Lecture 3: The Wage Mass

Prepared by: Prof Djouhara AGTI

For Students of 1 Master, HRM

Course: Wages and incentives Management 2

1. Definition of wage mass:

- M. Ferrary, 2014 defined it as the gross wages and social charges incurred by the organisation.

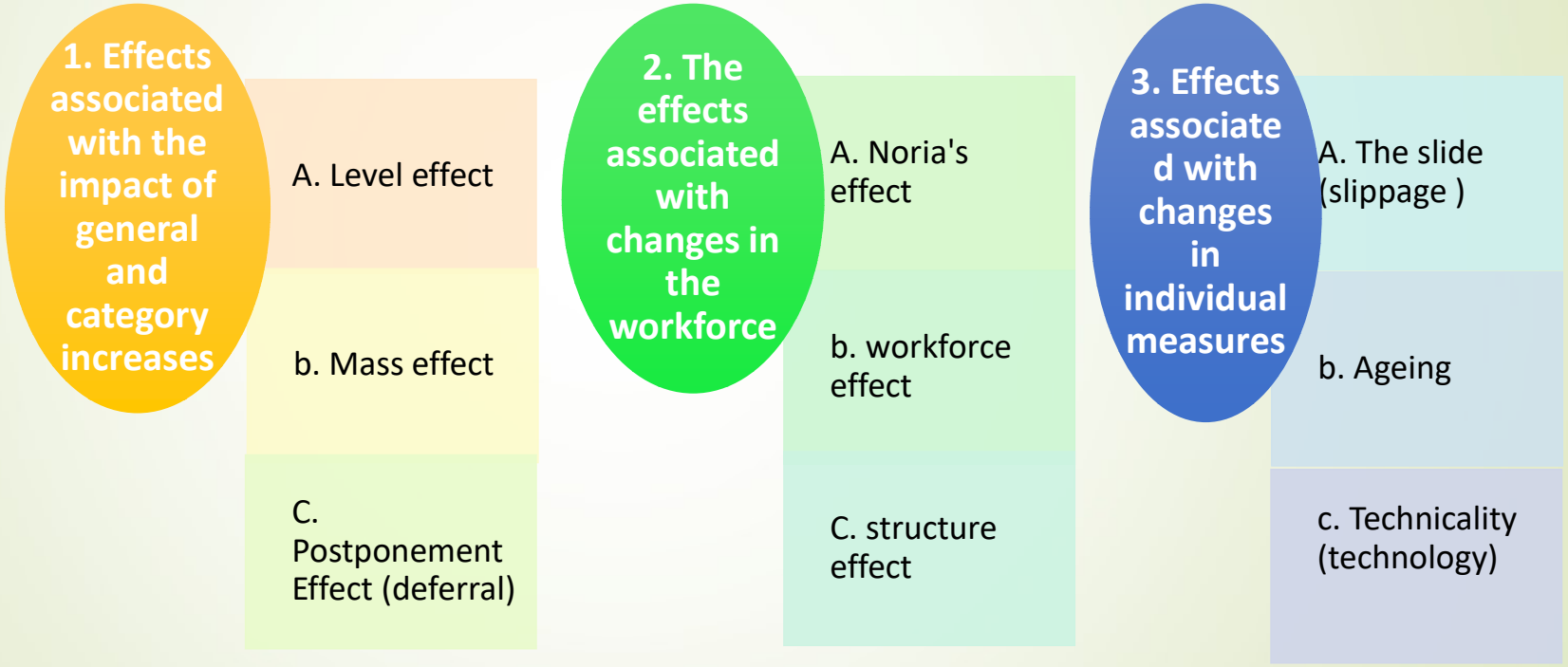
- It includes all expenses related to wages, including social expenses (amounts paid to the social security), tax expenses (taxes related to employees' wages, such as the tax on gross income in Algeria), and indirect compensation for employees.

1. Definition of wage mass:

Jean Pierre CITEA defined the wage mass as: It represents the total direct and indirect expenses included in the cost of labour, namely:

- Total wages paid.
- Tax-exempt allowances and bonuses, not subject to social security declarations.
- Social, legal and contractual expenses.
- Tax expenses on wages.
- Training costs.
- Expenses related to social activities carried out by the organisation.

2. **Effects of wage mass growth:**



2.1. Effects associated with the impact of general and category increases

a. **Level effect**

- It records the current development of nominal wages for workers over a period (two specific dates), indicating the wage increase at time 't' in the year.

b. Mass effect:

- It expresses the real cost during the year, reflecting the consequences of the general increase in wages from the year.
- It measures the evolution of the wage mass over the entire year. It is calculated on 31 December of the year and takes into account any increases in the level that occurred during the year.
- The cost of the increase over the year differs depending on whether it occurs in May or October.

2.1. Effects associated with the impact of general and category increases

C. Postponement effect (deferral)

- Shows the cost carried forward or deferred to the following year.
- It measures the impact of increases in year (n+1) through the level achieved in year (n), or the evolution of the wage mass for the following year.
- The previous year's increases have a full impact on the coming year (on all twelve months).
- **Deferral impact rate = (wage mass effect level – wage mass effect mass) / wage mass effect mass × 100**
- Increase rate to be applied during the next fiscal year:
- **Deferral effect = Wage mass Mass effect × Deferral effect rate.**

2.2. The effects associated with changes in the workforce

- **These effects take into account developments attributable to leaving employment (retirement, resignations, redundancies, etc.) or recruitment,**
- **It resulting in a more difficult but more accurate individual analysis, or an average analysis of the workforce by category.**

2.2. The effects associated with changes in the workforce

A. **Noria's effect**

- This is the effect on the wage mass of changes in average wages resulting from labour inflows and outflows.
- **It reflects reductions in the wage mass associated with replacing retired workers with younger ones in the same jobs, where they earn lower wages. This will enable the organisation to spend less.**
- This results in a positive noria effect (but we must not forget certain consequences related to the loss of skills). Conversely, a negative noria effect occurs if older or more skilled workers are integrated, or by a larger number of those who have left.

b. **Workforce effect**

- The evolution of the amount of wages paid according to changes in the number of individuals employed.
- It reflects the results of changes in the workforce (employees) by category. It is directly related to the number of employees in the organisation. If this number increases, the wage mass increases, and vice versa.

2.2. The effects associated with changes in the workforce

C. **Effect of structure**

- **This occurs when there are changes in the structure of the organisation's qualifications. In some cases, the acquisition of new equipment results in the replacement of a less qualified employee with another highly qualified employee who receives a higher salary, and thus the wage mass will grow under the effect of the structure.**

2.3. Effects associated with changes in individual measures

- **These effects take into account the impact of measures relating to the personal situation of each employee concerning the development of their expertise, performance or seniority.**

2.3. Effects associated with changes in individual measures

A. **The slide (slippage)**

- **It measures scheduled increases without any change in the nature of the work or the employee's qualifications.**
- **It simultaneously explains the effect of noria, in addition to individual performance compensation such as bonuses.**

b. **Ageing**

- **It measures the effects of changes in seniority rates or the application of automatic increases (e.g. in the public sector).**

2.3. Effects associated with changes in individual measures

c. Technicality (technology)

- **It is an expression of the structure effect, as it measures changes in qualifications.**

3. Factors influence on the growth of the wage mass

- Changes in the workforce for each category of employees (entries and exits).
- Development of employee qualifications related to promotions.
- Changes in working hours related to types of employment (part-time, fixed-term contracts, and overtime).
- Employee turnover related to ageing (leaving of older employees) and natural renewal (recruitment of younger employees).
- Decisions to increase wages and developments in the minimum wage, or reductions in income tax, etc.

Some of these changes are predictable, while other factors are uncontrollable.

4. Strategic decisions affecting the wage mass

A. Outsourcing the activity

B. Automating the activity

C. Transforming the activity

4. Strategic decisions affecting the wage mass

A. Outsourcing the activity:

- Outsourcing allows for a reduction in operating costs when an organisation entrusts part of its activities to a service provider specialising in that type of activity, which incurs lower operating costs than the organisation itself.
- The latter benefits from this in terms of reducing its human resource costs.

B. Automating the activity:

- The automation process involves replacing human capital with technical capital. The economic justification for this is to replace labour costs with the costs of robots,
- Although modern enterprises have used of robots in various fields, there are still other variables that favour human capital, such as the risk of malfunctions, the wages of workers supervising the robots, excessive energy consumption and the obsolescence of robots.
- In addition, there is an increasing need for human skills and competencies that cannot be replaced by technology.

4. Strategic decisions affecting the wage mass

C. Transforming the activity:

- **Many enterprises have moved all or part of their operations to other countries where certain advantages are available that are not available in their home country, the most important of which is cheap human resources.**
- **Open borders, cheap transport costs, free trade zones and currency unification have all made it easy to relocate activities and encourage the optimisation of wage costs.**

However, there are other operational dimensions that must be taken into account:

- The amount of wage costs in relation to operating costs;
- The difference in individual productivity
- The availability of skills,
- A comparison of wage cost trends
- The costs of coordination between the head office in the home country and the branch in the other country.

5. Wage mass control

A. Average wage cost

B. Ratio of business number to individual cost

C. Ratio of net added value to average wage cost

D. Wage productivity

E. Wage profitability

5. Wage mass control

A. Average wage cost

- **Average wage cost = employee expenses / number of employees**
- **This indicator shows each employee's share of employees' expenses.**
- **For example: Assumed Employee expenses are 5,000,000DZD, and the number of employees is 200, from which:5,000,000/200 = 25,000**
- **This means that the average cost borne by the enterprise for each employee is 25,000 DZD.**

B. Ratio of business number to individual cost

- **Business number ratio to individual cost = average wage cost / nominal business number per worker.**
- It measures the ratio of business number to per capita employee expenses.
- For example, the nominal businrss number of a worker is 100,000 DZD, from which: 25,000/10,000 = 0.25
- This means that each worker costs the enterprise 25% of the business number they generate, reflecting the extent to which individual production contributes to covering wages.

5. Wage mass control

C. Ratio of net added value to average wage cost

- **Net value added ratio to average wage cost = net value added / average wage cost,**
- **It is an important indicator for creating new jobs.**
- **For example: if the net value added is 7,500,000 DZD, then: 7,500,000/25,000=300**
- **This means that every monetary unit spent by the enterprise on wages contributes to the creation of 300 monetary units as added value, highlighting the enterprise's ability to create new jobs.**

D. Wage productivity

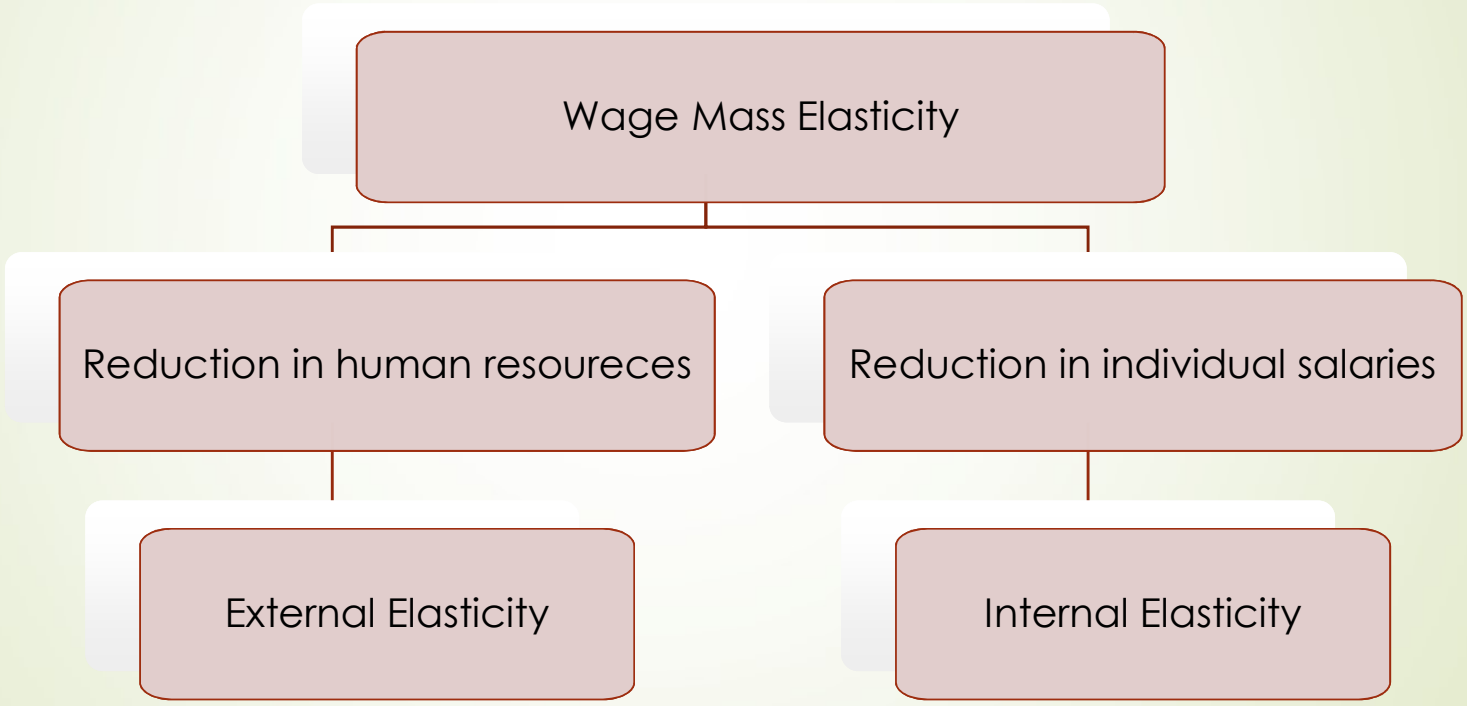
- **Wage productivity = business number/ wage mass.**
- **This indicator corresponds to the amount of business number achieved per wage unit spent by the enterprise.**
- **For example: if the enterprise's business number is 20,000,000 DZD and the wage mass is 5,000,000 DZD, then:**
- **20,000,000/5,000,000=4DZD**
- **This means that for every dinar paid by the enterprise in wages, there are 4 dinars of business number generated.**

5. Wage mass control

E. Wage profitability

- **Wage profitability = margin achieved from operations/wage mass.**
- This indicator corresponds to the amount achieved from the margin of operations for each wage unit spent by the enterprise.
- For example: if the margin achieved from operations is 3,000,000 DZD, then: 3,000,000/500,000 = 0.6DZD,
- This means that every dinar spent by the enterprise on wages achieves a margin of 0.6 dinars from operations, which reflects the profitability of spending on wages.

6. Elasticity of the wage mass:



6. Elasticity of the wage mass:

- The elasticity of the wage mass is measured according to changes in the Business number using the following formula:
- $E_{WM} = \frac{(WM_{t+1} - WM_t)/WM_t}{(Bn_{t+1} - Bn_t)/Bn_t}$
- t: Time.
- WM: Wage mass.
- Bn: Bunisness number .

- Through the above relationship, we can determine the effect of the change in wage mass relative to the change in business number.

6. Elasticity of the wage mass:

- **Example:**
- Current year's wage mass (WMt=5,000,000 DZD)
- Next year's wage mass (WMt+1)=5,500,000 DZD
- Current year's Business number (Bnt) = 20,000,000 DZD
- Next year's Business number (= (Bnt+1) = 22,000,000 DZD
- Wage Elasticity: $\boldsymbol{E_{WM}} = \frac{(\boldsymbol{WM_{t+1}} - \mathbf{WM_t})/\mathbf{WM_t}}{(\mathbf{Bn_{t+1}} - \mathbf{Bn_t})/\mathbf{Bn_t}}$
- 1. Change in wage mass:
- (WMt+1 –WMt) /WMt) = (5,500,000–5,000,000)/5,000,000 = 0.10 =
- 2. Change in Business number
- (Bnt+1–Bnt) /Bnt= (22,000,000-20,000,000)/20,000,000 =0.10

- **EWM = 0.10 / 0.10 = 1**
- **Explanations:**
- **EWM =1: The wage mass changes at the same rate as the business number, leading to a relative balance in the relationship between them.**
- **EWM>1: Wage mass grows at a faster rate than business number, which may indicate higher wage costs compared to revenue.**
- **EWM<1: This indicates that business number is growing at a faster rate than wage mass, reflecting an improvement in wage management efficiency,**

Exercises:

Exercise 1:

- Calculate the changes in the wage mass that took place between 1 January 2020 and 31 December 2023, given that the following changes occurred in the enterprise during the period mentioned:
- Five employees in category A, grade 7, left the enterprise and new employees in the same category with no experience entered, noting that the raw wage for each worker was 58,000 DZD, and the reduction in wages resulting from the ''Noria effect'' was 10% of the raw wage for each employee.
- Five employees from category B, whose raw wage was 42,000 DZD per employee, were promoted to category A, and the wage increase was 5% for each employee.
- Four employees in category A, each with a raw wage of 66,000 DZD, retired and received an end-of-service bonus of 450,000 DZD, distributed equally among them.
- The enterprise introduced new technological equipment and decided to train 10 employees for a period of three months. The cost of the training was 140,000 DZD.
- For ethical reasons, the enterprise dismissed two employees whose wages were 73,000 DZD for each employee.

Solution 1:

- Calculate the changes in the wage mass that took place between 1 January 2020 and 31 December 2023, given that the following changes occurred in the company during the period mentioned: **(The period mentioned is therefore 48 months)**
- Five employees in category A, grade 7, left the company and new employees in the same category with no experience entered the company, noting that the raw wage for each worker was 58,000 DZD, and the reduction in wages resulting from the 'Noria effect' was 10% of the raw wage for each employee.
- **The decrease in the wage mass is estimated as follows: 5*58,000*0.1*48 = -(1,392,000 DZD)**
- Five employees from category B, whose gross wage was 42,000 DZD per employee, were promoted to category A, and the wage increase was 5% per employee.
- **The increase in the wage mass is estimated at: 5*42,000*0.05*48 = +(504,000 DZD)**
- Four employees in category A, each with a raw wage of 66,000 DZD, retired and received an end-of-service bonus of 450,000 DZD, distributed equally among them.

Solution 1:

- **This represents a decrease in the wage mass estimated at: 4*66,000*48 = -(12,672,000 DZD) with an increase in the mass estimated at: +(450,000 DZD). In this case, there is a decrease in the wage mass estimated at: -12,672,000 + 450,000 = -(12,222,000 DZD).**
- - The enterprise introduced new technological equipment and decided to train 10 employees for three months, at a cost of 140,000 DZD.
- **This represents an increase in the wage mass estimated at the cost of training = +(140,000 DZD).**
- -For ethical reasons, the company laid off two employees, each earning 73,000 DZD.
- **The decrease in the wage mass is estimated at: 2*73,000*48 = - (7,008,000 DZD).**
- Therefore, during the period mentioned, **there was a decrease in the wage mass = -1,392,000 + 504,000 – 12,222,000 + 140,000 – 7,008,000 = - (19,978,000 DZD).**

Exercise 2:

- If you know that the total number of employees in 2022 is: 10 category A, 80 category B, 200 category C. Their salaries were respectively: 100,000 DZD, 70,000 DZD, 40,000 DZD.
- In 2023, the following changes occurred:
- 30 employees from category B were laid off, so that if the enterprise hired new employees, each of them would be paid 10,000 DA less per employee laid off.
- (Internal promotion is from category C to category B and then to category A).
- -Calculate the wage mass for 2022.
- - Calculate the wage mass for 2023 in the following cases:
- 1.The enterprise fills all vacant positions after the layoffs through external recruitment.
- 2.The enterprise conducts an internal recruitment process (promotion from grade C to B) to fill all vacant positions after the layoffs.
- - Analyze which of the two options is better for the enterprise, and explain your reasoning (with regard to the wage mass for 2023 in the two previous cases).

Exercise 3:

- If you know that the number of employees for an enterprise in 2024 is 100 employees of category A and 50 employees of category B. Their wages are 56,000 DZD and 42,000 DZD respectively, and the annuall operating labour costs are 250,000 DZD.
- Calculate the wage mass for 2024.
- Calculate the wage mass for 2025 if you know that the enterprise has made the following changes:
- - Four employees have been promoted from category B to category A.
- -Three employees from category A and one employee from category B retired.
- - Five employees from category B were recruited, noting that their wages are 4,000 DA lower than those of employees in the same rank.
- What is the value of the changes in the wage mass between 2024 and 2025?

Thanks for your attention.