

**Ceny akcií (denní):**

datum	CETV	CEZ	KOBA
1	1,916.00	1,089.00	4,206.00
2	1,827.00	1,072.00	4,498.00
3	1,843.00	1,074.00	4,478.00
4	1,849.00	1,082.00	4,458.00
5	1,860.00	1,086.00	4,438.00
6	1,871.00	1,092.00	4,418.00
7	1,777.00	1,200.00	4,698.00
8	1,893.00	1,093.00	4,378.00
9	1,904.00	1,102.00	4,358.00
10	1,915.00	1,107.00	4,338.00
11	1,926.00	1,099.00	4,298.00
12	2,237.00	1,202.00	4,008.00
13	1,953.00	1,009.00	4,278.00
14	1,959.00	1,114.00	4,273.00
15	1,970.00	1,123.00	4,268.00
16	1,981.00	1,140.00	4,263.00
17	1,892.00	1,159.00	4,258.00
18	2,003.00	1,303.00	4,253.00
19	2,009.00	1,186.00	4,548.00
20	2,025.00	1,224.00	4,243.00
21	2,036.00	1,226.00	4,238.00
22	2,147.00	1,219.00	4,233.00
23	2,058.00	1,018.00	4,228.00
24	2,074.00	1,246.00	4,023.00
25	2,080.00	1,273.00	4,218.00
26	2,091.00	1,255.00	4,213.00
27	2,002.00	1,261.00	4,208.00
28	2,113.00	1,267.00	4,203.00
29	2,119.00	1,273.00	4,198.00
30	2,135.00	1,279.00	4,193.00
31	2,146.00	1,285.00	4,188.00
32	2,007.00	1,091.00	4,583.00
33	2,168.00	1,297.00	4,178.00

34	2,284.00	1,513.00	4,073.00
35	2,190.00	1,309.00	4,236.00
36	2,201.00	1,315.00	4,230.00
37	2,012.00	1,321.00	4,224.00
38	2,223.00	1,327.00	4,018.00
39	2,229.00	1,333.00	4,212.00
40	2,245.00	1,339.00	4,206.00
41	2,256.00	1,345.00	4,200.00
42	2,367.00	1,251.00	4,194.00
43	2,278.00	1,357.00	4,188.00
44	2,294.00	1,363.00	4,182.00
45	2,300.00	1,369.00	4,176.00
46	2,311.00	1,375.00	4,390.00
47	2,022.00	1,351.00	4,164.00
48	2,333.00	1,387.00	4,158.00
49	2,339.00	1,393.00	4,152.00
50	2,355.00	1,399.00	4,146.00
51	2,366.00	1,405.00	4,140.00
52	2,477.00	1,411.00	4,334.00
53	2,388.00	1,417.00	4,128.00
54	2,394.00	1,423.00	4,122.00
55	2,410.00	1,529.00	4,116.00
56	2,421.00	1,435.00	4,110.00
57	2,132.00	1,441.00	4,004.00
58	2,443.00	1,447.00	4,098.00
59	2,454.00	1,453.00	4,092.00
60	2,470.00	1,459.00	4,086.00
61	2,476.00	1,465.00	4,280.00
62	2,487.00	1,301.00	4,074.00
63	2,698.00	1,477.00	4,068.00
64	2,509.00	1,483.00	4,062.00
65	2,520.00	1,489.00	4,056.00
66	2,531.00	1,755.00	4,050.00
67	2,542.00	1,501.00	4,044.00
68	2,553.00	1,507.00	3,938.00

69	2,464.00	1,513.00	4,032.00
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### Výnosy akcií (30-denní):

CETV	CEZ	KOBA
0.1200	0.1800	-0.0043
0.0985	0.0177	0.0189
0.1763	0.2076	-0.0670
0.2353	0.3983	-0.0864
0.1774	0.2053	-0.0455
0.1764	0.2042	-0.0426
0.1322	0.1008	-0.1009
0.1743	0.2141	-0.0822
0.1707	0.2096	-0.0335
0.1723	0.2096	-0.0304
0.1713	0.2238	-0.0228
0.0581	0.0408	0.0464
0.1664	0.3449	-0.0210
0.1710	0.2235	-0.0213
0.1675	0.2191	-0.0216
0.1666	0.2061	0.0298
0.0687	0.1657	-0.0221
0.1648	0.0645	-0.0223
0.1643	0.1745	-0.0871
0.1630	0.1430	-0.0229
0.1621	0.1460	-0.0231
0.1537	0.1575	0.0239
0.1603	0.3919	-0.0237
0.1543	0.1421	0.0246
0.1587	0.2011	-0.0242
0.1578	0.1434	-0.0244
0.0649	0.1427	-0.0485
0.1562	0.1421	-0.0250
0.1581	0.1414	-0.0253
0.1569	0.1407	-0.0255
0.1538	0.1401	0.0220
0.2392	0.1925	-0.1111
0.2445	0.1388	-0.0263

5,0

4,0

4,0

3,0

3,0

2,0

2,0

1,0

1,0

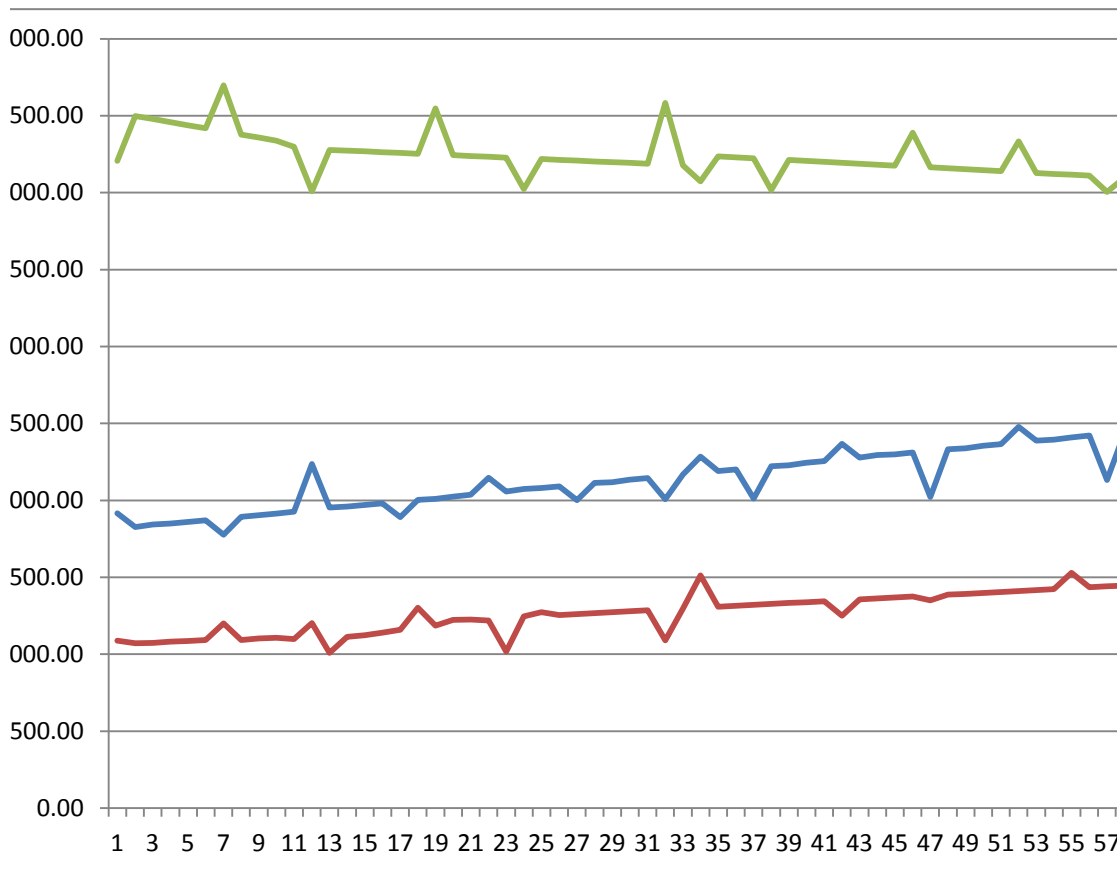
!

	0.0985	-0.0198	-0.0027	
	0.1507	0.1375	-0.0425	
	0.1499	0.3346	-0.0426	
	0.2634	0.1363	-0.0426	
	0.1484	0.1356	-0.0199	
	0.1054	0.1350	-0.0427	
Průměry:	0.1572	0.1752	-0.0287	0.0022
Rozptyly:	0.00185	0.00724	0.00118	0
Sm.Odch.:	0.04307	0.08511	0.03435	0



### Kovariance:

	CETV	CEZ	KOBA
CETV	0.0018549	0.0015251	-0.00060437
CEZ	0.0015251	0.0072433	-0.00095029
KOBA	-0.000604	-0.000950	0.00118019
ING kont	0	0	0



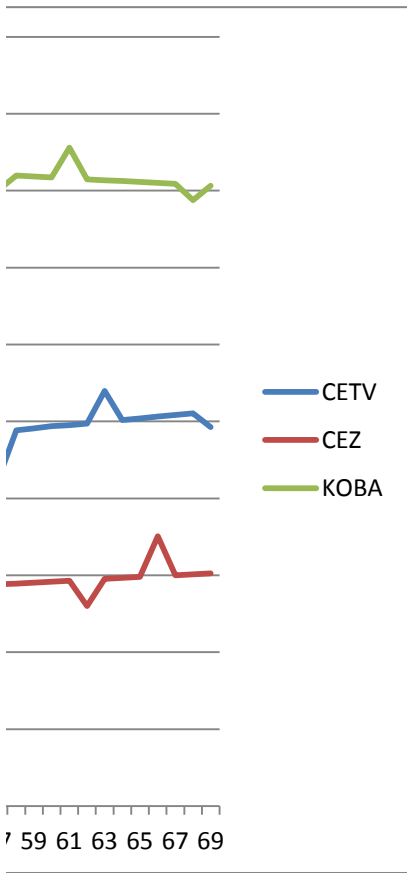






ING konte 0.00217

0
0
0
0



## Markowitzův model

Model používá 30-tidenní výnosy

Průměrné výnosy, tj  $R_i$ :

0.1572	0.1752	-0.0287
--------	--------	---------

Kov. matice, tj.  $S_{ij}$ :

	CETV	CEZ	KOBA
CETV	0.0019	0.0015	-0.0006
CEZ	0.0015	0.0072	-0.0010
KOBA	-0.0006	-0.0010	0.0012

$Z_i$ :

0.6117	0.0733	0.3149
--------	--------	--------

krátký prodej:

0	0	0
---	---	---

(Krátký prodej představuje "vypůjčení" akcií (tzv. krátkých p  
a za získané prostředky zakoupení jiných akcií (tzv. dlouhých

$Z_i * \text{Kov.mat.}$ :

0.0011	0.0012	-0.0001
--------	--------	---------

Výnos:

Zadaný výnos:

Riziko:

suma: 1 =

ozic) za účelem jejich okamžitého prodeje  
ch pozic))

0.10

## Sharpeův model

Model používá 30-tidenní výnosy

Průměry, tj.  $R_i$ :

0.1572	0.1752
--------	--------

Kovar. matice, tj.  $S_{ij}$ :

	CETV	CEZ
CETV	0.0019	0.0015
CEZ	0.0015	0.0072
KOBA	-0.0006	-0.0010

$Z_i$ :

0.6144	0.3856
--------	--------

krátký prodej:

0	0
---	---

$Z_i * \text{Kov.mat.}$ :

0.0017	0.0037
--------	--------

-0.0287

Výnos: 0.16416

KOBA  
-0.0006  
-0.0010  
0.0012

Riziko: 0.05

Zadané riziko: 0.05

0.0000 suma: 1 = 1

0

-0.0007

## Markowitzův CAPM model

Model používá 30-tidenní výnosy

Průměrné výnosy, tj  $R_i$ : 

0.1572	0.1752	-0.0287
--------	--------	---------

Kovar. matice, tj.  $S_{ij}$ : 

	CETV	CEZ	KOBA
CETV	0.0019	0.0015	-0.0006
CEZ	0.0015	0.0072	-0.0010
KOBA	-0.0006	-0.0010	0.0012
ING kont	0.0000	0.0000	0.0000

$Z_i$ : 

0.591	0.067	0.172
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krátký prodej: 

0	0	0
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$Z_i * \text{Kov.mat.}$ : 

0.0011	0.0012	-0.0002
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0.0022

Výnos: 0.1

Zadaný výnos:

ING konto  
0.0000  
0.0000  
0.0000  
0.0000

Riziko: 0.0263

0.171 suma: 1.000 = 1

0

0.0000

0.10

## Sharpeův CAPM model

Model používá 30-tidenní výnosy

Průměrné výnosy, tj  $R_i$ :

0.1572	0.1752	-0.0287
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Kovar. matice, tj.  $S_{ij}$ :

	CETV	CEZ	KOBA
CETV	0.0019	0.0015	-0.0006
CEZ	0.0015	0.0072	-0.0010
KOBA	-0.0006	-0.0010	0.0012
ING konto	0.0000	0.0000	0.0000

$Z_i$ :

0.614	0.386	0.000
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krátký prodej:

0	0	0
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$Z_i * \text{Kov.mat.}$ :

0.0017	0.0037	-0.0007
--------	--------	---------

0.0022

Výnos: 0.1642

ING konto
0.0000
0.0000
0.0000
0.0000

Riziko: 0.05

Zadané riziko: 0.05

0.000 suma: 1.000 = 1

0

0.0000

**Ceny akcií (denní):**

datu	CETV	CEZ	KOBA	PX
1	1,916.00	1,089.00	4,206.00	1,798.60
2	1,827.00	1,072.00	4,498.00	1,812.10
3	1,843.00	1,074.00	4,478.00	1,806.30
4	1,849.00	1,082.00	4,458.00	1,776.20
5	1,860.00	1,086.00	4,438.00	1,762.40
6	1,871.00	1,092.00	4,418.00	1,757.50
7	1,777.00	1,200.00	4,698.00	1,765.00
8	1,893.00	1,093.00	4,378.00	1,755.70
9	1,904.00	1,102.00	4,358.00	1,770.20
10	1,915.00	1,107.00	4,338.00	1,761.90
11	1,926.00	1,099.00	4,298.00	1,747.80
12	2,237.00	1,202.00	4,008.00	1,750.80
13	1,953.00	1,009.00	4,278.00	1,780.70
14	1,959.00	1,114.00	4,273.00	1,790.90
15	1,970.00	1,123.00	4,268.00	1,793.80
16	1,981.00	1,140.00	4,263.00	1,792.10
17	1,892.00	1,159.00	4,258.00	1,802.90
18	2,003.00	1,303.00	4,253.00	1,825.30
19	2,009.00	1,186.00	4,548.00	1,816.30
20	2,025.00	1,224.00	4,243.00	1,828.80
21	2,036.00	1,226.00	4,238.00	1,845.50
22	2,147.00	1,219.00	4,233.00	1,835.10
23	2,058.00	1,018.00	4,228.00	1,862.70
24	2,074.00	1,246.00	4,023.00	1,881.50
25	2,080.00	1,273.00	4,218.00	1,896.10
26	2,091.00	1,255.00	4,213.00	1,883.40
27	2,002.00	1,261.00	4,208.00	1,881.00
28	2,113.00	1,267.00	4,203.00	1,900.70
29	2,119.00	1,273.00	4,198.00	1,898.80
30	2,135.00	1,279.00	4,193.00	1,908.30
31	2,146.00	1,285.00	4,188.00	1,886.30
32	2,007.00	1,091.00	4,583.00	1,892.20
33	2,168.00	1,297.00	4,178.00	1,886.00

34	2,284.00	1,513.00	4,073.00	1,876.10
35	2,190.00	1,309.00	4,236.00	1,848.40
36	2,201.00	1,315.00	4,230.00	1,867.60
37	2,012.00	1,321.00	4,224.00	1,872.60
38	2,223.00	1,327.00	4,018.00	1,884.60
39	2,229.00	1,333.00	4,212.00	1,910.10
40	2,245.00	1,339.00	4,206.00	1,936.10
41	2,256.00	1,345.00	4,200.00	1,913.40
42	2,367.00	1,251.00	4,194.00	1,908.30
43	2,278.00	1,357.00	4,188.00	1,925.50
44	2,294.00	1,363.00	4,182.00	1,908.30
45	2,300.00	1,369.00	4,176.00	1,888.60
46	2,311.00	1,375.00	4,390.00	1,903.30
47	2,022.00	1,351.00	4,164.00	1,871.40
48	2,333.00	1,387.00	4,158.00	1,860.90
49	2,339.00	1,393.00	4,152.00	1,832.10
50	2,355.00	1,399.00	4,146.00	1,820.50
51	2,366.00	1,405.00	4,140.00	1,811.10
52	2,477.00	1,411.00	4,334.00	1,828.30
53	2,388.00	1,417.00	4,128.00	1,797.40
54	2,394.00	1,423.00	4,122.00	1,793.80
55	2,410.00	1,529.00	4,116.00	1,770.60
56	2,421.00	1,435.00	4,110.00	1,767.10
57	2,132.00	1,441.00	4,004.00	1,728.20
58	2,443.00	1,447.00	4,098.00	1,742.00
59	2,454.00	1,453.00	4,092.00	1,767.90
60	2,470.00	1,459.00	4,086.00	1,771.10
61	2,476.00	1,465.00	4,280.00	1,737.70
62	2,487.00	1,301.00	4,074.00	1,748.10
63	2,698.00	1,477.00	4,068.00	1,757.60
64	2,509.00	1,483.00	4,062.00	1,774.10
65	2,520.00	1,489.00	4,056.00	1,766.90
66	2,531.00	1,755.00	4,050.00	1,756.60
67	2,542.00	1,501.00	4,044.00	1,778.80
68	2,553.00	1,507.00	3,938.00	1,812.80

E(Xi)
Cov(Xi,PX)
Var(Xi)
BETAi
ALFAi
Var(ei)

69	2,464.00	1,513.00	4,032.00	1,842.70
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**Výnosy akcií (30-denní):**

CETV	CEZ	KOBA	PX	ING konto
0.1200	0.1800	-0.0043	0.0488	0.0022
0.0985	0.0177	0.0189	0.0442	0.0022
0.1763	0.2076	-0.0670	0.0441	0.0022
0.2353	0.3983	-0.0864	0.0562	0.0022
0.1774	0.2053	-0.0455	0.0488	0.0022
0.1764	0.2042	-0.0426	0.0626	0.0022
0.1322	0.1008	-0.1009	0.0610	0.0022
0.1743	0.2141	-0.0822	0.0734	0.0022
0.1707	0.2096	-0.0335	0.0790	0.0022
0.1723	0.2096	-0.0304	0.0989	0.0022
0.1713	0.2238	-0.0228	0.0947	0.0022
0.0581	0.0408	0.0464	0.0900	0.0022
0.1664	0.3449	-0.0210	0.0813	0.0022
0.1710	0.2235	-0.0213	0.0656	0.0022
0.1675	0.2191	-0.0216	0.0528	0.0022
0.1666	0.2061	0.0298	0.0621	0.0022
0.0687	0.1657	-0.0221	0.0380	0.0022
0.1648	0.0645	-0.0223	0.0195	0.0022
0.1643	0.1745	-0.0871	0.0087	0.0022
0.1630	0.1430	-0.0229	-0.0045	0.0022
0.1621	0.1460	-0.0231	-0.0186	0.0022
0.1537	0.1575	0.0239	-0.0037	0.0022
0.1603	0.3919	-0.0237	-0.0351	0.0022
0.1543	0.1421	0.0246	-0.0466	0.0022
0.1587	0.2011	-0.0242	-0.0662	0.0022
0.1578	0.1434	-0.0244	-0.0618	0.0022
0.0649	0.1427	-0.0485	-0.0812	0.0022
0.1562	0.1421	-0.0250	-0.0835	0.0022
0.1581	0.1414	-0.0253	-0.0689	0.0022
0.1569	0.1407	-0.0255	-0.0719	0.0022
0.1538	0.1401	0.0220	-0.0788	0.0022
0.2392	0.1925	-0.1111	-0.0762	0.0022
0.2445	0.1388	-0.0263	-0.0681	0.0022



0.0985	-0.0198	-0.0027	-0.0544	0.0022
0.1507	0.1375	-0.0425	-0.0441	0.0022
0.1499	0.3346	-0.0426	-0.0594	0.0022
0.2634	0.1363	-0.0426	-0.0501	0.0022
0.1484	0.1356	-0.0199	-0.0381	0.0022
0.1054	0.1350	-0.0427	-0.0353	0.0022
0.1572	0.1752	-0.0287	0.0021	0.0022
-0.0002	0.0011	0.0000	0.0037	0.0000
0.0019	0.0072	0.0012	0.0037	0.0000
-0.0894	0.1520	0.0079	1.0000	0.0000
0.1574	0.1749	-0.0287	0.0000	0.0022
0.0018	0.0072	0.0012	0.0000	0.0000

## Markowitzův Indexový model

Model používá 30-tidenní výnosy

$$R_{PF} = \sum (\alpha_i + \beta_i$$
$$\sigma_{PF}^2 = Var(F) \sum \sum$$
$$Var(X_i) - \beta_i^2 Var$$

Průměrné výnosy, tj Ri:

0.1572	0.1752	-0.0287	0.0022
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Kovariance s PX:

	CETV	CEZ	KOBA	ING kor	
PX	-0.0002	0.0011	0.0000	0.0037	
Koeficient BETAi:	BETA	-0.0894	0.8066	1.1853	0.0000
Koeficient ALFAi:	ALFA	0.0548	0.1267	0.0337	0.0000
Individ.riziko:	Var(ei)	0.0048	0.0026	-0.0034	0.0000

Zi:

0.1909	0.3943	0.0000	0.4148
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krátký prodej:

0	0	0	0
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Zi<sup>2</sup>:

0.0364	0.1555	0.0000	0.1720
--------	--------	--------	--------

(suma BETAi\*Zi)<sup>2</sup> =

0.0906

$$E(F)) Z_i$$

$$\sum \beta_i \beta_j Z_i Z_j + \sum Var(e_i) Z_i^2$$

$$\cdot(F) = Var(e_i)$$

Výnos:

PX
0.000

Riziko:

Zadaný výnos:

suma: 1.0000 =

## Sharpeův Indexový model

Model používá 30-tidenní výnosy

Průměrné výnosy, tj  $R_i$ :

0.1572	0.1752	-0.0287
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Kovariance s PX:

Koeficient  $BETA_i$ :

Koeficient  $ALFA_i$ :

Individ.riziko:

	CETV	CEZ	KOBA
PX	-0.0002	0.0011	0.0000
BETA	-0.0894	0.8066	1.1853
ALFA	0.0548	0.1267	0.0337
Var(ei)	0.0048	0.0026	-0.0034

$Z_i$ :

0.3689	0.6311	0.0000
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krátký prodej:

0	0	0
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$Z_i^2$ :

0.1361	0.3983	0.0000
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$(\text{suma } BETA_i * Z_i)^2 =$

0.2266

$$R_{PF} = \sum E(X_i) Z_i$$

$$\sigma^2_{PF} = Var(F) \sum \sum \beta_i \beta_j Z_i Z_j + \sum Var(e_i) Z_i^2$$

$$Var(X_i) - \beta_i^2 Var(F) = Var(e_i)$$

0.0022

Výnos:

0.16857

ING konto	PX
0.0037	0.004
0.0000	
0.0000	
0.0000	

Riziko:

0.05

Zadané riziko:

0.05

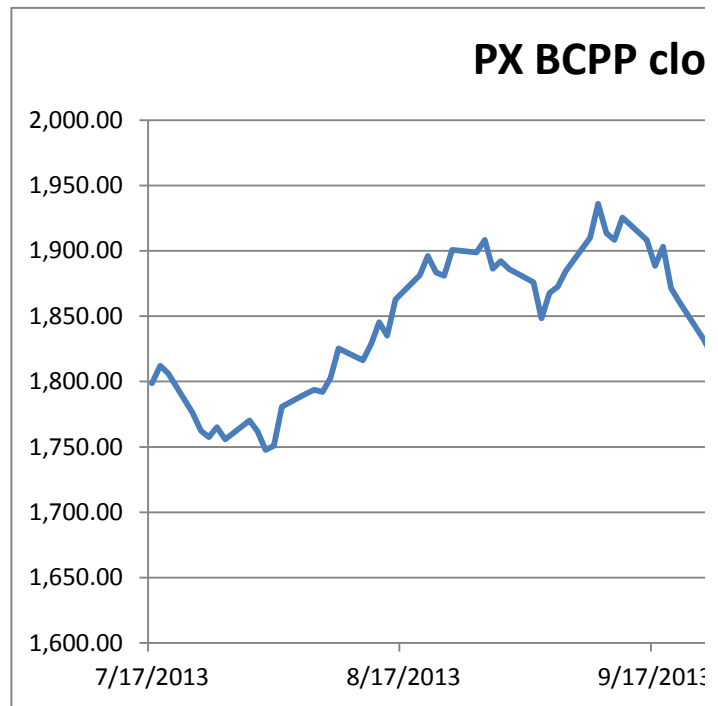
0.0000 suma: 1.0000 =

1

0

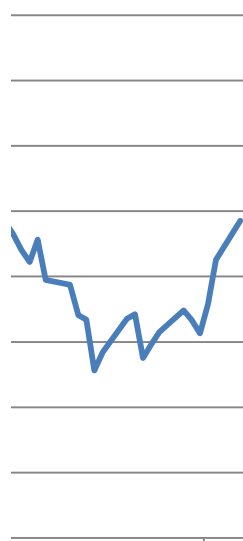
0.0000

Den	PX BCPP close
7/17/2013	1,798.60
7/18/2013	1,812.10
7/19/2013	1,806.30
7/22/2013	1,776.20
7/23/2013	1,762.40
7/24/2013	1,757.50
7/25/2013	1,765.00
7/26/2013	1,755.70
7/29/2013	1,770.20
7/30/2013	1,761.90
7/31/2013	1,747.80
8/1/2013	1,750.80
8/2/2013	1,780.70
8/5/2013	1,790.90
8/6/2013	1,793.80
8/7/2013	1,792.10
8/8/2013	1,802.90
8/9/2013	1,825.30
8/12/2013	1,816.30
8/13/2013	1,828.80
8/14/2013	1,845.50
8/15/2013	1,835.10
8/16/2013	1,862.70
8/19/2013	1,881.50
8/20/2013	1,896.10
8/21/2013	1,883.40
8/22/2013	1,881.00
8/23/2013	1,900.70
8/26/2013	1,898.80
8/27/2013	1,908.30
8/28/2013	1,886.30
8/29/2013	1,892.20
8/30/2013	1,886.00
9/2/2013	1,876.10
9/3/2013	1,848.40
9/4/2013	1,867.60
9/5/2013	1,872.60
9/6/2013	1,884.60
9/9/2013	1,910.10
9/10/2013	1,936.10
9/11/2013	1,913.40
9/12/2013	1,908.30
9/13/2013	1,925.50
9/16/2013	1,908.30
9/17/2013	1,888.60
9/18/2013	1,903.30
9/19/2013	1,871.40
9/20/2013	1,860.90
9/23/2013	1,832.10
9/24/2013	1,820.50
9/25/2013	1,811.10
9/26/2013	1,828.30
9/27/2013	1,797.40
9/30/2013	1,793.80
10/1/2013	1,770.60



10/2/2013	1,767.10
10/3/2013	1,728.20
10/4/2013	1,742.00
10/7/2013	1,767.90
10/8/2013	1,771.10
10/9/2013	1,737.70
10/10/2013	1,748.10
10/11/2013	1,757.60
10/14/2013	1,774.10
10/15/2013	1,766.90
10/16/2013	1,756.60
10/17/2013	1,778.80
10/18/2013	1,812.80
10/21/2013	1,842.70

se



PX BCPP close

3 10/17/2013



## Kataokův / VaR model

Model používá 30-tidenní výnosy

Alfa	1-Alfa	K_Alfa
0.05	0.95	-1.6449

Průměrné výnosy, tj Ri: 

0.1572	0.1752	-0.0287
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Kov. matice, tj. Sij: 

	CETV	CEZ	KOBA
CETV	0.0019	0.0015	-0.0006
CEZ	0.0015	0.0072	-0.0010
KOBA	-0.0006	-0.0010	0.0012

Zi: 

0.8673	0.1327	0.0000
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krátký prodej: 

0	0	0
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Zi\*Kov.mat.: 

0.0018	0.0023	-0.0007
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Výnos: 0.15962

Výnos R\_Alfa:

Riziko: 0.04329

suma: 1 = 1

**0.0884**

## Min-Risk model

Model používá 30-tidenní výnosy

Průměrné výnosy, tj  $R_i$ : 

0.1572	0.1752	-0.0287
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Kov. matice, tj.  $S_{ij}$ : 

	CETV	CEZ	KOBA
CETV	0.0019	0.0015	-0.0006
CEZ	0.0015	0.0072	-0.0010
KOBA	-0.0006	-0.0010	0.0012

$Z_i$ : 

0.8027	0.1973	0.0000
--------	--------	--------

krátký prodej: 

0	0	0
---	---	---

$Z_i * \text{Kov.mat.}$ : 

0.0018	0.0027	-0.0007
--------	--------	---------

Výnos: 0.16078

Zadaný výnos:

Riziko: 0.04427

Učel.fce:

Pravd.Zad.Výnosu:

suma:      1    =    1

0.12

**0.9210**

0.8215