

Předpokládejme, že kapitálový trh je v rovnováze. Je dáno

$$r_f = 0,04$$

$$r_M = 0,10$$

$$\sigma_M = 0,09$$

a) Popište a nakreslete přímkou kapitálového trhu (CML)

b) Mějme tři CP mající následující kovariance s výnosem tržního portfolia:

$$\sigma_{1,M} = 0,0108$$

$$\sigma_{2,M} = -0,0027$$

$$\sigma_{3,M} = 0,0054$$

c) Popište a nakreslete přímkou SML. Zanešte CP na přímkou SML

CML

0	0.09
0.04	0.1

SML-covar

0	0.0081
0.04	0.1

SML-beta

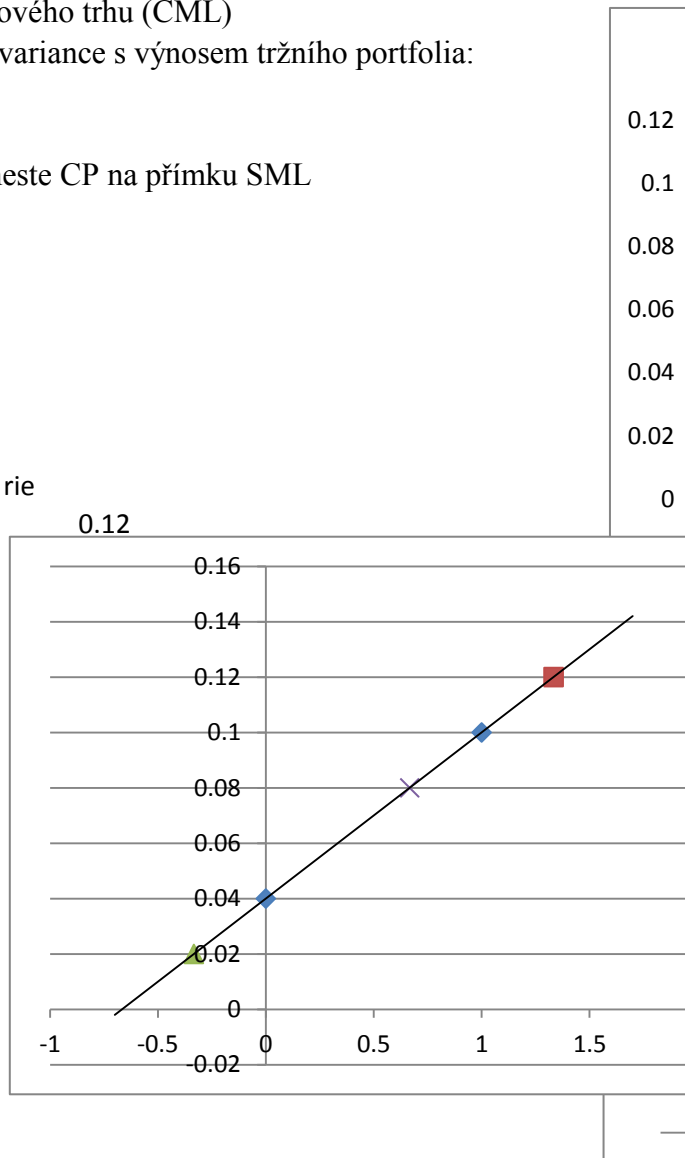
0	1
0.04	0.1

covar

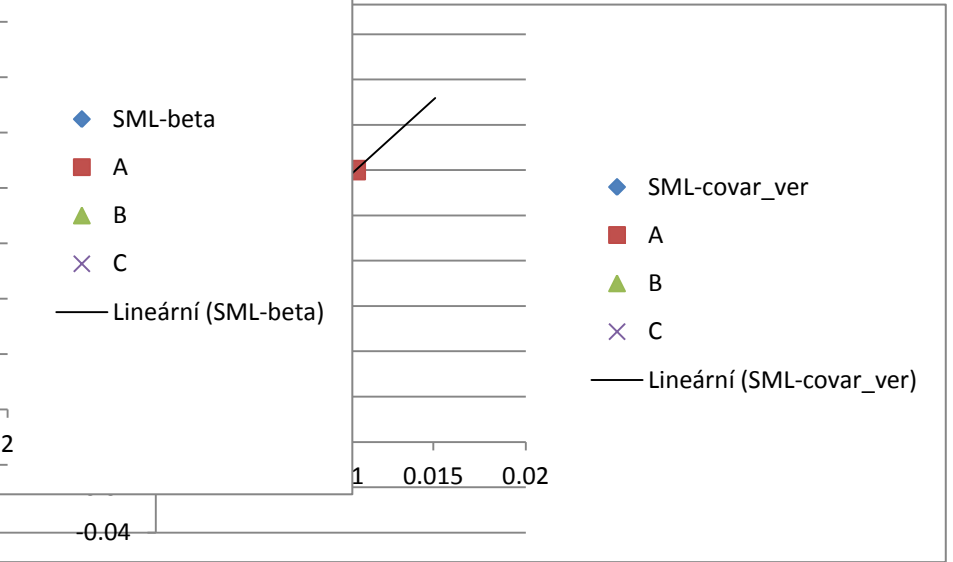
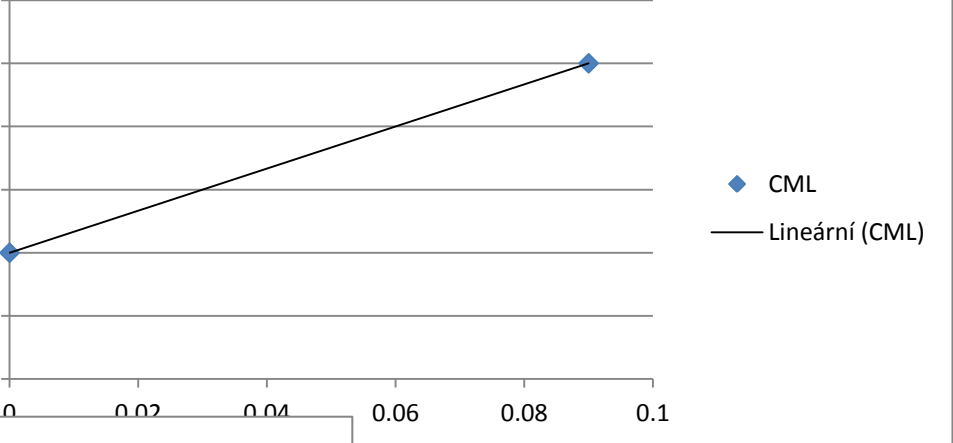
0.0108	0.12
-0.0027	
0.0054	

beta

1.333333
-0.333333
0.666667



CML

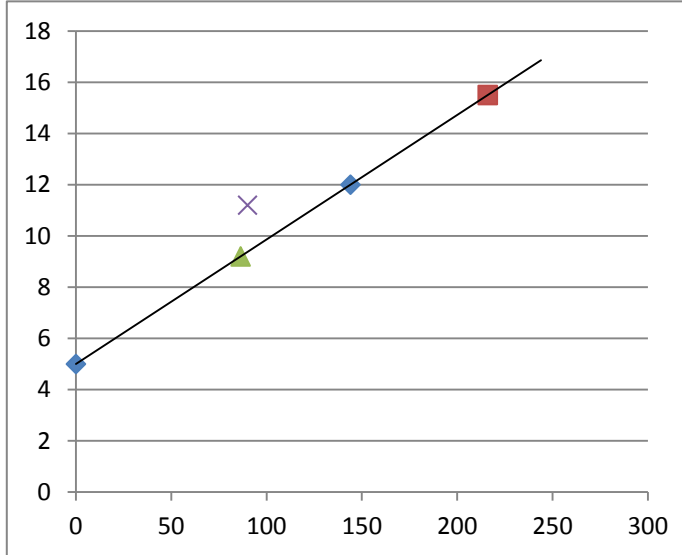


	r_i	korelaci a M	sigma i
C1	15.5	0.9	20
C2	9.2	0.8	9
C3	11.2	0.5	15
TP	12	1	12
rf	5	0	0

covar	beta	rie	delta
216	1.5	15.5	0
86.4	0.6	9.2	0
90	0.625	9.375	1.825
144			

covar

0	144
5	12



◆ SML_COVAR

■ C1

▲ C2

× C3

— Lineární (SML_COVAR)

den	Český Telecom	ČEZ	Komerční banka	UNIPETRO	IPB	PX50
1	570	98.4	669.1	53.9	103.5	333.4
2	569	98.2	715	53.8	103	338.9
3	563.8	96.6	725	53.2	101.9	346.8
4	575.3	96.5	716	53.9	100	347.8
5	595.1	97	725	55.6	101.6	350.9
6	602.8	98.4	727.5	57	101.2	348.1
7	601.8	99	716.6	54.7	102	349.4
8	601.3	105.4	721.5	55.6	101.6	354.2
9	614.8	116.9	718.6	55.9	101.7	361.1
10	628.1	119.6	717.8	56.5	100.5	372.7
11	629	113.2	729.5	56.4	103.4	371.6
12	618.6	109.5	702.6	54.9	102.3	395.9
13	638	105	750.8	55	102.8	397.6
14	656	104.9	789.7	56.6	99.8	406.1
15	662	105.3	799.1	56.9	101.4	400.7
16	669.4	105.7	805	56	100.9	396.6
17	700.7	108.5	870	56.7	95.3	398.2
18	709	110.3	937.6	57	65.7	400.9
19	713	112.6	948.8	56.8	99.4	399.1
20	708	113.9	951.5	56.5	99.2	401.1

Český Telecom		ČEZ
0.001757469	0.002037	
0.009223129	0.016563	
-0.019989571	0.001036	
-0.033271719	-0.00515	
-0.012773723	-0.01423	
0.001661682	-0.00606	
0.000831532	-0.06072	
-0.02195836	-0.09837	
-0.021174972	-0.02258	
-0.001430843	0.056537	
0.016812156	0.03379	
-0.030407524	0.042857	
-0.027439024	0.000953	
-0.009063444	-0.0038	
-0.011054676	-0.00378	
-0.044669616	-0.02581	
-0.011706629	-0.01632	
-0.005610098	-0.02043	
0.007062147	-0.01141	

E(ri) -0.011221162 -0.0071

0.03

19

0.00012

covar -7.40386E-05 -2E-05

beta alfa

Český Telecom ČEZ

-0.24846 -0.01359

beta -0.248455119 -0.06762

0.218382 0.004219

alfa -0.013590897 -0.00774

0.070753 0.015994

1.294382 17

0.000331 0.004349

n sumaXi
sumaXi

19 -0.18122
-0.181219693 0.007092

VPS

-0.213202084 -0.13489
0.000700801 0.000924

Český Telecom ČEZ

alfa -0.013590897 -0.00774

beta -0.248455119 -0.06762

Tangencialni portfolio

VPS

0.00026 0.00012 0.000247 0.000188 -0.00023
0.00012 0.001175 -9.5E-05 0.000168 -0.00011
0.000247 -9.5E-05 0.001014 0.000204 -0.00165
0.000188 0.000168 0.000204 0.000331 -0.00025
-0.00023 -0.00011 -0.00165 -0.00025 0.01791

-0.01134
-0.00722
-0.01799
-0.00244
0.010367

Zi

wi

7737.548	-424.385	-1365.14	-3401.1	-76.0046	-52.6242	1.301576
-424.385	985.5008	323.1143	-437.531	24.39365	-6.79272	0.168007
-1365.14	323.1143	1615.689	-284.16	129.0974	-13.8785	0.343263
-3401.1	-437.531	-284.16	5348.126	1.887143	33.8113	-0.83627
-76.0046	24.39365	129.0974	1.887143	66.91026	-0.947	0.023423
					-40.4311	1

Komerční t UNIPETROL IPB	PX50			
-0.0642	0.001859	0.004854	-0.016229	
-0.01379	0.011278	0.010795	-0.0227797	
0.01257	-0.01299	0.019	-0.0028752	
-0.01241	-0.03058	-0.01575	-0.0088344	
-0.00344	-0.02456	0.003953	0.00804367	
0.015211	0.042048	-0.00784	-0.0037207	
-0.00679	-0.01619	0.003937	-0.0135517	
0.004036	-0.00537	-0.00098	-0.0191083	
0.001115	-0.01062	0.01194	-0.0311242	
-0.01604	0.001773	-0.02805	0.00296017	
0.038286	0.027322	0.010753	-0.0613791	
-0.0642	-0.00182	-0.00486	-0.0042757	
-0.04926	-0.02827	0.03006	-0.0209308	
-0.01176	-0.00527	-0.01578	0.01347642	
-0.00733	0.016071	0.004955	0.01033787	
-0.07471	-0.01235	0.058762	-0.0040181	
-0.0721	-0.00526	0.450533	-0.0067348	
-0.0118	0.003521	-0.33903	0.00451015	
-0.00284	0.00531	0.002016	-0.0049863	
-0.01787	-0.00232	0.010487	-0.0095379	
-0.00014	-5.6E-05	-0.00028	0.000298	
Komerční t UNIPETROL IPB			0.000298	
-0.46452	-0.18726	-0.9335	1	
-0.0223	-0.00411	0.001584		

Covar_M

0.00026	0.00012
0.00012	0.001175
0.000247	-9.5E-05
0.000188	0.000168
-0.00023	-0.00011

Maticesoust

0.00052	0.000241
0.000241	0.00235
0.000494	-0.00019
0.000377	0.000335
-0.00046	-0.00023
1	1
3223.939	-335.133
-335.133	469.3112
-791.812	140.7297
-2020.82	-279.826
-76.1779	4.918477
0.521938	0.09951

sumaYi
sumaYiXi

0.069591	1.778152
1.778152	186.4306

-0.33946	-0.04408	0.19926
0.000746	-0.00058	-0.00691
Komerční t UNIPETROL IPB		
-0.0223	-0.00411	0.001584
-0.46452	-0.18726	-0.9335

1.301576	0.168007
0.00044	2.63E-05
2.63E-05	3.32E-05

Rp Sigma_p beta_p Syst_r Nest_r

-0.01974 0.022166 -0.35947 3.8506E-05 0.02128

0.00011 -5.5E-06
-0.00021 -2.4E-05
-7E-06 -4.5E-07

0.000491

						0.521938407	0.09951
						7.08272E-05	6.25E-06
0.000247	0.000188	-0.00023				6.24638E-06	1.16E-05
-9.5E-05	0.000168	-0.00011				1.14083E-05	-8.3E-07
0.001014	0.000204	-0.00165				2.54902E-05	4.32E-06
0.000204	0.000331	-0.00025				-3.7219E-06	-3.5E-07
-0.00165	-0.00025	0.01791					

Var_p 0.000211232

VPS

0.000494	0.000377	-0.00046	1	0
-0.00019	0.000335	-0.00023	1	0
0.002028	0.000408	-0.00329	1	0
0.000408	0.000663	-0.0005	1	0
-0.00329	-0.0005	0.03582	1	0
1	1	1	0	1

				wi	ri	Rp	Sigma_p
-791.812	-2020.82	-76.1779	0.521938	0.521938	-0.01122	-0.00842036	0.014534
140.7297	-279.826	4.918477	0.09951	0.09951	-0.0071		
789.3377	-196.337	58.08136	0.088422	0.088422	-0.01787		
-196.337	2514.996	-18.017	0.25923	0.25923	-0.00232		
58.08136	-18.017	31.19505	0.0309	0.0309	0.010487		
0.088422	0.25923	0.0309	-0.00042	-0.00042			

zk 1

0.343263 -0.83627 0.023423

0.00011 -0.00021 -7E-06
-5.5E-06 -2.4E-05 -4.5E-07

0.00012	-5.9E-05	-1.3E-05
-5.9E-05	0.000232	4.89E-06
-1.3E-05	4.89E-06	9.83E-06

0.088422 0.25923 0.030899876

1.14E-05 2.55E-05 -3.7219E-06
-8.3E-07 4.32E-06 -3.4915E-07
7.93E-06 4.67E-06 -4.5007E-06
4.67E-06 2.23E-05 -2.0017E-06
-4.5E-06 -2E-06 1.71005E-05

Beta_i	Beta_p	Syst_r	Nes.r
-0.24846	-0.25487	1.93573E-05	0.013852
-0.06762			
-0.46452			
-0.18726			
-0.9335			

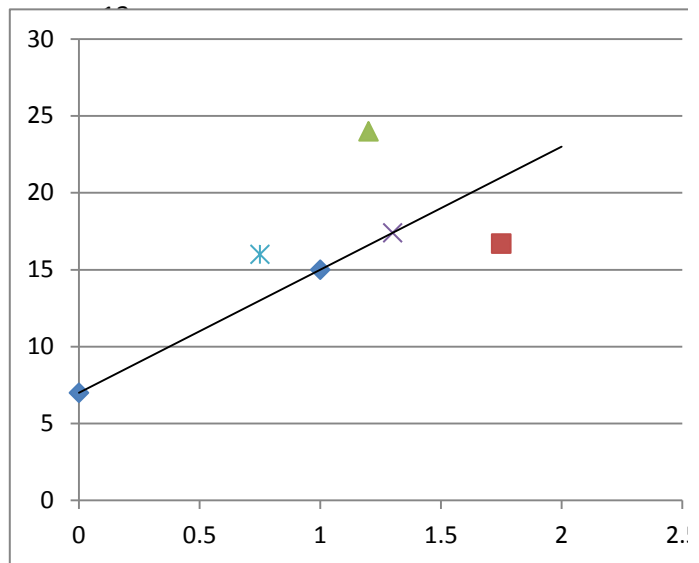
Cenný papír	β	r_i
C1	1.75	16.7
C2	1.2	24
C3	1.3	17.4
C4	0.75	16

$r_f = 7\%$
 $r_M = 15\%$

0 1
7 15

rie

21
16.6
17.4
16



◆ SML_beta

■ C1

▲ C2

× C3

✱ C4

— Lineární (SML_beta)

Rok	Tržní portfolio	Společnost S_1
1	8	8.1
2	0	3
3	14.9	5.3
4	5	1
5	4.1	3.1
6	8.9	3
7	10.1	5
8	5	3.2
9	1.5	1.2
10	2.4	1.3

Matice soustavy

10	59.9	
59.9	542.05	
0.2958	-0.03269	alfa
-0.03269	0.005457	beta

VPS

34.2
259.6
1.630606
0.29873

9
8
7
6
5
4
3
2
1
0

