into 25 ordinary shares (with $2 par value) that have a total fair value of $410,000.

Issuance:

Cash	200,000 (1,000*200)	
Share Capital - preference		1,000
Share Premium - conversion equity		199,000

Conversion: FV ord ordinary shares are irrelevant here

Share Capital - preference	1,000	
Share Premium - conversion equity	199,000	
Share Capital - ordinary		50,000
Share Premium - ordinary		150,000

Call: No gain/losses

Share Capital - preference	1,000	
Share Premium - conversion equity	199,000	
Retained Earnings	210,000	
Cash		410,000

*The company has to balance any difference between the BV of the converted preference and MV of the ordinary shares through the Retained Earnings account.

Warrants, Options, and Restricted Shares

Dilutive Securities

Warrants:

- Give holder the right to acquire shares at a certain price within stated period (conversion privilege)
- Similar to convertible bonds, except that warrant holder has to pay to exercise shares

Share warrants - Equity kicker

1. Share warrant (warrants issued with securities)

Share warrant: warrant issued with bonds that gives holder the option to buy shares at an exercise price within a period => With and without method

Share warrant is a compound instrument => With and without method.

- The warrant can be detachable (separated from the ordinary share) or non-detachable.

Example: 10,000 bonds each with one detachable warrant that provides the option to buy one ordinary share (par value $5) at $25.

- FV of compound instrument (selling price) = for $10.2 million
- FV of liability component = $9,707,852
- FV of equity component = $492,148 ($10.2 Mio. – $9,707,852)

Issuance (with-and-without)

Cash	10,200,000	
Bonds Payable		9,707,852
Share Premium - Share warrants		492,148

Exercise all 10,000 warrants at 25 euros per share (par value = 5 euros)

Cash	250,000	
Share Premium - Share warrants	492,148	
Share Capital - ordinary		50,000
Share Premium - ordinary		692,148

No warrants exercised

Share Premium - Share warrants	492,148	
Share Premium - Expired Share warrant		492,148

2. Share right

Share right: upon the issuance of additional ordinary shares, share right gives existing shareholders preemptive right to purchase additional shares to avoid dilution => no formal entry upon issuance, only a memorandum entry

Share compensation - Incentivize employee

1. Share option (employee stock option)

Share option: give key employees the option to purchase additional ordinary shares at given price over a period => Use FV of warrants granted to employees as an expense in P&L

1. How to determine compensation expense:
- **Intrinsic Value Method:** compensation expense = excess of market price over exercise price at grant date (cost usually = 0)
- **Fair Value Method** (required by IFRS): Fair value of share options at grant date based on acceptable option-pricing model

2. Over what periods to allocate compensation expense:
- **Immediately recognize** everything at **grant date**
- **Match it to service period** (required by IFRS): service period = vesting period (exercise date)

Example: Grants its CEO options to purchase 1m shares (par value €1 per ordinary shares) on Jan 1, 2019.
- CEO may exercise options at any time within next 10 years and service period is 2 years, starting with grant date
- Option exercise price per share = €60
- Market price per share at the date of grant = €70
- Total comp. expense (based on FV option pricing model) = €22,000,000

Issuance and **compensation expense allocation**

Compensation Expense	11m (22m/2 years)	
Share Premium - Share Options		11m

Exercise of 0.2m (20%) of the 1m options on June 1, 2022

Cash	12m	
Share Premium - Share Options	4.4m (0.2*€22m)	

Share Capital - Ordinary		0.2m (0.2m*€1)
Share Premium - Ordinary		16.2m

Expiration of options (if CEO fails to exercise remaining share options before their expiration date):

Share Premium - Share Options	17.6m (0.8*22m)	
Share Premium - Expired Share Options		17.6m

Service conditions: suppose CEO violates service period and leaves firm after on year (all compensation is foregone and the expenses must be reversed)

Share Premium - Share Options (BS)	11m	
Compensation Expense (IS)		11m

Market conditions: when exercisability of share options depend on performance conditions.
=> If market conditions are violated, no adjustments to compensation expense because they are already reflected in the FV of the option at the grant date.

2. Restricted Shares

An alternative to ESO for compensation and they cannot be sold or transferred until vesting happens.

Advantages:

- Never become completely worthless (ESO is worthless if share price < exercise price after vesting period)
- Less dilution to existing shareholders (fewer shares - restricted shares are usually 0.5 or 0.33 the size of share options)
- Better align incentives (employees receive actual shares and not just the right to buy them)

Accounting Treatment: Same approach as with ESO

- FV method: market price of shares (no pricing model needed)
- Match it to service period: expensed over the vesting/service period

Difference to ESO: **Shares are issued directly at grant date rather than exercise date**

Example: Issues 1,000 restricted shares to its CEO (par value of €1 and FV of €20 per ordinary shares) on Jan 1, 2019. Service period = 5 years (no separate vesting period, vesting after 5y)

Recognition and expense allocation: grant date

Unearned Compensation	20,000 (20*1,000)	
Share Capital - ordinary		1,000 (1*1,000)
Share Premium - ordinary		19,000

*Unearned *Compensation*: cost of services yet to be performed (contra equity)

Recognition and expense allocation: end of each service period

Compensation Expense	4,000 (1,000*20*1/5)	
Unearned Compensation		4,000

Service Condition: CEO leaves after **2 years**

Service Capital - ordinary	1,000	
Share Premium - ordinary	19,000	
Compensation Expense		8,000 (4,000*2)
Unearned Compensation		12,000 (4,000*3)

*Compensation Expense: reverse expense from first 2 years and dissolve "Unearned Compensation" since it is not needed anymore.

Earnings per share

EPS: net income earned by each ordinary share = $\frac{Net\ Income}{number\ of\ ordinary\ shares}$

Computation is tricky due to firm's capital structure

Basic EPS: Simple capital structure only considers existing ordinary shares and not potential shares due to conversion/exercise of dilutive securities at a later point that could diluted EPS.

Diluted EPS: Complex capital structure includes dilutive securities that may increase number shares and hence dilute EPS.

Basic EPS - Simple capital structure

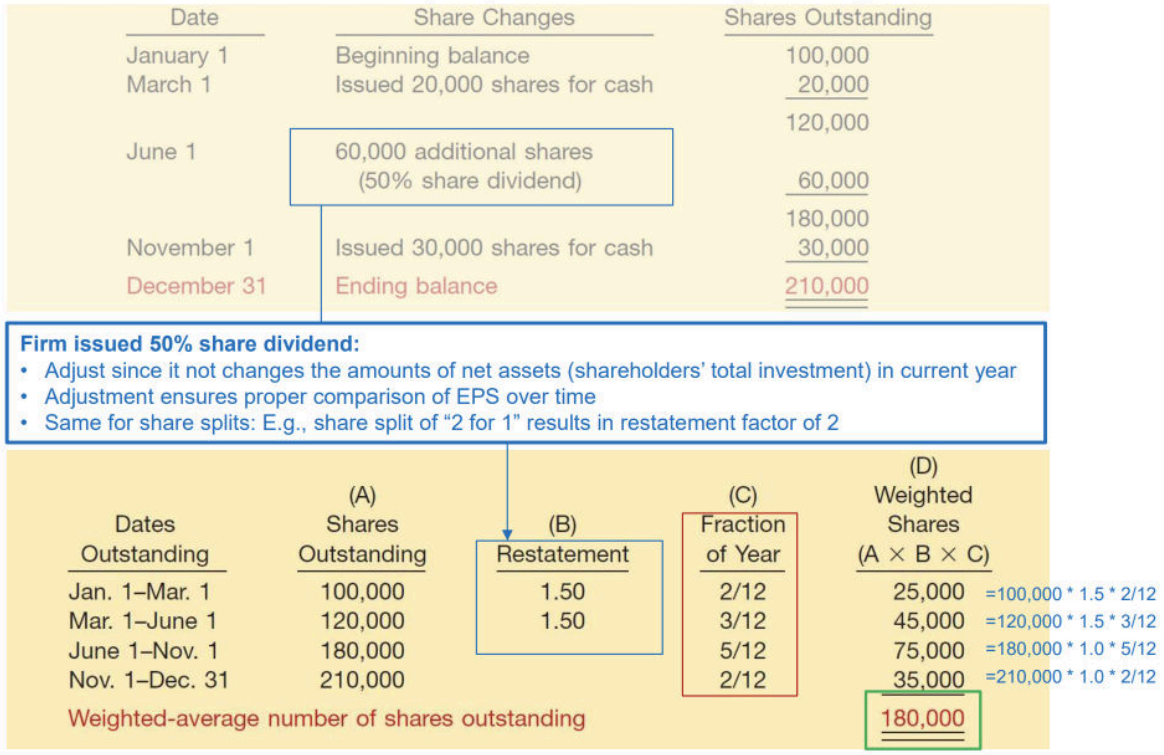
$$EPS = \frac{Net\ Income - Preference\ Dividends}{Weighted\text{–}Average\ Ordinary\ Shares\ Outstanding}$$

Weighted-average:

- Companies issue/purchase shares during the year which affect outstanding amount
- Based on monthly fraction of year (e.g if a company issues shares halfway through the year, those shares only count for 6/12)
- Stock dividends and stock splits increase the number of shares, but they don't actually affect a company's real value => to make EPS comparable over time, we need to offset effects of share dividends/splits.

Preference Dividends: Not all NI is available for ordinary shareholders

Example: Calculating the weighted-average number of shares outstanding for EPS when stock dividends or stock splits occur.



Date	Share Changes	Shares Outstanding
January 1	Beginning balance	100,000
March 1	Issued 20,000 shares for cash	20,000
		120,000
June 1	60,000 additional shares (50% share dividend)	60,000
		180,000
November 1	Issued 30,000 shares for cash	30,000
December 31	Ending balance	210,000

Dates Outstanding	(A) Shares Outstanding	(B) Restatement	(C) Fraction of Year	(D) Weighted Shares (A × B × C)	
Jan. 1–Mar. 1	100,000	1.50	2/12	25,000	=100,000 * 1.5 * 2/12
Mar. 1–June 1	120,000	1.50	3/12	45,000	=120,000 * 1.5 * 3/12
June 1–Nov. 1	180,000		5/12	75,000	=180,000 * 1.0 * 5/12
Nov. 1–Dec. 31	210,000		2/12	35,000	=210,000 * 1.0 * 2/12
Weighted-average number of shares outstanding				180,000	

Diluted EPS - Complex Capital Structure

To find Dilutive EPS, you start with Basic EPS and then adjust for each instrument individually. Keep in mind that antidilutive securities are excluded from calculations because this would increase EPS and we are only interested in worst-case scenarios.

$$EPS = \frac{NI - Preference\ Dividends}{Weighted\text{-}Average\ Shares\ Outstanding} - Impact\ of\ Convertibles - Impact\ of\ Options,\ Warrants\ \&\ Other\ Dilutive\ Securities$$

Methods to measure dilutive effect of potential conversion:

1. If-converted method for convertible bonds

Assumptions

- Conversion at beginning of period if bonds issued in *previous* period, and at the time of issuance if bonds issued *during* the period => **affect denominator**
- Elimination of bond-related interest, **net of tax** (assume conversion of bond so stops paying interest expense) => **affect numerator** as it would increase NI

Example: Compute basic & diluted EPS

NI = $210,000, WA ordinary shares outstanding = 100,000
Tax rate = 40%, 2 convertible bonds outstanding:

- 6% issue sold at 100 (total £1,000,000) in a prior year and convertible into 20,000 ordinary shares (interest expense for current year = £62,000)
- 7% issue sold at 100 (total £1,000,000) on April 1 of current year and convertible into 32,000 ordinary shares (interest expense for current year = £80,000)

Basic EPS: $\frac{\text{NI} - \text{Pref. Div.} = £210{,}000 - 0}{\text{Weighted-average shares} = 100{,}000} = £2.10$

Diluted EPS: *Start with Basic EPS and adjust per instrument*

- Adjust ***denominator*** for news shares due to conversion
- Adjust ***numerator*** for interest expense effect due to conversion:

	6% Bond Issue	7% Bond Issue	
£210,000	+ £37,200 (= £62,000 x (1-0.40**))	+ £36,000 (= £80,000 x (1-0.40**) x 9/12*)	= £283,200
100,000	+ 20,000	+ 24,000 (= 32,000 x 9/12)*	144,000
Basic EPS = £2.10	Effect on EPS = £1.86	Effect on EPS = £1.50	**Diluted EPS = £1.97**

* Timing of the bond issuance: Second bond issued on April 1 of the *current* year, hence times 9/12.
** Tax effects: bond conversion → no interests expense anymore → higher taxable NI → higher tax expenses → lower NI

2. If-converted method for convertible preference shares

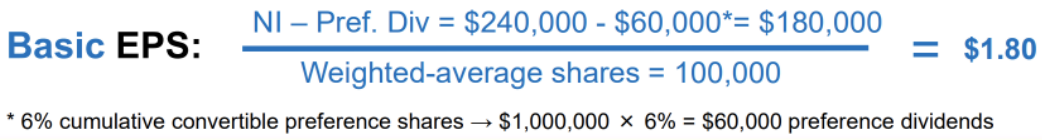
Assumptions

- Conversion at beginning of period if bonds issued in *previous* period, and at the time of issuance if bonds issued *during* the period => **affect denominator**
- **Add back preference dividends**, **no tax effect** (preference dividends are not tax deductible) => **affect numerator**

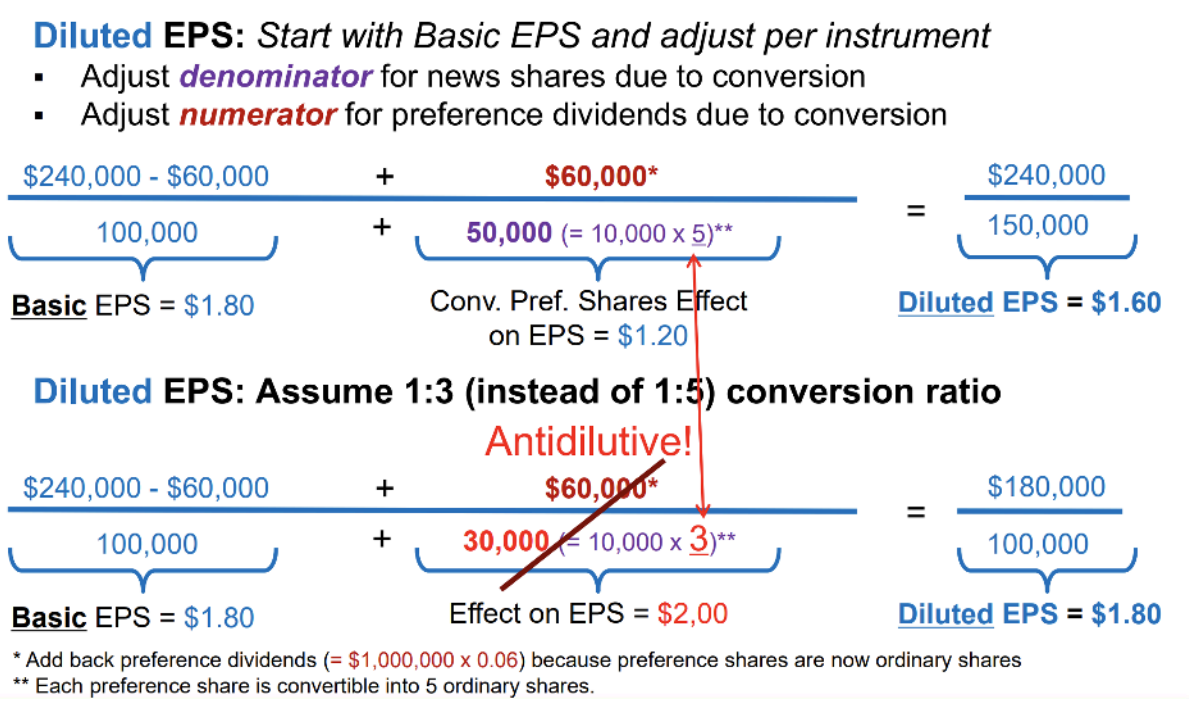
Example: Compute basic & diluted EPS!

- NI = $240,000, WA ordinary shares outstanding = 100,000
- Tax rate = 40% and cumulative convertible preference shares outstanding
- Issued $1,000,000 of 6% cumulative convertible preference shares

- Each $100 convertible preference share is convertible into 5 ordinary shares => New shares after conversion = $1,000,000/$100 = 10,000



* 6% cumulative convertible preference shares → $1,000,000 × 6% = $60,000 preference dividends



* Add back preference dividends (= $1,000,000 x 0.06) because preference shares are now ordinary shares
** Each preference share is convertible into 5 ordinary shares.

Important!!

- **Not possible that Basic EPS < Diluted EPS!!**
- **Convertible debt is antidilutive if effect on EPS > basic EPS**
- **Should exclude securities that are antidilutive**

In the example, the component is antidilutive because the effect on EPS ($2) > Basic EPS ($1.8) => The component is excluded and diluted EPS = basic EPS = $1.8

3. Treasury share method for options and warrants

Assumptions

- Options/warrants are exercised at the beginning of period if issued in previous period, and at time of issuance if issued during the period => **affect denominator**

- Proceeds are used to repurchase ordinary shares (treasury) => **affect denominator**

Example: Compute basic & diluted EPS

- NI = $220,000; WA ordinary shares outstanding = 100,000
- Options outstanding (issued in t-1) give right to acquire 5,000 shares
- Exercise price = $20 per share, FV (market price) per share = $28

Basic EPS: $\frac{\text{NI} - \text{Pref. Div} = \$220{,}000 - 0 = \$220{,}000}{\text{Weighted-average shares} = 100{,}000} = \$2.20$

Diluted EPS: *Start with Basic EPS and adjust per instrument*

- Adjust ***denominator*** for news shares due to exercise of options
- Adjust ***denominator*** for news shares due to purchase of treasury shares

$$\frac{\$220{,}000}{100{,}000} + \frac{0}{1{,}429\ (= 5{,}000^{*} - 3{,}571^{**})} = \frac{\$220{,}000}{101{,}429}$$

Basic EPS = $2.20

Options Effect on EPS = Increase in shares outstanding!

Exercise price ($20) < FV of share ($28)

Diluted EPS: Assume exercise price of $30 (instead of $20)

Antidilutive!

$$\frac{\$220{,}000}{100{,}000} + \frac{0}{-357\ (= 5{,}000 - 5{,}357)} = \frac{\$220{,}000}{100{,}000}$$

Basic EPS = $2.20

Diluted EPS = $2.20

* Number of ordinary shares issued upon exercise of options

** Treasury shares: $100,000 / $28 = 3,571 (proceeds from exercise = $20 * 5,000 shares = $100,000)

Adjust for options/warrants only if **Exercise price < FV of share**

- **Exercise price > FV**: instrument is antidilutive (you can buy back more than you have to issue => ↓shares outstanding hence ↑ EPS)
- **Exercise price = fair value**: no net effect on shares outstanding & EPS

In the example, the component is antidilutive since exercise price ($30) > FV ($28), and since the denominator is negative (shares issued < shares repurchased)

EPS Disclosure

Disclosure Requirement

- Public companies must report EPS in income statement due to its importance
- If dilutive instruments exist, basic EPS will fail to recognize potential impact of dilutive securities

IAS 33 requires to disclose:

1. Amounts used as numerator in calculating basic and diluted EPS, and reconciliation of those amounts to net income or loss
2. WA ordinary shares used as denominator, and reconciliation of these denominators to each other
3. Instruments that could dilute basic EPS in future but were not included in calculation of diluted EPS because they are antidilutive for the period presented
4. Description of ordinary share transactions that occur after the reporting period that would have significantly changed the number of ordinary shares at the end of the period.

Intermediate accounting – IBEB – – FA Lecture 5, week 5 - Tax

Income Taxes

Book vs Tax Reporting

The income that companies state in their financial accounting based on IFRS is not the same income that tax authorities use. This creates a difference between pretax financial income and taxable income. The income tax that companies actually need to pay is called income tax payable, and the one they report is called income tax expense.

The difference essentially comes from the fact that IFRS requires accrual accounting, whereas tax codes resemble cash accounting.

Temporary Difference:
Difference between tax basis of an asset or liability and its GAAP basis that will reverse in future years.

It is important to note that it leads to either deferred tax liability or deferred tax assets, thus it has an immediate accounting implication.

Permanent Difference:
The difference between the tax basis of an asset or liability and its reported amount in financial statements that will NEVER reverse in future years.

Temporary Differences

Deferred Tax Liability (DTL)

If the **book amount of the tax is higher than the tax payable,** the difference will result in higher taxes payable in future years. This is because the tax effect arrives only once cash has been transferred, but e.g., revenue is recognised immediately when performance obligations have been satisfied. Therefore, in the case of tax liability the financial income outweighs taxable and thus income tax expense exceeds income tax payable.

Think about this in 4 steps:

1. Temporary book-tax differences in current year: **financial income> taxable income**
2. Deferred tax liability accounts for the increase in future tax payable = deferred tax consequences attributable to taxable temporary differences at the end of the current year = C*umulative temp. differences at the end the year* tax rate*
3. Income tax expense is based on current tax expense and deferred tax expense (ΔDTL)
    a. *Income tax expense = current tax expense + deferred tax expense* (if there is an increase in DTL, otherwise subtract)
4. Journal entries to record income tax in current and future years

Income Tax Expense (IS)	Z=(X+Y)
Income Tax Payable (BS)	X
Deferred Tax Liability (BS)	Y

Deferred Tax Asset (DTA)

Deferred tax assets result when the **book value of the tax is lower than tax payable**. This means that the company is paying more than it owes based on its income. An example would be unearned revenue. The money is received and thus taxed (because the tax code resembles cash accounting), but the revenue is not booked yet as income. Therefore, in the case of tax assets the taxable income outweighs the financial income and thus the income tax payable exceeds income tax expense.

Think about this in 4 steps:

1. Temporary book-tax differences in current year: **financial income < taxable income**
2. Deferred tax asset accounts for the decrease in future taxes payable
3. Income tax expense is based on current tax expense and deferred tax expense (ΔDTA) = current tax expense - deferred tax benefit (if there is an increase in DTA, otherwise add)
4. Journal entries

Income Tax Expense (IS)		X
Deferred Tax Asset (BS)		Y
	Income Tax Payable (BS)	Z=(X+Y)

Non-Recognition of DTA

Sometimes, DTA are NOT recognised. A company should reduce a DTA if it is probable that it will NOT realize some portion or all of the DTA.

- "Probable" = more than 50%
- Example: litigation expense or warranty liabilities turn out to be lower than initially estimated
- The DTA should be corrected for any changes in its expected value

Example: ABC Inc. has a deductible temporary difference of €1,000,000 at the end of its first year of operations. Its tax rate is 40%.

- Deferred tax asset: €1,000,000 * 40% = €400,000

- Assuming €900,000 of income taxes payable

Journal Entry:

Income tax expense	500,000	
DTA	400,000	
Income tax payable		900,000

- ABC Inc. determines that it will not realize €100,000 of this deferred tax asset.* Recording of the reduction in asset value:

Income tax expense	100,000	
DTA		100,000

*Note that this implies a deductible temporary difference of only 750,000 and that tax expenses of 500,000 in this year are too low:

- **Deferred tax asset:** 750,000 * 40% = 300,000 (with: (400,000 – 100,000) * 100 / 40 = 750,000)
- **Income tax expense:** income tax payable – increase in DTA = 900,000 – 300,000 = 600,000 (instead of 500,000)

Note that the reverse can also happen, then you would debit DTA and credit income tax expense and that tax expense would be too high.

Changes in Future Tax Rates

Example: DTL and change in tax rate

> EG Corporation has one temporary difference at the end of 2019 that will reverse and cause taxable amounts of $40,000 in 2020, $55,000 in 2021, and $65,000 in 2022. EG's pretax financial income since 2018 is $500,000, **and the tax rate is 30% for 2019, and 40% thereafter**. There are no deferred taxes at the beginning of 2019.

	2019	2020	2021	2022
Fin. Income (GAAP)	500,000	500,000	500,000	500,000
Temporary Diff.	-160,000	40,000	55,000	65,000
Taxable income	340,000	540,000	555,000	565,000
Tax rate	30%	40%	40%	40%
Income tax payable	102,000	216,000	222,000	226,000
Income tax expense	166,000	200,000	200,000	200,000
Increase DTL	**64,000**	**(16,000)**	**(22,000)**	**(26,000)**

EG Corporation has one temporary difference at the end of 2019 that will reverse and cause taxable amounts of $40,000 in 2020, $55,000 in 2021, and $65,000 in 2022. EG's pretax financial income since 2018 is $500,000, **and the tax rate is 30% for 2019, and 40% thereafter**. There are no deferred taxes at the beginning of 2019.

Journal entry end of 2019

Income tax expense (IS)	**$166,000**	
Income tax payable (BS)		$102,000
Deferred tax liability (BS)		**$64,000**

Journal entry end of 2020

Income tax expense (IS)	**$200,000**	
Deferred tax liability (BS)	**$16,000**	
Income tax payable (BS)		$216,000

Permanent Differences

Permanent differences result from items that:

1. Enter into pretax financial income but never into taxable income
    - Example: charitable donations recognised as expense but sometimes not deductible for tax purposes
2. Enter into taxable income but never into pretax financial income
    - Example: "percentage depletion" of natural resources in excess of their cost

Accounting Treatment:

- Permanent differences affect only the period in which they occur
- They do NOT give rise to future tax/deductible amounts
- Do NOT recognize deferred tax consequences

If the tax rate is known for certain to be different in the future, the new tax rate can be used in calculating deferred tax assets/liabilities.

*Permanent differences between GAAP income and Tax income are NOT explicitly reflected in the journal entry. However, you can spot the permanent differences when comparing the statutory tax rate of 30% with the effective tax rate of the company. If future tax rates do not change and both numbers differ, the company is facing permanent differences.

Accounting for Losses

If a company fails to make a profit, it incurs a net operating loss (NOL). this means that **tax-deductible expenses > taxable revenues.** It would be unfair if companies did not get money back from the tax authorities if they have paid income taxes in profitable years. Loss carrybacks and loss carryforwards facilitate this.

Loss Carrybacks

A company making a loss in the current period can use the amount of the loss to reduce taxable income from the previous two years, thus getting a refund. They are NOT permitted in all countries.

Income tax refund receivable	x	
Benefit due to loss carryback		x

Loss Carryforward

Possible scenarios:

1. Companies may carry any remaining NOLs forward (often for 20 years) to offset future taxable income = fails to absorb a loss
2. Companies may elect to forgo loss carryback and carry forward full amount of NOLs forward to offset future taxable income = chooses NOT to carry back
3. Companies may NOT be permitted to use loss carryback and carryforward full amount of NOL forward to offset future taxable income = NOT allowed to carry back

Of course, these will only be realised if there are earnings in the future. If the company predicts that the future also contains only losses, it is not allowed to book the loss carryforward asset in the current year.

Accounting Treatment:

- Tax effect of a loss carryforward represents future tax savings
- Realization of future tax benefit depends on future earnings (uncertain)

Non-Recognition and Write Downs

In order to become profitable in the future, companies need to recognize the loss carryforward, however, if it is probable that a firm may NOT realize it, it is NOT allowed to recognize a DTA in the current period. Or if the deferred tax asset has already been recognized, it could also be necessary to write down the deferred tax asset in case it becomes probable that the carryforward will NOT be realized.

Accounting for loss carryforward is **controversial:**

- High uncertainty
- Subjective: probable?
- Gives companies the opportunity to "manage" the numbers

Intermediate accounting – IBEB – FA Lecture 6, week 5 - Revenue Recognition

Baseline: Revenue Recognition

Most revenue transactions pose some problems for recognition because most companies initiate and complete transactions at the same time.

IFRS 15

Objective: recognize revenue to depict the transfer of goods/services to customers in an amount that reflects the consideration that the company receives, or expects to receive, in exchange for these goods/services.

Steps for Process of Recognition:

1. Identification of contract.
2. Identification of separate obligations within the contract.
3. Determination of transaction price.
4. Allocation of transaction price to separate performance obligations.
5. Recognition of revenue when performance obligations are satisfied (customer gains control over the asset).

Revenue Recognition Principle: recognize revenue in the accounting period when the performance obligation is satisfied.

Step 1: Identify Contract

Definition: an agreement between two or more parties that creates enforceable rights/obligations (can be oral, written, or implied by business practice).

5 criterias for a **valid contract**

1. Contract has commercial substance (impact on CF)
2. Parties to the contract have approved the contract and are committed to perform their respective obligations
3. Company can identify each party's rights regarding goods or services to be transferred
4. Company can identify payment terms for goods and services to be transferred
5. It is probable that the company will collect the consideration to which it will be entitled

Asset-liability approach

- Revenue cannot be recognized without a valid contract
- Company has the right to receive consideration (asset) and assumes obligation to transfer good/services (liability)

- Contract between two parties is not recorded and does not lead to any immediate journal entries until one/both of the parties perform under the contract
- Disregard revenue recognition if contract is fully underperformed or if each party can unilaterally terminate contract without compensation

Contract Modification

1. New Contract Conditions:
    - Promised goods/service are distinct
    - The price reflects the standalone selling price of the promised goods/services

2. Prospective Modification: You change the contract going forward, and apply the new terms only from the date of the change onward. You do not change the revenue already recognized under the old contract terms.

Example:

- 100 products for € 10,000 EUR (€ 100 / product)
- After delivery of 60 products: 20 more for € 1,900 (€ 95 / product)
- ABC regularly sells the products separately.

1. **New contract:** If separate performance obligation (distinct products, standalone selling price)
    - Recognize the 20 new units at €95 as separate performance obligation
    - Total revenue = €100*100 + €95*20 = €11,900
    - Revenue recognized prior to (after) modification = €6,000 (€5,900)

2. **Prospective modification**: If there is no separate performance obligation
    - Calculate blended price for future sales: (€100*40+€95*20)/60 = €98.33 (40 products which are still needed to be delivered)
    - Total revenue = €100*60 + €98.33*60= €11,900
    - Revenue recognized prior to (after) modification = €6,000 (€5,900)

Step 2: Performance Obligation

Definition: promise in contract to provide distinct product/service to customers

- Can be explicit, implicit, customer business practices
- Distinct = when a customer is able to benefit from it

Multiple vs. Combined PO in one Contract:

Multiple PO:

- Transfer distinct products to customer
- Often involve products with a service that can also be sold separately (products and services that are distinct and NOT interdependent)
- Eg: cars sold with navigation services that are also offered separately

Combined PO:

- Transfer a combined item for which distinct products are inputs

Step 3: Determine Transaction Price

Definition: the amount of consideration that a company expects to receive from a customer in exchange for transferring products.

- Easily determined as customers agree to often pay a fixed amount

In complex contracts, consider:

1. Variable Consideration: discounts, rebated, credits, bonuses, penalties, or royalties from customers.

Two approaches to adjust transaction price:

a) Expected Value: probability-weighted amount in a range of possible consideration outcomes.
   - Appropriate for companies with a large number of contracts with similar characteristics and when there's a limited number of discrete outcomes.

b) Most Likely Amount: single most likely amount in a range of possible outcomes.
   - Appropriate if the contract has only two possible outcomes

Example: Revenue for completing a construction project for 1.5 million. Bonus amount depends on when the project is completed. Bonus is 100,000 when completed on the agreed-upon date (chance = 70%), 50,000 two weeks later (20%) and 30,000 four weeks later (10%) => adjust base transaction price of 1.5m.

Expected value = 70% * (1,500,000 + 100,000) + 20% * (1,500,000 + 50,000) + 10% * (1,500,000 + 30,000) = 1,583,000

Most likely amount = 1.5 million + 100,000 = 1.6 million => 100,000 is the most likely outcome with 70%.

2. Time Value of Money

The company only accounts for the time value of money if:

- The payment occurs later than 1 year
- The contract involves a significant financing component (e.g exchange product for a bond)

To account for the time value of money, the company either

a) Determines the fair value by measuring the consideration received (e.g bond)
b) discounts the payment using an imputed interest rate.

2 Revenue Components:

- Sales revenue = fair value of services
- Interest revenue = fair value of bond - fair value of services

Example: On July 1, 2019, SEK Inc. sold goods to Grant Inc. for $900,000 in exchange for a 4-year, zero-interest-bearing note with a face amount of $1,416,163. The goods' inventory costs are $590,000.

How much revenue should SEK record on **July 1, 2019** (exchange date)?

Notes Receivables	900,000	
Sales Revenue		900,000
COGS	590,000	
Inventory		590,000

How much revenue should SEK record on **December 31, 2019** (note maturity date)?

Notes Receivables	54,000	
Interest Revenue		54,000 (12%*900,000*0.5)

Impound interest rate: $(\frac{1416163}{900000})^{\frac{1}{4}} = 1,12$

Note that the contract was only for half a year from July to December 2019, thus 0.5 represents the interest for only half a year.

3. Non-Cash Consideration

Approaches:

a) Recognize the fair value of the **received** consideration as revenue.
b) If this can't be estimated, then recognize the fair value of the **sold product**

4. Consideration Paid or Payable to Customers: discounts, volume rebates, coupons, free products => These reduce the consideration received and the revenue to be recognized

Example: Volume discount

Samsung offers a 3% discount if sales exceed $2 million. In Q1 2019, Samsung delivers $700,000 worth of products to customer A and expects purchases of $3 million.

How much **revenue** should Samsung recognize for Q1 2019?

A/R	0.97(700,000) = 679,000	
Sales revenue		679,000

If customer A ends up purchasing nothing in the remaining 3 quarters, Samsung recognize 21,000 as "**sales discounts forfeited**"

Cash	700,000	
A/R		679,000
Sales discount forfeited (IS)		21,000

Step 4: Allocate Transaction Price

Definition: allocate transaction price to various performance obligations based on their relative fair values.

- Use standalone selling prices

- If this is not available, use the best estimate of what the product might sell for as a standalone unit.

Best estimates

1. Adjusted market assessment approach: Evaluate the market in which it sells products and estimate the price that customers in that market are willing to pay, or refer to prices from competitors and adjust them to reflect the company's costs and margins.
2. Expected cost plus a margin approach: Forecast expected costs of satisfying a performance obligation and add an appropriate margin.
3. Residual approach: Refer to the total transaction price less the sum of observable standalone selling prices of other products in the contract.

Example: Erasmus University purchases a new SAP system for € 500,000 from ABC Company. The fair value (FV) of the system itself is also € 500,000. The purchase also includes an installation service (worth € 5,000) and training services (worth € 8,000).

a) How many separate performance obligations do we have?

Equipment, installation, and training are three separate products/services because they each have a standalone selling price, and they are not interdependent, (can be performed separately) => 3 performance obligations.

b) How do we allocate the transaction price and hence apply the **relative fair value approach**?

Component	Fair value	Relative FV		Revenue
1. SAP system	500,000	500/513	* 500,000 =	487,329.43
2. Installation	5,000	5/513	* 500,000 =	4,873.29
3. Training	8,000	8/513	* 500,000 =	7,797.27
	513,000			~500,000

c) How much revenue should ABC Company recognize **at the point of delivery of the SAP system**?

Cash (BS)	500,000	
Sales Revenue (IS)		487,329.43
Service Revenue (installation) (IS)		4,873.29
Unearned Service Revenue (BS)		7,797.27

Note: We only recognize revenue when we fulfill a performance obligation. In this case, the training hasn't been done => Record unearned revenue instead of revenue.

Step 5: Recognize Revenue

Definition: recognize revenue when the corresponding performance obligation is satisfied.

Collective indicators for when customer obtains product control

- Company has right to payment for the asset
- Company has transferred legal title to the asset
- Company has transferred physical possession of the asset
- Customer has significant risks/rewards of ownership
- Customer has accepted the asset

Disclosure Requirements: Companies disclose qualitative and quantitative information:

- Contracts with customers
- Significant judgments
- Assets recognized from cost incurred to fulfill a contract

Special Issues

1. Right of Return (sale returns and allowances)

When right of return exists, only recognize revenue in the amount of consideration that is reasonably assured => Recognize gross amount upon date of sale and adjust records at the end of the accounting period.

Example:

- Jan 2, 2019, A bought in cash 800 copies of Kiesoet at €65 per book.
- Studystore agrees to take back any books that A have left over, as they are able to resell these books for the same price next year. There're no costs to recover these books.
- Based on experience, Studystore expects 50 books to be returned. In reality, only 40 books will be returned on May 1, 2019. The cost per book is €40.

Jan 2, 2019 - 800 books sold in cash:

Cash	52,000 (800*65)	
Sales Revenue		52,000
COGS	32,000 (800*40)	
Inventory		32,000

If sold on credit, use accounts receivable.

May 1, 2019 - 40 books are returned:

Sales Returns (contra account to sales revenue)	2,600 (40*65)	
Refund Liability		2,600
Returned Inventory (separate inventory account)	1,600 (40*40)	
COGS		1,600

End of year (remaining 10 books):

- If it is unlikely that someone will return more books then the right of return has expired and you do NOT record anything.
- If you are still expecting the 10 book to be returned then:

Sales Returns	650 (10*65)	
Refund Liability		650
Estimated Inventory Returns	400 (40*10)	
COGS		400

2. Warranties

1. Assurance-Type Warranty: assures that product will meet agreed-upon specifications (quality guarantee)

- Included in sales price => **1 PO**
- Record warranty expense when warranty costs are incurred, and record future expected warranty costs as liability at the end of reporting period

2. Service-Type Warranty: additional service beyond assurance warranty

- Not included in sales price (standalone selling price)

Record as **separate PO** (unearned warranty revenue), and recognize revenue in period the service warranty is in effect

Example:

- Maverick sold 1,000 Rollomatics on Oct 1, 2019 at a total price of $6m with a warranty guarantee that the product was free of any defects (assurance).
- The cost of Rollomatics sold is $4m
- The term of the assurance warranty is 2 years, with an estimated cost of $80,000.
- Maverick sold extended service warranties related to 400 Rollomatics for 3 years beyond the 2-year period for $18,000.
- On November 22, 2019, Maverick incurred labor costs of $3,000 and part costs of $25,000 related to the assurance warranties. Maverick prepares financial statements on December 31, 2019.
- It estimates that its future assurance warranty costs will total $44,000 at December 31, 2019.

Sale & related service warranty - Oct 1, 2019

Cash	6,018,000	
Sales Revenue (product + warranty)		6,000,000
Unearned warranty revenue		18,000
COGS	4,000,000	
Inventory		4,000,000

Warranty costs incurred - Nov 22,2019

Warranty Expense	28,000 (3,000 + 25,000)	
Salaries and Wages Payable		3,000

Inventory		25,000

Adjusting entry for assurance warranty - Dec 31, 2019

Warranty Expense	44,000	
Warranty Liability		44,000

Reduce warranty liability as **actual warranty costs are incurred** in 2020

Warranty liability	x	
Cost accounts		x

Recognize fulfilled service revenue over the period that **extends beyond the assurance warranty** (3 years)

Unearned warranty revenue	1,500 (18,000/36*3)	
Warranty revenue		1,500

Incurred expense costs associated with **service warranty**

Warranty Expense	x	
Cost account		x

3. Consignment

The principal/manufacturer (**consignor**) delivers goods to the dealer/agent (**consignee**) who sells goods
=> Principal retains title of goods until they are sold

Revenues:

- Manufacturer makes profit on sale
- Dealer makes commission on sale

Note

- **Freight costs increase book value of the consignments** for the **consignor**
- **Sales result in a liability** for the **consignee**.

- **Inventory (consignments) is not an asset** for the **consignee**

Consignee (Agent):	**Consignor (Principal):**
▪ Accepts merchandise and agrees to exercise due diligence in caring for and selling it ▪ **Remits** to consignor **cash received** from customers, after deducting a **sales commission** and chargeable expenses ▪ Does **not record merchandise as asset** on its books ▪ Upon sale of the merchandise, it has a **liability for the net amount due** vis-à-vis the consignor	▪ Carries merchandise as inventory throughout consignment, separately classified as **Inventory (consignments)** ▪ Periodically receives report from consignee called **account sales** that shows: merchandise received, merchandise sold, expenses chargeable to the consignment, and cash remitted ▪ Uses a modified version of the point-of-sale basis of **revenue recognition** (recognizes revenue only after receiving notification of the sale)

4. Non-Refundable Upfront Fee

Firms may receive payments (**upfront fees**) from customers before they deliver a product or perform a service (e.g membership fee)

Example: fees paid for 1 year membership

- $200 upfront fee +$50 monthly fee
- Contract length = 3 years

=> Total transaction price = 200 + (36 months*50) = $2,000
=> Revenue recognized each period = 2000/36 = $55.56

5. Repurchase Agreement

1. If the company **sell an asset** to customer but have an **unconditional obligation or right to buy this asset back**

- If **repurchase price > original selling price** => **Financing transaction** (not a sale)
- If **repurchase price < original selling price** => **lease**

2. If **customer has the option to require seller to repurchase**, we must determine if the customer has an economic incentive to do so.

- If there's an **economic incentive** (asset fair value < repurchase price) => **Financing transaction**
- If there's **no economic incentive** => **Sale with right of return**

6. Bill-and-Hold Agreement

Bill and hold agreement: sales contract where a customer has been billed for a product, but the seller retains physical possession of the product until it is transferred to the customer in the future

E.g: Buyer lacks space to accommodate the product or has more than sufficient inventory

Revenue can only be booked at the time of the billing when:

- Reason for bill-and-hold is substantive
- Product is identified separately as belonging to the buyer
- Product is currently ready for physical transfer to buyer
- Seller is not able to use product or direct it to another buyer

Long-Term Contracts

Common in the construction business and often allows sellers to bill purchases at intervals.

Recognition over time applicable when 1 of these criterias is met:

- Customer simultaneously receives and consumes benefits of seller's performance
- Seller creates/enhances an asset the customer controls
- Seller does not create an asset with an alternative use and either
    a) Another seller would not need to re-perform the work
    b) Seller has an enforceable right to payment for its completed performance

LT contracts: Percentage of Completion (POC)

Percentage of completion: If one of the criteria is met and if it can reasonably estimate its progress, the company recognizes revenues and gross profits each period based on the progress of construction.

Measure of progress

- **Input measures** (costs, hours worked) => Rely on productivity
- **Output measures** (units delivered) => Require units to be comparable in time, effort or cost

=> Most popular approach to estimate progress: **Cost-to-cost basis**

2 accounts for POC

1. **Construction in Process (CiP)** - Inventory account: DL, DM and project-related overhead (charged as incurred and not allocated to CiP)
2. **Billings on Construction in Process** - Contra inventory account: Accumulation of progress billings (continuous sale occurs as the work progresses)

Cost-to-cost basis

1. Compute progress (% complete) based on costs incurred & estimated total costs

$$Percent\ complete\ =\ \frac{costs\ incurred\ to\ date}{most\ recent\ estimate\ of\ total\ costs}$$

2. Apply % complete to revenues and gross profit

$$Percent\ complete\ *\ estimated\ revenue/GP\ =\ revenue/GP\ to\ be\ recognized\ to\ date$$

3. Compute current period revenue and gross profit

$$Current\ period\ revenue/GP\ =\ revenue/GP\ to\ be\ recognized\ to\ date\ -\ revenue/GP\ recognized\ in\ prior\ periods$$

Example: Hardhat Construction has a contract to construct a £4,500,000 bridge at an cost of £4,000,000. The contract is to start in July 2019, and the bridge is to be completed in October 2021.

	2019	2020	2021
Costs to date	£1,000,000	£2,916,000	£4,050,000
Estimated costs to complete	3,000,000	1,134,000	—
Progress billings during the year	900,000	2,400,000	1,200,000
Cash collected during the year	750,000	1,750,000	2,000,000

Cost Recovery Method (CRM)

Apply this method if NONE of the following criteria are fulfilled:

- Customer simultaneously receives and consumes benefits
- Customer controls asset as it is created/enhanced
- NO alternative use

Then the seller recognizes revenues when the contract is completed at a point in time.

- Contract revenue is recognized over time only to the extent of costs incurred that are expect to be recoverable
- Recognize GP after all costs have been recognized (completed contract)

Biggest difference compared to POC Method: NO recognition of GP over time.

Contract Loss

1. Loss in current period os a still profitable contract
    - Increase in estimate total costs but contract is still profitable
    - Increase requires to recognize a loss in the current period
    - ONLY applies to POC

2. Loss on an unprofitable contract
    - Increase in estimated total costs => indicates an overall loss on completion of entire contract
    - Under both POC and CRM, recognize the entire expected contract loss

Note that accounting is consistent with accounting **conservatism**= the accounting custom of anticipating foreseeable losses to avoid overstatement of current and future income.

Intermediate accounting – IBEB – MA Lecture 3, week 6
Cost Estimation

Cost Estimation and Cost Behaviour

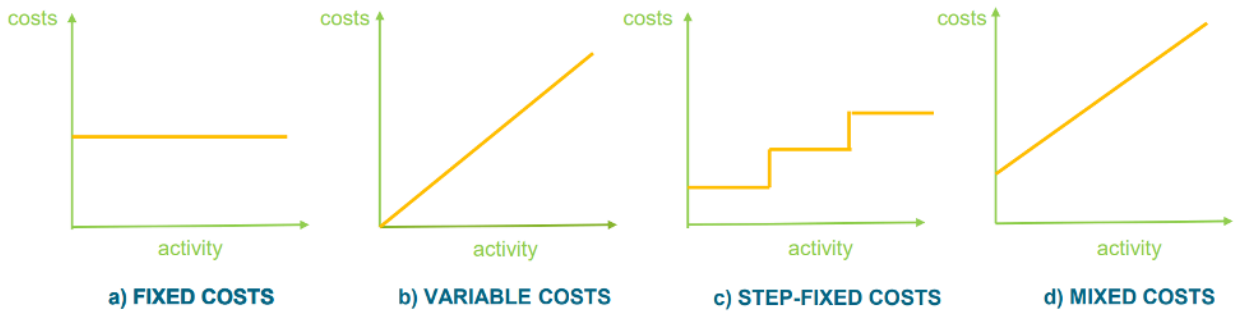
Cost Estimation: process of collecting and analyzing historical data to predict future costs.

Steps:

1. Estimate past relationship between costs and the level of an activity
2. Use estimates to make more accurate future cost predictions

Types of cost:

1. Fixed costs remain constant across different activity levels (e.g rent)
2. Variable costs change when units produced change (e.g packaging)
3. Step-Fixed costs remain constant for a certain level of activity, but once this threshold is surpassed, the costs will change in a step-like manner.
4. Mixed costs have a fixed and variable component



Criteria to classify costs into fixed/variable costs:

1. Cost object
2. Time horizon (all costs become variable in the long run)
3. Relevant range: the activity level at which an organization expects to be operating in the short run

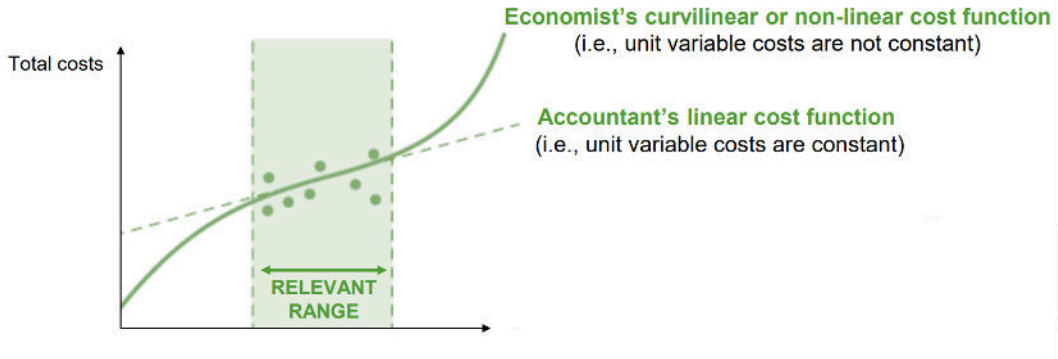
- If a firm's activity declines/increases to unexpected levels outside the relevant range, take action to change fixed costs accordingly.

Cost Function: mathematical expression describing past relationship between costs and changes in the level of an activity (activity measure/cost driver).

Linear regression: $y = a + b_1x_1 + \ldots + b_nx_n$
y= total costs for the period
x= volume of activity levels/cost drivers
a= total fixed costs (intercept)
b= average variable cost per unit of activity (slope)

2 assumptions of cost function:

1. Changes in total costs can be explained by changes in activity levels (e.g. machine hours)
2. Cost behaviour approximated by a linear function of activity level within the relevant range => **Linear function closely approximates the nonlinear function only within the relevant range**.



Cost Estimation Methods

Account analysis starts with classifying costs into fixed, variable, and mixed to create a direct cost function.

Need to use a large enough data sample, to account for possible seasonal variation in production schedule.

5 methods

1. Inspection of accounts method

2. Graphical or scatterplot method
3. High-low method
4. Least square method
5. Engineering method

1. Inspection of the Accounts Method

- Classifying each expense as a fixed, variable or a semi-variable cost
- Calculate total fixed cost
- Calculate unit variable cost
- Final cost estimation function: y = a + bx

Disadvantages:

- Highly subjective depending the manager
- Cost estimates might be based on an outlier, and use past costs

2. Graphical or Scatterplot Method

Cost estimation function developed by fitting a straight line to a scatterplot of past cost observations (y-axis) against their activity level (x-axis).

Advantages:

- Simple to use and provide visual representation

Disadvantages:

- Determination of the straight line is subjective (based on visual approximation) => Use least-squares method to define best fit

Unit variable cost (slope) = $\frac{difference\ in\ costs}{difference\ in\ activity}$

3. High-Low Method

Estimate the cost function using the highest and lowest activity levels and compare changes in cost

Calculations:

1. Unit variable cost = $\frac{difference\ in\ costs}{difference\ in\ activity}$

2. Fixed costs = total costs – variable costs (=unit variable cost*units)

Advantages: Easy to split Fixed Costs and Variable Costs
Disadvantages: Ignores cost observations at 'normal' activity levels, therefore it is NOT recommended!

4. Least Squares Method

A regression equation shows the average change in the dependent variable(Y) that is due to a one-unit increase in the independent variable(X). This is done by using all the available data, and not just the highest/lowest observations such as with the high-low method.

The data is fitted with a regression line with the least-squares technique (minimizing the difference between actual points and points on the line). This is more accurate than the High-Low method.

Cost drivers (X) should be chosen based on their economic plausibility, goodness-of-fit (R-squared of the regression equation: this indicates how much of the driver explains the variation in the dependent variable), and slope of the regression line. A steep slope shows that there is a strong relationship between the costs and the cost driver.

Note: The smaller the differences between the actual costs and predicted costs, the more reliable the estimated cost function.

5. Engineering Method

Analysis of the relationship between inputs and outputs in physical terms. Using data mainly derived from evaluations and opinions of industrial engineers with experience in the business:

- Close study of the product itself: Direct observations/repetitive processes of the underlying physical quantities required for an activity and converting the final results into cost estimates

Advantages:

- Estimating costs for a new product with no prior experience

- Estimating costs that are difficult to associate directly with individual units of output (e.g. overhead costs)
- Can provide reliable cost estimation for repetitive processes where input–output relationships are clearly defined

Disadvantages

- No separation of semi-variable costs into their fixed and variable elements
- Complex, time intensive, and costly analysis of the product and its production process
- Detailed technical knowledge needed

Test of Cost Driver Reliability

Reliability indicates whether the regression reflects an actual relationship among the variables. An indication of whether the regression model is likely to continue to predict cost accurately in the future.

1. Economic plausibility
2. Plotting the data for each potential cost driver and examine distance from the regression line obtained by the scatterplot or least-squares method
3. Goodness of fit statistics
    - Indicate how well predicted costs (y) based on the chosen cost driver (x) matches the actual costs (observed data)
    - Correlation coefficient (r): the extent to which total costs change when the cost driver changes
    - Coefficient of determination (r^2): the percentage of variation in total costs that is explained by the cost driver
    - Values closer to 1 = stronger relationship between the cost driver and costs

Intermediate accounting – IBEB - MA Lecture 4, week 6
Relevant costs and revenue

Relevant Costs and Revenues for

5-Step Managerial Decision-Making Process

1. Identify the problem and uncertainties
2. Obtain information
3. Make prediction about the future
4. Make decision by choosing among alternatives
5. Implement the decision, evaluate performance and learning

It is important to remember the definition of relevant and irrelevant costs/revenues from chapter 2:

Relevant Costs/Revenues:

- Future costs/revenues that will be **changed** by a decision
- Future qualitative or non-financial factors that will be **changed** by a decision

Irrelevant Costs/Revenues:

- Past costs and sunk costs
- Future costs that do NOT differ between alternatives (e.g common fixed costs)

Decision Cases

1. Special Pricing Decisions

Special pricing decisions are pricing decisions outside the main market. Typically, they involve:

- One-time-only orders
- Orders at a price below the prevailing market price

Remember to avoid using fixed cost per unit in the calculations and instead include the total fixed costs, which remain constant over activity levels, because otherwise you could get faulty results.

Example: there are two ways you can calculate if you should accept or reject the special order and both give the same result. The first one is to calculate all the costs/revenues with the units of special order and the second method is to only consider the relevant (differential) cost/revenues. If the profit calculated is positive, then we can conclude that we should accept the special order.

Considerations before recommending the management to accept the special order:

- Normal selling price will not be affected in the long-term
- No better opportunities will be available during the period under consideration
- The company's fixed costs cannot be reduced and are unavoidable for the period under consideration
- Assumes no alternative uses for the idle capacity (otherwise you have an opportunity cost)

2. Outsourcing and Make-or-Buy Decisions

These decisions are very prevalent in reality. Insourcing is the conventional way in which organisations produce goods by themselves in their own facilities. In contrast to this, outsourcing occurs when organisations buy goods or services that they need from an external provider. Decisions on whether or not to outsource are called make-or-buy decisions.

Advantages

- Cost saving and quality improvements
    - Lower cost of labour in overseas countries
- Enables companies to focus on their core activities and provide high quality goods
- Best suited for **non-core activities**

Disadvantages

- Loss of control of operations which can result in reduced quality and failure to achieve on-time deliveries

    - Leads to reputational damage
- Other qualitative factors (e.g competitive advantage)

*Take into consideration the best alternative use of the resources

Option 1: compare the total net cost of each alternative and then select the one with the lowest total costs.

- In this example the cost of making is the same as buying so you have to consider it in both calculations
- In the second alternative you also make phone cases thus you gain revenue from that which decreases the total costs

Option 2: focus on the relevant costs and revenues.

- This is the difference in the costs between alternative 1 and alternative 2

3. Decisions on Replacement of Equipment

Irrelevance of Past Costs Principles:

- An important example of an **irrelevant cost** is the **book value** (original cost - accumulated depreciation) of current equipment because it is a sunk cost since you cannot change what the company has already spent.
    - If we decide to NOT replace the current equipment then the book value is written off periodically (e.g yearly)
    - If we decide to replace the current equipment then the book value is written off as a lump sum (immediately)

$$straight\ line\ depreciation\ = \frac{original\ cost - salvage\ value}{useful\ life}$$

Example: the firm has two possible alternatives:

1. Keep old machine and NOT buy a new one
2. Buy new machine and sell old one

Option 1: compare the total net costs of both alternatives

- Keep in mind that when buying a new machine you need to consider the disposal value of the old machine, which you receive, and the purchase of the new machine, which you pay for.
- Choose the alternative with the lowest costs.

Option 2: consider only relevant costs

- The current disposal value of the old machine is relevant because if the company replaces the machine then they can sell the old one for this amount of money and the cost of the new machine is also relevant because it is the cost incurred of making the decision.
- The difference in operating costs is also relevant
- If total costs are positive then that means that if we keep the old machine we will incur higher costs.

4. Product Mix Decisions: Capacity Constraints

Example: how should Ryanair decide which of the many flights to cancel when facing pilot shortages?

Short-term Capacity Constraints Caused by scarce resources or limiting factors:

- Shortage of skilled labour
- Shortage of raw materials
- Limited equipment or space

When **sales demand > a company's productive capacity**:

Prioritize the production of the good that has the highest contribution margin per unit of the limiting sector (**contribution margin*units per limiting factor**)

Total profit can be calculated by deducting fixed cost from the fixed contribution margin

5. Discontinuation Decisions

Most organizations periodically analyse profits by one or more cost objects to identify unprofitable cost objects. Cost objects can be: products, services, customers etc. This can highlight which business activities are unprofitable and whether it should be discontinued.

Unprofitable = total revenue < total costs

Steps

1. Verify whether the contribution margin is positive or negative

- Positive = the product still produces enough revenue to cover the total variable costs associated with that product

2. Verify whether any of the fixed costs can be avoided by discontinuation
   - Distinguish between direct and common/indirect (irrelevant) fixed costs

Examples:
- Salary of supervisor = avoidable direct fixed cost
- Depreciation = unavoidable direct fixed cost
- Factory rent = unavoidable common fixed cost

Note: It's important to think about if there are possibilities of alternative use for the resources if we discontinue the production of a good (opportunity cost) and if discontinuing will have effects on the sale of other products.

Intermediate accounting – IBEB - MA Lecture 5, week 7
The Budgeting Process

Sales budget

Expected total revenue derived from sales forecast.

$$sales = Expected\ unit\ sales\ x\ unit\ selling\ price\ for\ each\ product$$

Production Budget

The quantity of products that must be produced to meet sales demand and inventory requirements.

$$production = sales + ending\ inventory - beginning\ inventory$$

Direct Material Budget

Does NOT really exist because it is subdivided into two different budget

1. **DM usage budget**
    - Costs of direct material required to meet production budget

    Costs of material to meet production in each production:
    - Multiply the production budget by the amount of material in this department and the cost per unit
    - To find the total add the result in each department

2. **DM purchase budget**
    - Costs of direct materials purchased to meet materials usage budget and inventory requirements
    - The reason for the different budgets is that different managers are responsible for the amount of direct material that are used and purchased from other suppliers.
    - For the calculations, first find the purchase budget for each material then add the result to find the total purchase budget

$$Purchase = material\ usage\ budget + ending\ inventory - beginning\ inventory$$

Direct Labour Budget

Costs of direct labour required to meet the production budget.

- Find the total budgeted hours by multiplying budgeted production by hours per unit.
- Find the total wages by multiplying total budgeted hours by wage per hour.

Production Overhead Budget

Overhead costs required to meet the production budget.

1. **Variable Overhead (controllable)**
    - Allocated to each department according to the overhead rate

2. **Fixed Overhead (non-controllable)**
    - Calculated for each department separately

Selling and Administration Budgets

Budget related to non-manufacturing costs.

Important to note that typically selling and administration budgets are separate budgets because there are different individuals responsible for each (sales manager and administrative officer).

Selling budget = all the expected selling expense
Administrative budget = all expected expenditures related to administration costs

Departmental Budgets

Departmental managers are responsible for controlling ALL costs within the department.

The following budget establishes a target production cost for this year for the departmental manager which can be used to evaluate whether they have succeeded in controlling the costs within the departments by matching the actual costs to the budgeted ones.

- Direct labour budget
- Direct material usage budget
- Production overhead budget

Master Budget

Budget profit and loss account (income statement)

$$budgeted\ operating\ profit\ =\ gross\ profit\ -\ selling\ and\ administration$$
$$gross\ profit\ =\ sales\ -\ cost\ of\ goods\ sold$$

$$COGS\ =\ total\ manufacturing\ costs\ +\ opening\ stock\ of\ finished\ goods\ -\ closing\ stock\ of\ finished\ goods$$
$$total\ manufacturing\ costs\ =\ purchased\ DM\ +\ DM\ opening\ stock\ -\ DM\ closing\ stock\ +\ cost\ of\ DL\ +\ production\ OH$$

Intermediate accounting – IBEB – MA Lecture 6, week 7
Standard Costing and Variance Analysis

Standard Costing

Standard vs Budgeted Cost

Predetermined/target costs (future) that should be incurred under efficient operating conditions.

Standard Costs: Target cost per unit of activity/output

$$standard\ cost\ =\ standard\ input\ *\ standard\ price\ per\ input$$

(Standard input : amount of input we expect to need to manufacture one product)

Budgeted Cost: target cost for entire activity/output

Example: manufacturing bikes

Standard direct material cost
- Standard input: materials used to make a bike
- Standard price: unit cost of materials

Standard direct labor cost
- Standard input: labor time used to make a bike
- Standard price: wage rate for an employee

Standard manufacturing overhead cost
- Standard input: standard hours or output
- Standard price: overhead rate per hour or unit of output

*It is important to note that where different products are produced, standard hours should be used.

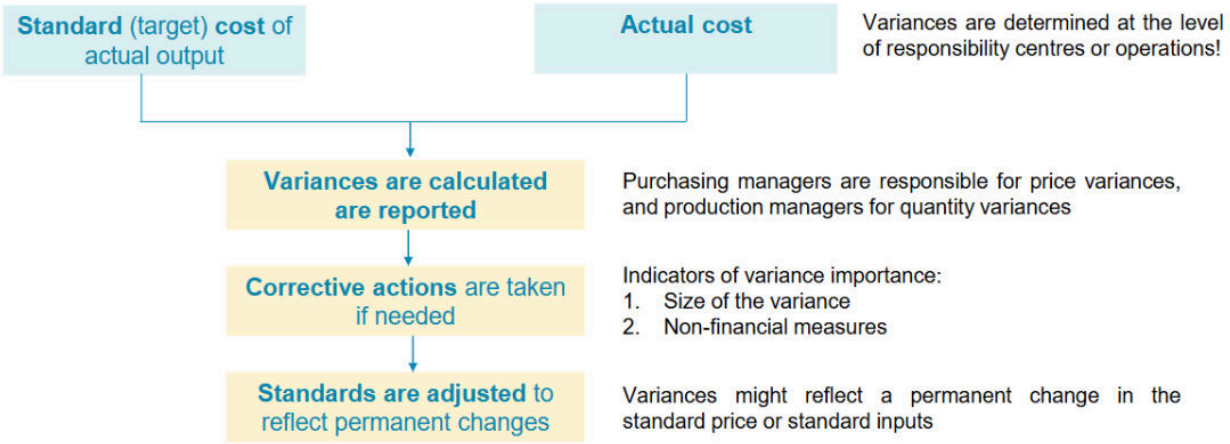
Variance Analysis

We can identify inefficiencies by comparing both types of costs. This is called **variance** and can indicate when we performed better/worse than expected.

$$variance = standard\ cost - actual\ cost$$

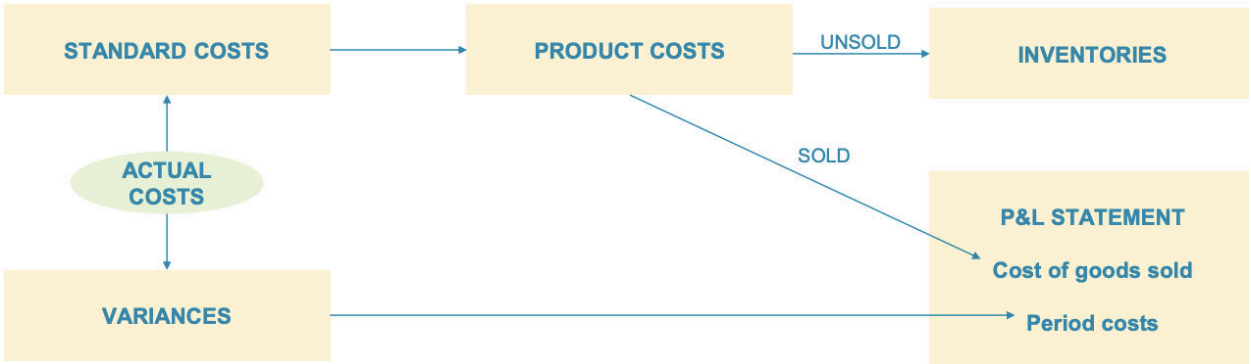
This requires that:

1. Activities that are repetitive
2. Output can be measured
3. Input can be specified



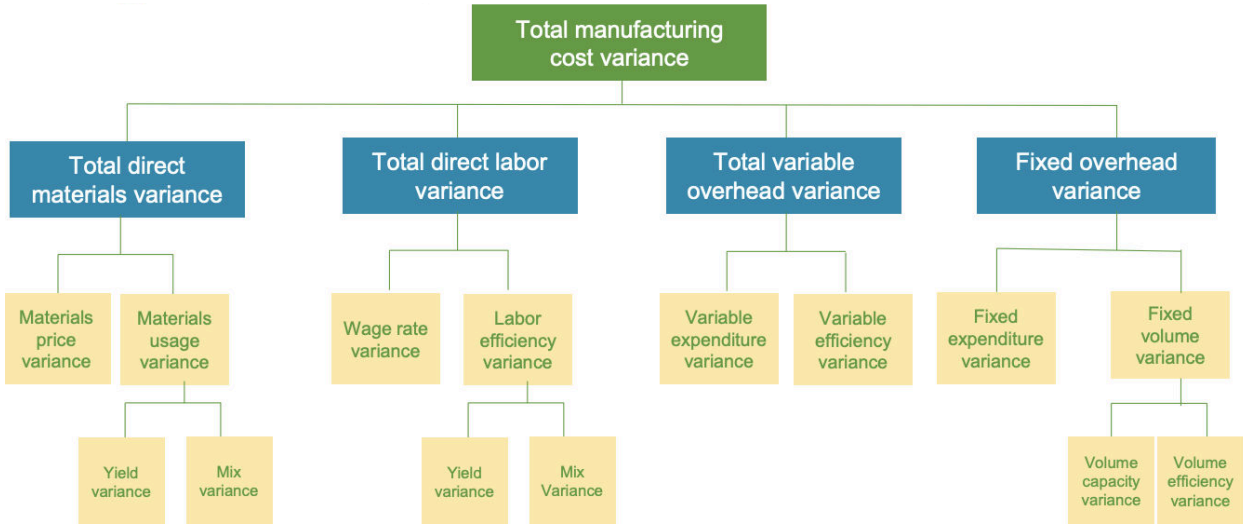
Purpose of Standard Costing

1. Provide prediction of future costs than can be used for decision-making
2. Provide challenging target to motivate employees
3. Assist in setting budgets and evaluating performance
4. Act as a control device by highlighting activities in need of corrective action
5. Simplify task of tracing costs to products for inventory valuation



*Note that **variance is a period cost and can never be part of procuts costs** because they are never formulated at product level, they are always formulated at the level of the responsibility center or level of operations.

Variance Analysis Overview



Direct Material Variances

Total Direct Material Variance:

$$total\ direct\ materials\ variance\ =\ standard\ material\ cost\ for\ actual\ output\ -\ actual\ material\ cost$$

$$total\ material\ variance\ =\ material\ price\ variance\ +\ material\ usage\ variance$$

Standard cost > actual cost = favourable variance

- It means that the price we paid for our direct material was lower than what we expected to pay for them.

Standard cost < actual cost = adverse variance

- We pay more than we expected to pay for direct materials

We need these variances to understand why our standard costs for direct materials, which are our expected costs, were different from actual costs.
Reasons:

1. **Materials Price Variance** => standard price was different from the actual price

$$material\ price\ variance\ =\ (standard\ unit\ price\ -\ actual\ unit\ price)\ *\ actual\ quantity\ purchased$$

*Note that the larger the number of units/material purchased, the greater the consequence of the price variance and the price variance is reported in the period in which it is incurred.

Standard price < actual price = adverse variance (opposite case=favourable)

Causes:

- Outside the direct control of the purchasing manager
    - changes in market conditions
- Within the direct control of the purchasing manager
    - Failure to seek best sources of supply
    - Purchasing material of higher quality

***Note: an adverse (favourable) variance does NOT always indicate inefficiency (efficiency) of the purchasing department.**

2. **Materials Usage Variance** => the standard price = actual price but the difference comes from the standard quantity used vs the actual quantity used of direct material.

$$material\ usage\ variance\ =\ (standard\ quantity\ for\ actual\ production\ -\ actual\ quantity)\ *\ standard\ unit\ price$$

$$flexible\ budget\ =\ standard\ quantity\ \ for\ actual\ output\ *\ \ standard\ price$$

*Note that the evaluation is based on actual working conditions and price effects are removed. And we focus on the standard unit price because the purchasing department is responsible for the price variance which is the actual unit price.

Standard quantity < actual quantity = adverse variance (opposite case=favourable)

Reasons:

- Outside the direct control of the production department:
    - Purchase of material of inferior quality
- Within the direct control of the production department
    - Inappropriate low setting of material usage beforehand
    - Theft or careless handling of materials by production personnel

Direct Labour Variances

$$total\ direct\ labour\ variance\ =\ standard\ labour\ cost\ for\ actual\ production\ -\ actual\ labour\ cost$$

Standard cost > actual cost: favourable variance
Standard cost < actual cost: adverse variance

Reasons:

1. **Wage Rate Variance**
    - Managers are not held accountable because they do not have much control over the wage rate.

$$wage\ rate\ variance\ =\ (\ standard\ wage\ rate\ -\ actual\ wage\ rate)\ *\ actual\ labour\ hours$$

Standard wage rate > actual wage rate = favorable
Standard wage rate < actual wage rate = adverse

2. **Labour Efficiency Variance**

$$labour\ efficiency\ variance\ =\ (standard\ labour\ hours\ for\ actual\ production\ -\ actual\ labour\ hours)\ *\ standard\ wage\ rate$$

$$flexible\ budget\ =\ standard\ hours\ for\ actual\ output\ *\ standard\ wage\ rate$$

Standard labour hours < actual labour hours = adverse (opposite case=favourable)

- Outside the direct control of the production department
    - Change in quality standards

    - Use of inferior quality materials
- Within the direct control of the production department
    - Careless handling of machinery
    - Introduction of new equipment
    - Changes in production process

Important remarks: standard labour hours are used for actual production to ensure that the production manager is evaluated under actual working conditions. And we use the standard wage rate instead of the actual wage rate to remove any price effects because production managers should never be punished for increasing wage rates.

Mix and Yield Variance

This can be done for both material and labour variances. For materials, nearly all production processes require a mix of multiple input materials. For labour, managers can decide to vary the mix of skilled , high-cost labour vs low-cost labour.

In many cases, input materials are substitutes:

- Expensive vs cheap input
- High quality vs low quality input
- Same input obtained from different supplier

Standard Mix: a mix of input materials that minimizes the cost per unit of output but meets quality requirements.

These variances are tools that help us understand that shifting labour mix to a high skill set (which is more expensive) is only worth it if the total time taken can be reduced (improve yield variance)

Deviation from standard mix: Can be a deliberate or conscious change

1. Material/Direct Labour Mix Variance

- Comparison between the cost of the standard mix and the cost of the actual mix.

$$direct\ M/L\ mix\ variance\ =\ actual\ usage\ in\ standard\ mix\ proportions\ -\ (actual\ usage\ in\ actual\ proportions\ *\ standard\ price)$$

Use more cheaper materials/labour = favourable variance (opposite case=adverse)

This does not only impact price but also the quality (yield) of the product.

2. Materials/Direct Labour Yield Variance

- Comparison of the actual output obtained and the output expected to be obtained from the actual amount of direct materials used.

$$direct\ M/L\ yield\ variance\ = (\ actual\ yield\ -\ standard\ yield\ from\ actual\ input\ of\ material)\ *\ standard\ cost\ per\ unit\ of\ output$$

Actual yield < standard yield = adverse variance (opposite case=favourable)

- This means that we overestimated the amount of output we could get from our input

*Important to use **standard prices** in all calculations to remove price effects!

Relation between material mix and yield variance:

The use of higher quality material may result in

- Adverse material mix variance
- A favourable yield variance (boost in output)

The use of lower quality material may result in

- A favourable materials mix variance
- An adverse yield variance (higher material wastage)

Variable Overhead Variances

Indirect costs or overhead cannot be directly traced to a cost object and thus need to be allocated through a cost allocation process. First you must choose an allocation base/cost driver that significantly determines/causes overhead costs (such as direct labour or machine hours). Then you can use this to calculate the budgeted overhead rate:

$$budgeted\ OH\ rate\ = \frac{budgeted\ total\ overhead}{budgeted\ total\ allocation\ base/cost\ driver}$$

Lastly, multiply the overhead rate by the total amount of the cost driver consumer by the cost object to find the amount allocated.

$$total\ variable\ OH\ variance\ =\ standard\ variable\ OH\ for\ actual\ production\ -\ actual\ variable\ OH$$

Standard overhead > actual overhead = favourable (opposite case=adverse)

The total variable OH variance does NOT tell us much because we do NOT know what is driving the variance to happen.

Reasons:

1. **Expenditure Variance:** actual OH rate is different from the budgeted

$$expenditure\ variance\ =\ (standard\ variable\ OH\ rate\ -\ actual\ variable\ OH)\ *\ actual\ input\ hours$$

Standard overhead > actual overhead = favourable
Standard overhead < actual overhead = adverse

- Increase in variable OH costs is NOT fully offset by an increase in the OH allocation base
- Decrease in the OH allocation base is NOT fully offset by a decrease in variable OH costs

2. **Efficiency Variance:** actual amount of cost driver is different from the standard amount

$$efficiency\ variance\ =\ (standard\ input\ hours\ for\ actual\ output\ -\ actual\ input\ hours)\ *\ standard\ variable\ OH\ rate$$

$$flexible\ budget\ =\ standard\ input\ hours\ for\ actual\ output\ *\ standard\ variable\ OH\ rate$$

Standard input > actual input = favourable (opposite case=adverse)

- Workers are NOT skilled if cost driver = direct labor hours
- Machines are NOT in good operating conditions if cost drive = machine hours
- Production scheduler inefficiently scheduled jobs
- Standard input were set too tight

Fixed Overhead Variances

1. Variable/direct Costing = **Expenditure Variance**

- Treats fixed manufacturing OH as period costs
- Immediately charges to the profit and loss account in the period it is incurred

- Assume that fixed OH costs remain unchanged in the short term

$$expenditure\ variance\ =\ budgeted\ fixed\ OH\ -\ actual\ fixed\ OH$$

Budgeted fixed OH > actual fixed OH = favourable
Budgeted fixed OH < actual fixed OH = adverse

2. Absorption/full Costing = **Volume Variance**
    - Assigns all manufacturing OH to products
    - Used for inventory valuation
    - Make use of budgeted OH rate

$$volume\ variance\ =\ standard\ fixed\ OH\ allocated\ to\ actual\ output\ -\ actual\ fixed\ OH$$

This variance does NOT tell us much but may be cause by:

1. Expenditure Variance: difference between actual and budget fixed OH

$$volume\ variance\ =\ (standard\ input\ hours\ actual\ production\ -\ standard\ input\ hours\ budgeted\ production)\ *\ standard\ fixed\ OH\ rate$$

Budgeted production < actual production = adverse (opposite case=favourable)

- Fixed overhead costs are spread over smaller number units

2. Volume Variance: difference between actual and budgeted production volume

$$volume\ efficiency\ \ variance\ =\ (standard\ input\ hours\ for\ actual\ output\ -\ actual\ input\ hours)\ *\ standard\ fixed\ OH\ rate$$

Standard input hours > actual input hours = favourable (opposite case=adverse)

$$volume\ capacity\ variance\ =\ (actual\ input\ hours\ -\ budgeted\ input\ hours)\ *\ standard\ fixed\ OH\ rate$$

Budgeted input hours > actual input hours = adverse (opposite case=favourable)

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