Lecture 2

Example 1

Estimates from three independent experts of the future prices are in the following table. The price of the security in the time of purchase was 100,--. Calculate the expected return and risk of this security.

The estimates of experts:

Expert 1		Expert 2		Expert 3	
Price	p_{i1k} v %	**Price**	p_{i2k} v %	**Price**	p_{i3k} v %
80	10	100	20	120	50
100	80	120	30	160	50
180	10	150	50		

Example 2

Consider several portfolios created from two assets.

	$\bar{r}_i$	σ_i	$\rho_{1,2} = 1$	$\rho_{1,2} = 0,5$
C_1	5%	20%	$\rho_{1,2} = -1$	$\rho_{1,2} = -0,5$
C_2	15%	40%	$\rho_{1,2} = 0$	

Proportions (weights) of individual securities in the portfolio are:

	P_1	P_2	P_3	P_4	P_5	P_6	P_7
X_1	1	0,83	0,67	0,50	0,33	0,17	0
X_2	0	0,17	0,33	0,50	0,67	0,83	1

Calculate the returns of each portfolio and their risk. Plot the results.

Example 3

Calculate and plot calculated portfolio, if you know the return and covariance matrix.

$$\left[\sigma_{ij}\right] = \begin{pmatrix} 459 & -211 & 112 \\ -211 & 312 & 215 \\ 112 & 215 & 179 \end{pmatrix} \qquad \left[R_i\right] = \begin{pmatrix} 16,2 \\ 24,6 \\ 22,8 \end{pmatrix}$$

X_i / P_i	A	B	C	D	E
X_1	0,20	0,25	0,50	0,30	0,10
X_2	0,20	0,25	0,10	0,40	0,20
X_3	0,60	0,50	0,40	0,30	0,70

Example 4
The portfolio consists of two securities in following manner:

Security	Expected return	Risk	Weight
C_i	$\bar{r}_i$	σ_i	w_i
C_1	0,15	0,28	0,60
C_2	0,21	0,42	0,40

Calculate the expected return of the portfolio. Then calculate the risk of the portfolio. Use the whole interval for correlation $\langle -1, 1 \rangle$ and the step will be 0,2. Determine the portfolio with the smallest and largest risk.

Example 5
We have multi assets portfolio with following correlation matrix:

Security	E(ri)	Risk	Weight
C_i	$\bar{r}_i$	σ_i	w_i
C_1	0,13	0,28	0,2
C_2	0,25	0,42	0,4
C_3	0,21	0,35	0,1
C_4	0,41	0,48	0,2
C_5	0,30	0,39	0,1

$$\left[\rho(C_i C_j) \right] = \begin{pmatrix} 1 & 0,30 & 0,41 & -0,23 & 0,13 \\ & 1 & 0,25 & -0,09 & 0 \\ & & 1 & -0,22 & 0,31 \\ & & & 1 & 0,14 \\ & & & & 1 \end{pmatrix}$$

Calculate the expected return of the portfolio and its risk.