Homework Exercise 1

Due at 14:00 on March 17, 2020

- *You can submit your solution by e-mail (zhuk-sn@ranepa.ru) or bring it to the class on March 17.*
- *Up to **two** students can submit one solution.*
- *Please, include brief descriptions of what exactly you did. It should be clear how you got your results.*
- *If you have any questions, you can always send me an e-mail (zhuk-sn@ranepa.ru)*

1. Please choose two risky assets (these could be equities, indices or some other securities). Try to select not only the most common names, so that your securities are different from the ones selected by your classmates. You can use securities from any country but, please, use the same currency.
2. Please find the data on the monthly returns of the securities that you selected (you can use Bloomberg or any other source). I recommend using at least 10 years of data. Please, describe briefly where you found the data and how you processed it.
3. Calculate the means, variances, and correlation for the two securities.
4. Plot the mean variance frontier for these two securities for the cases when short selling is allowed and when it is not allowed.
5. Suppose an investor is planning to invest for one month in these two securities and has the following mean-variance preferences

$$Utility = E[r_p] - \frac{3}{2}Var[r_p]$$

where r_p is the portfolio return. Find analytically the optimal portfolio for this investor. Which return and variance should this investor expect? Show the optimal portfolio on a graph.

6. Find some risk-free asset (or some close alternative) in the same currency as your two existing risky assets. For example, you can use the yields of short-term government bonds. Plot the mean variance frontier for the three assets. Find the optimal portfolio for the investor from question 5 if he can also use the risk-free asset in his portfolio. Show the optimal portfolio on a graph.
7. Suppose the short-selling is not allowed. Would that affect your optimal portfolios from questions 5 and 6? And if yes, how?