*Mohamed Khidher University Major: International Business*

*Faculty of economics, Commercial and Management Sciences Module: Commodity Market*

*Department of commerce*

*Academic year 2022/2023*

***exercises series n°2***

***Part 1*** *choose the right answer*

1. The stock market index is based on sample of Stocks
2. According to the equal weight, if we have 10 stocks that compose an index, then the weight of each stock is:
* 0.5
* **0.1**
* 0.2

**Explanation:** according to the equal weighting, the weight of each stock in the index is calculated as follow: $W\_{i}=^{1}/\_{N}$ , N: number of stocks composing the index; means the weight 1/10 = 0.1

1. According to the price-weighted method, if an index is composed of four stocks A, B, C, D their prices are as follows: 40, 50, 25 and 10 respectively. then the weight of each stock is:
* A :0.4, B :0.5, C : 0.25 and D :0.1.
* A :0.32, B :0.4, C : 0.2 and D :0.08.
* A :0.4, B :0.30, C : 0.25 and D :0.5.

**Explanation:** according to the price-weighting, the weight of each stock in the index is calculated as follow: $W\_{i}=\frac{P\_{i}}{\sum\_{i=1}^{N}P\_{i}}$, N: number of stocks composing the index; *Pi*: is the price of stock *i*.

$$\sum\_{i=1}^{N}P\_{i}=40+50+25+10=125$$

$$W\_{A}=\frac{40}{125}=0.32, W\_{B}=\frac{50}{125}=0.4, W\_{C}=\frac{25}{125}=0.2, W\_{D}=\frac{10}{125}=0.08$$

***Part 2:*** Let the X stock exchange have 5 companies listed, and suppose that the base value is 100.

|  |  |  |  |
| --- | --- | --- | --- |
| ***Stock*** | ***Number of share outstanding Qi*** | $$P\_{it-1}$$ | $$P\_{it}$$ |
| *A* | *5000* | *40* | *30* |
| *B* | *1000* | *50* | *55* |
| *C* | *2000* | *30* | *25* |
| *D* | *1500* | *20* | *25* |
| *E* | *3000* | *60* | *70* |

***Question:***

* Calculate the index price and the index value according to the three methods? Is the value of the index increased or decreased?

***Part 2 Answer***

***1*** Calculate the index price and the index value according to the equal weight method: The index price = $\sum\_{i=1}^{N}P\_{i}W\_{i}$, the weight of each stock in the index is calculated as follow: $W\_{i}=^{1}/\_{N}$ , N: number of stocks composing the index; means the weight 1/5 = 0.2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ***Stock*** | $$P\_{it-1}$$ | $$P\_{it}$$ | ***Wit =Wit-1*** | ***Wit-1\*Pit-1*** | ***Wit\*Pit*** |
| *A* | *40* | *30* | *0.2* | *8* | *6* |
| *B* | *50* | *55* | *0.2* | *10* | *11* |
| *C* | *30* | *25* | *0.2* | *6* | *5* |
| *D* | *20* | *25* | *0.2* | *4* | *5* |
| *E* | *60* | *70* | *0.2* | *12* | *14* |
| *total* | *//////////////////////* | *////////////* | ***1*** | *////////////////////* | *////////////////* |
| *Index price* | *//////////////////////* | *////////////* | *//////////////////* | ***40*** | ***41*** |

Applying Equation index value $I=\frac{\sum\_{i=1}^{N}W\_{it}×P\_{it}}{\sum\_{i=1}^{N}W\_{it-1}×P\_{it-1}}×begining value $, we find that the index value is (41/40)\*100=102.5 Index on day 1 is 100 and on day 2 is 102.5, thus market is 2.5 points higher than on day 1 (the index is increased).

***2***Calculate the index price and the index value according to the equal-weighted method: The index price = $\sum\_{i=1}^{N}P\_{i}W\_{i}$, the weight of each stock in the index is calculated as follow: $W\_{i}=\frac{P\_{i}}{\sum\_{i=1}^{N}P\_{i}}$,

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| ***Stock*** | $$P\_{it-1}$$ | $$P\_{it}$$ | ***Wit-1*** | ***Wit*** | ***Wit-1\*Pit-1*** | ***Wit\*Pit*** |
| *A* | *40* | *30* | *0.2* | *0.146* | *8* | *4.38* |
| *B* | *50* | *55* | *0.25* | *0.268* | *12.5* | *14.74* |
| *C* | *30* | *25* | *0.15* | *0.122* | *4.5* | *3.05* |
| *D* | *20* | *25* | *0.1* | *0.122* | *2* | *3.05* |
| *E* | *60* | *70* | *0.3* | *0.341* | *18* | *23.87* |
| *total* | *200* | *205* | ***1*** | ***≅ 1*** | *//////////////* | *////////////////* |
| *Index price* | */////////* | *////////////* | *//////* |  | ***45*** | ***49.09*** |

Applying Equation index value $I=\frac{\sum\_{i=1}^{N}W\_{it}×P\_{it}}{\sum\_{i=1}^{N}W\_{it-1}×P\_{it-1}}×begining value $, we find that the index value is (49.09/45)\*100=109.09 Index on day 1 is 100 and on day 2 is 9.09, thus market is 9.09 points higher than on day 1 (the index is increased).

***3***Calculate the index price and the index value according to the capitalization-weighting method: The index price = $\sum\_{i=1}^{N}P\_{i}W\_{i}$, the weight of each stock in the index is calculated as follow:$W\_{i}=\frac{P\_{i}×Q\_{i}}{\sum\_{i=1}^{N}P\_{i}×Q\_{i}}$

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Stock*** | ***Qi*** | $$P\_{it-1}$$ | $$P\_{it}$$ | ***Qi\* Pit-1*** | ***Wit-1*** | ***Qi\* Pit*** | ***Wit*** | ***Wit-1\* Pit-1*** | ***Wit \* Pit*** |
| *A* | *5000* | *40* | *30* | *200000* | *0.385* | *150000* | *0.298* | *15.4* | *8.94* |
| *B* | *1000* | *50* | *55* | *50000* | *0.096* | *55000* | *0.109* | *4.8* | *5.995* |
| *C* | *2000* | *30* | *25* | *60000* | *0.115* | *50000* | *0.099* | *3.45* | *2.475* |
| *D* | *1500* | *20* | *25* | *30000* | *0.058* | *37500* | *0.075* | *1.16* | *1.875* |
| *E* | *3000* | *60* | *70* | *180000* | *0.346* | *210000* | *0.418* | *20.76* | *29.26* |
| *Total* |  |  |  | ***520000*** | ***1*** | ***502500*** | ***≅ 1*** | *45.57* | *48.545* |
| *Index Price* |  |  |  |  |  |  |  |  |  |

Applying Equation index value $I=\frac{\sum\_{i=1}^{N}W\_{it}×P\_{it}}{\sum\_{i=1}^{N}W\_{it-1}×P\_{it-1}}×begining value $, we find that the index value is (48.545/45.57)\*100=106.528 Index on day 1 is 100 and on day 2 is 6.528, thus market is 6.109 points higher than on day 1 (the index is increased).