

	f_i	q_i	$\rho_{1,2}=1$	$\rho_{1,2}=0.5$
G_1	5%	20%	$\rho_{1,2}=1$	$\rho_{1,2}=0.5$
G_2	15%	40%	$\rho_{1,2}=0$	

	P_1	P_2	P_3	P_4	P_5	P_6	P_7
X_1	1	0.83	0.67	0.5	0.33	0.17	0
X_2	0	0.17	0.33	0.5	0.67	0.83	1

Rp P1 P2 P3 P4 P5 P6 P7
 0.05 0.067 0.083 0.1 0.117 0.133 0.15

Var(P) P1 P2 P3 P4 P5 P6 P7
 Correl_i
 -1 0.04 0.009604 0.00 0.01 0.040804 0.088804 0.16
 -0.5 0.04 0.020892 0.017692 0.03 0.058492 0.100092 0.16
 0 0.04 0.03218 0.03538 0.05 0.07618 0.11138 0.16
 0.5 0.04 0.043468 0.053068 0.07 0.093868 0.122668 0.16
 1 0.04 0.054756 0.070756 0.09 0.111556 0.133956 0.16

Sigma(P) 0.2 0.098 0.002 0.1 0.202 0.298 0.4
 0.2 0.144541 0.133011 0.173205 0.241851 0.316373 0.4
 0.2 0.179388 0.188096 0.223607 0.276007 0.333736 0.4
 0.2 0.20849 0.230365 0.264575 0.306379 0.35024 0.4
 0.2 0.234 0.266 0.3 0.334 0.366 0.4

0.04	0.009604	4E-06	0.01	0.040804	0.088804	0.16
0.04	0.020892	0.017692	0.03	0.058492	0.100092	0.16
0.04	0.03218	0.03538	0.05	0.07618	0.111138	0.16
0.04	0.043468	0.053068	0.07	0.093868	0.122668	0.16
0.04	0.054756	0.070756	0.09	0.111556	0.133956	0.16

0.2	0.098	0.002	0.1	0.202	0.298	0.4
0.2	0.144541	0.133011	0.173205	0.241851	0.316373	0.4
0.2	0.179388	0.188096	0.223607	0.276007	0.333736	0.4
0.2	0.20849	0.230365	0.264575	0.306379	0.35024	0.4
0.2	0.234	0.266	0.3	0.334	0.366	0.4

X_i/P_j	A	B	C	D	E
X_1	0.2	0.25	0.5	0.3	0.1
X_2	0.2	0.25	0.1	0.4	0.2
X_3	0.6	0.5	0.4	0.3	0.7

$$[q_j] = \begin{pmatrix} 459 & -2 \\ -211 & 3 \\ 112 & 2 \end{pmatrix}$$

	A	B	C	D	E	
Rp	21.84	21.6	19.68	21.54	22.5	
	21.84	21.6	19.68	21.54	22.5	

	A	B	C	D	E	
Var(P)	156.88	148.3125	187.41	128.46	172.22	
Sigma(P)	12.52517	12.17836	13.68978	11.33402	13.12326	

	156.88	148.3125	187.41	128.46	172.22	
--	--------	----------	--------	--------	--------	--

21111
12 215
15 179

$$[R] = \begin{pmatrix} 16 \\ 24 \\ 28 \end{pmatrix}$$

459	-211	112	16.2
	312	215	24.6
		179	22.8

<i>Cenný papír</i>	<i>Oček. výnos</i>	<i>Riziko</i>	<i>Podíl v portfoliu</i>
<i>G</i>	0.15	0.28	0.6
<i>G</i>	0.21	0.42	0.4

Rp 0.174

Correl_i	Sigma(P)
-1	0
-0.8	0.01129
-0.6	0.022579
-0.4	0.033869
-0.2	0.045158
0	0.056448
0.2	0.067738
0.4	0.079027
0.6	0.090317
0.8	0.101606
1	0.112896

Cenný papír	Oček. výnos	Riziko	Podíl v portfoliu
G_i	r_i	σ_i	X_i
G1	0.13	0.28	0.2
G2	0.25	0.42	0.4
G3	0.21	0.35	0.1
G4	0.41	0.48	0.2
G5	0.3	0.39	0.1

$$[\rho_{G_i G_j}] = \begin{bmatrix} 1 & 0.3 & 0.4 \\ & 1 & 0.2 \\ & & 1 \end{bmatrix}$$

Rp	0.259			1	0.3
		wTVw		0.3	1
Var(P)	0.049122	0.0491221		0.41	0.25
Sigma(P)	0.221635			-0.23	-0.09
				0.13	0
Variance	0.043322		Sigma_i	0.28	0.42
Covariance C1		0.0053469		0.0784	0.03528
C2		3.696E-05		0.03528	0.1764
C3		-0.000632		0.04018	0.03675
C4		0.0010483		-0.03091	-0.01814
sum		0.0058001		0.014196	0
Var(P)	0.049122		w_i	0.2	0.4
				0.029047	
				0.077662	
				0.031826	
				0.031565	
				0.027522	
					0.049122

41	-023	013
25	-009	0
1	-022	031
	1	014
		1

0.41	-0.23	0.13
0.25	-0.09	0
1	-0.22	0.31
-0.22	1	0.14
0.31	0.14	1

0.35	0.48	0.39
------	------	------

0.04018	-0.03091	0.014196
0.03675	-0.01814	0
0.1225	-0.03696	0.042315
-0.03696	0.2304	0.026208
0.042315	0.026208	0.1521

0.1	0.2	0.1
-----	-----	-----

		$X_i^2 - (E(X))^2$
$(X_i - E(x))^3 \cdot p_i$		
0.006158		0.013172
0.01424		0.054801
0.000158		0.013278
0.006586		0
0.011556		0.000694
0.004841		0.001108
0.043539	Sum_ X_i^2 *	0.083053
0.208661	Var(X)	0.043539

Trh	CP	r_i	riziko	korelace _{A,B}
I	A	0.22	0.3	0.15
	B	0.31	0.32	
II	A	0.26	0.29	-0.06
	B	0.34	0.33	
III	A	0.18	0.2	0.09
	B	0.41	0.38	

Trh_i

I

II

III

Trh I

CM

0.09 0.0144

0.0144 0.1024

Msoustavy

0.18 0.0288

0.0288 0.2048

1 1

VPS

1

0

1

0

0

1

InvM

3.056235 -3.05623 0.537897 w1 0.537897

-3.05623 3.056235 0.462103 w2 0.462103

0.537897 0.462103 -0.11013 -0.11013

Zk

1

ZK

1.00 0.00 0.00

0.00 1.00 0.00

0.00 0.00 1.00

Rp

0.261589

Trh II

CM

0.0841 -0.00574

-0.00574 0.1089

Msoustavy

0.1682 -0.01148

-0.01148 0.2178

1 1

VPS

1

0

1

0

0

1

InvM

2.445179 -2.44518 0.56064 w1 0.56064

-2.44518 2.445179 0.43936 w2 0.43936

0.56064 0.43936 -0.08925 -0.08925

Zk

1

ZK

1.00 0.00 0.00

0.00 1.00 0.00

0.00 0.00 1.00

Rp

0.295149

Trh III

CM

0.04 0.00684

0.00684 0.1444

Msoustavy			VPS	
0.08	0.01368	1		0
0.01368	0.2888	1		0
1	1	0		1

InvM			Wi	
2.928772	-2.92877	0.805764	w1	0.805764
-2.92877	2.928772	0.194236	w2	0.194236
0.805764	0.194236	-0.06712		-0.06712
			Zk	1

Rp
0.224674

ZK		
1.00	0.00	0.00
0.00	1.00	0.00
0.00	0.00	1.00

Rp	Sigma(P)	Rp/Sigma
0.261589	0.234659	1.114761
0.295149	0.212666	1.387852 <== best
0.224674	0.212666	1.056466

Var(P)	Sigma(P)
0.055065	0.234659

Var(P)	Sigma(P)
0.045227	0.212666

Var(P)	Sigma(P)
0.064437	0.253845

Emise	CP ₁	CP ₂	CP ₃	CP ₄	CP ₅	CP ₆	CP ₇	r _i (v %)
CP ₁	80.5	82.7	85.3	85.1	123.9	22	3.5	1.9
CP ₂	82.7	184.7	131.5	69.4	49.5	58	-9.9	6.1
CP ₃	85.3	131.5	374.2	384.5	366.5	103.8	343.5	2.9
CP ₄	85.1	69.4	384.5	684.8	599.1	51.6	502.7	4
CP ₅	123.9	49.5	366.5	599.1	871.4	-21.2	520.4	5.7
CP ₆	22	58	103.8	51.6	-21.2	89.7	74.4	3.4
CP ₇	3.5	-9.9	343.5	502.7	520.4	74.4	574.6	4.9

Rp/Sigma(p)

Matice Soustavy

161	165.4	170.6	170.2	247.8	44	7
165.4	369.4	263	138.8	99	116	-19.8
170.6	263	748.4	769	733	207.6	687
170.2	138.8	769	1369.6	1198.2	103.2	1005.4
247.8	99	733	1198.2	1742.8	-42.4	1040.8
44	116	207.6	103.2	-42.4	179.4	148.8
7	-19.8	687	1005.4	1040.8	148.8	1149.2
1	1	1	1	1	1	1

InvM

0.077542	-0.00619	0.008788	-0.00971	-0.03769	-0.07775	0.045002
-0.00619	0.007803	-0.00362	0.000167	0.001056	-0.00048	0.001254
0.008788	-0.00362	0.007544	-0.00229	-0.00426	-0.00879	0.002623
-0.00971	0.000167	-0.00229	0.004278	0.004072	0.01066	-0.00718
-0.03769	0.001056	-0.00426	0.004072	0.02058	0.040175	-0.02394
-0.07775	-0.00048	-0.00879	0.01066	0.040175	0.086382	-0.0502
0.045002	0.001254	0.002623	-0.00718	-0.02394	-0.0502	0.032436
2.1372	0.044435	-0.29067	-0.23027	-0.77333	-1.1224	1.235036

Rp 0.39525

Riziko

2.1372 0.044435 -0.29067 -0.23027 -0.77333 -1.1224 1.235036

2.1372	80.5	82.7	85.3	85.1	123.9	22	3.5
0.044435	82.7	184.7	131.5	69.4	49.5	58	-9.9
-0.29067	85.3	131.5	374.2	384.5	366.5	103.8	343.5
-0.23027	85.1	69.4	384.5	684.8	599.1	51.6	502.7
-0.77333	123.9	49.5	366.5	599.1	871.4	-21.2	520.4
-1.1224	22	58	103.8	51.6	-21.2	89.7	74.4
1.235036	3.5	-9.9	343.5	502.7	520.4	74.4	574.6

367.6936	7.853678	-52.9898	-41.881	-204.776	-52.7736	9.238319
7.853678	0.36468	-1.69843	-0.71011	-1.70094	-2.89267	-0.5433
-52.9898	-1.69843	31.61554	25.73579	82.38249	33.86451	-123.312
-41.881	-0.71011	25.73579	36.31192	106.6853	13.33649	-142.966
-204.776	-1.70094	82.38249	106.6853	521.1259	-18.4013	-497.027
-52.7736	-2.89267	33.86451	13.33649	-18.4013	113.0031	-103.134

9.238319 -0.5433 -123.312 -142.966 -497.027 -103.134 876.446

Var(ρ) 15.14374
Sigma(ρ) 3.891496

VPS

1	0
1	0
1	0
1	0
1	0
1	0
1	0
0	1

wi

2.1372	1	2.1372
0.044435	2	0.044435
-0.29067	3	-0.29067
-0.23027	4	-0.23027
-0.77333	5	-0.77333
-1.1224	6	-1.1224
1.235036	7	1.235036
-30.2875	lambda	-30.2875

ZK	1
----	---

	Firma 1	Firma 2	Firma 3		Kovariance	
μ	0.8	0.3	0.6		$\sigma_{1,2}$	-0.1
σ	1.2	0.8	1.1		$\sigma_{1,3}$	-0.5
					$\sigma_{2,3}$	0.3

CM	Firma 1	Firma 2	Firma 3
Firma 1	1.44	-0.1	-0.5
Firma 2	-0.1	0.64	0.3
Firma 3	-0.5	0.3	1.21

Matice soustavy						VPS
	2.88	-0.2	-1	1		0
	-0.2	1.28	0.6	1		0
	-1	0.6	2.42	1		0
	1	1	1	0		1
					wi	
InvM	0.219576	-0.23012	0.01054	0.332139		0.332139
	-0.23012	0.641161	-0.41105	0.379918		0.379918
	0.01054	-0.41105	0.400506	0.287943		0.287943
	0.332139	0.379918	0.287943	-0.59263		-0.59263
					Zk	1

Var(p)

0.332139 0.379918 0.287943

0.158855 -0.01262 -0.04782

-0.01262 0.092376 0.032818

-0.04782 0.032818 0.100322

Var(p) 0.296317

Rp

Var(p)

Sigma(p)

0.552452 0.296317 0.54435

0.296317