# **ETM595-Risk Assessment & Management – HW 1 Report**

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In this homework, it is asked to select 15 assets from one of the stock markets to design two portfolios with different weights. Then, it is expected to calculate some statistics from those portfolios to conclude.

As the project team, we randomly selected 15 assets from BIST100. Preferred stocks are documented in Table 1. 52-week-return rate data is retrieved from https://www.investing.com/.

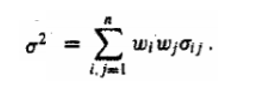
|  |  |  |
| --- | --- | --- |
| AEFES | ENJSA | THYAO |
| AKBNK | ENKAI | TTKOM |
| DEVA | GOLTS | TTRAK |
| DGKLB | IHLGM | ULKER |
| ECILC | SISE | VESTL |

Table 1: Selected Assets

Mean and variance values for each asset and covariance matrix for 15 assets are calculated. We are asked to form two different two portfolios with 15 assets in each with different weights. For the first portfolio, weights decrease as average returns decrease. For the second one weights increase proportional to decreasing standard deviation. Thus, the following formulations are used:

After determining the weights, mean and variance of each portfolio are calculated with the formulas in below:





For each portfolio results are documented in Table-2 in below:

|  |  |  |
| --- | --- | --- |
|  | **Mean** | **Variance** |
| **Portfolio 1** | 0.015832 | 0.002735 |
| **Portfolio 2** | 0.008211 | 0.001797 |

Table 2: Portfolio parameters

Assuming the average weekly return of a portfolio is normally distributed with the parameter values, to calculate the probability of gaining a positive return is calculated as follows:

Calculated probabilities are **0.618** and **0.576** for portfolio 1 and 2, respectively.

In the homework, it is also asked to find probabilities having a return above the inflation rate, which is taken as rate banks loan money. To find those rates, the site of Central Bank of the Turkish Republic is visited. Yearly rates are converted to weekly simply as follows:

Next, corresponding weekly rates are combined with the original data set, which includes weekly returns of each asset. Then, to find the net return for each week, weekly inflation rates are subtracted from weekly returns of assets. With the net returns, steps explained above are repeated. By considering the net returns, mean, standard deviation and covariance matrix calculated. With the formulas documented above, weights of assets for two portfolios are found. Succeeding, portfolio means and variances are obtained and reported in Table -3 in below:

|  |  |  |
| --- | --- | --- |
|  | **Mean** | **Variance** |
| **Portfolio 1** | 0.013920 | 0.002738 |
| **Portfolio 2** | 0.006299 | 0.001797 |

Table 3: Portfolio parameters with net returns

Finally, probabilities are calculated with the following formula:

Probabilities for portfolio 1 and 2 are evaluated as **0.604** and **0.559**.