

CVIČENÍ 4a

| | | | | | jednodenní | | |
|-----------|--------|--------------|-----------|--------|------------|-------------|-----------|
| | ČEZ | Philip Moris | Unipetrol | KB | ČEZ | Philip Mori | Unipetrol |
| 25.3.2005 | 420.41 | 19285 | 142 | 1175.2 | 0.0270184 | 0.0248167 | 0.0142857 |
| 24.3.2005 | 409.35 | 18818 | 140 | 1170.1 | 0.0341822 | 0.0427796 | 0.0517617 |
| 23.3.2005 | 395.82 | 18046 | 133.11 | 1145 | 0.0087927 | 0.0194904 | -0.010996 |
| 22.3.2005 | 392.37 | 17701 | 134.59 | 1147.6 | 0.0360151 | 0.0204658 | 0.0656374 |
| 21.3.2005 | 378.73 | 17346 | 126.3 | 1117.4 | -0.041869 | -0.030571 | -0.056406 |
| 18.3.2005 | 395.28 | 17893 | 133.85 | 1137.7 | -0.011058 | 0.0030833 | 0.0546013 |
| 17.3.2005 | 399.7 | 17838 | 126.92 | 1131.7 | -0.025431 | 0.0050144 | -0.081953 |
| 16.3.2005 | 410.13 | 17749 | 138.25 | 1143.4 | -0.064975 | -0.06214 | -0.114917 |
| 15.3.2005 | 438.63 | 18925 | 156.2 | 1214.1 | -0.021985 | -0.00604 | -0.087564 |
| 14.3.2005 | 448.49 | 19040 | 171.19 | 1220.1 | -0.037699 | 0.0316428 | -0.191737 |
| 11.3.2005 | 466.06 | 18456 | 211.8 | 1255.8 | 0.0149832 | -0.016362 | 0.0207229 |
| 10.3.2005 | 459.18 | 18763 | 207.5 | 1262.7 | 0.0226498 | -0.003082 | 0.0333665 |
| 9.3.2005 | 449.01 | 18821 | 200.8 | 1250.1 | 0.0107602 | 0.0037331 | 0.0709333 |
| 8.3.2005 | 444.23 | 18751 | 187.5 | 1240.9 | 0.0162191 | -0.000267 | 0.0152697 |
| 7.3.2005 | 437.14 | 18756 | 184.68 | 1250.4 | 0.0332325 | 0.0029947 | 0.024975 |
| 4.3.2005 | 423.08 | 18700 | 180.18 | 1217.6 | 0.0053705 | -0.001335 | -0.033887 |
| 3.3.2005 | 420.82 | 18725 | 186.5 | 1205.1 | -0.017419 | -0.043227 | 0.0146899 |
| 2.3.2005 | 428.28 | 19571 | 183.8 | 1211.3 | -0.004185 | 0.0107943 | -0.017375 |
| 1.3.2005 | 430.08 | 19362 | 187.05 | 1212.9 | 0.0029617 | 0.0008788 | 0.0360585 |
| 28.2.2005 | 428.81 | 19345 | 180.54 | 1199.9 | 0.0297783 | 0.0200369 | 0.059507 |
| 25.2.2005 | 416.41 | 18965 | 170.4 | 1187.9 | 0.0071349 | 0.0015844 | 0.0062002 |
| 24.2.2005 | 413.46 | 18935 | 169.35 | 1171.9 | -0.016672 | 0.0076632 | 0.0057011 |
| 23.2.2005 | 420.47 | 18791 | 168.39 | 1174 | 0.0185064 | 0.0085878 | -0.040185 |
| 22.2.2005 | 412.83 | 18631 | 175.44 | 1176.6 | 0.032798 | 0.0054506 | 0.1515589 |
| 21.2.2005 | 399.72 | 18530 | 152.35 | 1161.2 | 0.0155746 | -0.01885 | 0.0866619 |
| 18.2.2005 | 393.59 | 18886 | 140.2 | 1147.9 | 0.0235346 | 0.0016441 | 0.022313 |
| 17.2.2005 | 384.54 | 18855 | 137.14 | 1139.7 | -0.008099 | 0.0018597 | 0.0043943 |
| 16.2.2005 | 387.68 | 18820 | 136.54 | 1148.6 | -0.002727 | -0.002544 | 0.0242292 |
| 15.2.2005 | 388.74 | 18868 | 133.31 | 1142.4 | 0.0004632 | -0.00438 | 0.0390491 |
| 14.2.2005 | 388.56 | 18951 | 128.3 | 1141.6 | 0.0071279 | -0.021934 | 0.0194676 |
| 11.2.2005 | 385.81 | 19376 | 125.85 | 1135.6 | 0.0263907 | -0.017145 | 0.0418909 |
| 10.2.2005 | 375.89 | 19714 | 120.79 | 1118 | 0.0195286 | -0.011433 | -0.031278 |
| 9.2.2005 | 368.69 | 19942 | 124.69 | 1121.1 | 0.0054542 | 0.0013055 | 0.0016066 |
| 8.2.2005 | 366.69 | 19916 | 124.49 | 1118.1 | 0.0149745 | 0.0132791 | 0.0076083 |
| 7.2.2005 | 361.28 | 19655 | 123.55 | 1108.8 | 0.0200751 | 0.0346915 | 0.0190531 |
| 4.2.2005 | 354.17 | 18996 | 121.24 | 1105.3 | 0.0063935 | -0.00742 | -0.043094 |
| 3.2.2005 | 351.92 | 19138 | 126.7 | 1106.7 | 0.002564 | 0.0179246 | -0.005807 |
| 2.2.2005 | 351.02 | 18801 | 127.44 | 1102.7 | 0.0040043 | -0.000266 | -0.000392 |
| 1.2.2005 | 349.62 | 18806 | 127.49 | 1106.6 | -0.005292 | 0.0211772 | -0.02672 |
| 31.1.2005 | 351.48 | 18416 | 130.99 | 1096.2 | -0.007119 | -0.000217 | 0.0327184 |
| 28.1.2005 | 354 | 18420 | 126.84 | 1102.2 | 0.0016694 | 0.0173985 | 0.0371218 |
| 27.1.2005 | 353.41 | 18105 | 122.3 | 1094.2 | -0.003187 | 0.0167921 | 0.0041051 |
| 26.1.2005 | 354.54 | 17806 | 121.8 | 1098.3 | 0.0009317 | 0.0180675 | -0.025132 |
| 25.1.2005 | 354.21 | 17490 | 124.94 | 1094.4 | 0.0217203 | -0.003476 | 0.0643155 |
| 24.1.2005 | 346.68 | 17551 | 117.39 | 1063.2 | -0.002159 | 0.000114 | 0.0699052 |
| 21.1.2005 | 347.43 | 17549 | 109.72 | 1056.2 | -0.00023 | 0.0057886 | 0.061738 |
| 20.1.2005 | 347.51 | 17448 | 103.34 | 1053.3 | -0.016611 | -0.006604 | 0.0038858 |
| 19.1.2005 | 353.38 | 17564 | 102.94 | 1061.1 | -0.005768 | -0.023734 | 0.0039009 |
| 18.1.2005 | 355.43 | 17991 | 102.54 | 1068.5 | | | |

ri 0.0037151 0.0016257 0.0083706

roční rf 0.034

počet obchodních dnů 252

Úloha:

1. Vypočítat jednodenní a dvoudenní výnosnosti CP

2. Určit kovariance a riziko změny výnosnosti CP
3. Vypočítat jednodenní, dvoudenní výnosnost portfolia a podíly CP v portfoliu (sell short je povolen)
4. stejně jako 3. a navíc $R_f = 0.034$ p.a.

| | ČEZ | Philip Mori | Unipetrol |
|-------------|-----------|-------------|-----------|
| ČEZ | 0.0004181 | 0.0001676 | 0.0007439 |
| Philip Mori | 0.0001676 | 0.0003522 | 0.000106 |
| Unipetrol | 0.0007439 | 0.000106 | 0.0030271 |
| KB | 0.0002323 | 0.0001136 | 0.0005299 |
| | 0.0008362 | 0.0003351 | 0.0014877 |
| | 0.0003351 | 0.0007043 | 0.0002119 |
| | 0.0014877 | 0.0002119 | 0.0060542 |
| | 0.0004647 | 0.0002272 | 0.0010598 |
| | 1 | 1 | 1 |
| | 3978.5614 | -647.879 | -425.5221 |
| | -647.879 | 2002.5544 | 371.40805 |
| | -425.5221 | 371.40805 | 325.02557 |
| | -2905.16 | -1726.083 | -270.9115 |
| | -0.126676 | 0.1202054 | -0.126309 |
| | 8074.7537 | -1407.38 | -733.7547 |
| | -1407.38 | 4111.029 | 631.51812 |
| | -733.7547 | 631.51812 | 767.00003 |
| | -6862.213 | -2454.008 | -1590.662 |

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0.0219214
-0.002266
0.027027
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-0.005464
0.0100792
0.007414
-0.007598
0.0269382
0.0103726
-0.005118
-0.001319
0.0108342
0.0101019
0.013653
-0.001789
-0.00221
0.0132621
0.0115864
0.0071949
-0.007749
0.0054272
0.0007008
0.0052836
0.0157424
-0.002765
0.0026831
0.0083874
0.0031666
-0.001265
0.0036275
-0.003524
0.0094873
-0.005444
0.0073113
-0.003733
0.0035636
0.0293454
0.0066275
0.0027533
-0.007351
-0.006926

rf
0.0020829 0.0001349

dvoudenní
ČEZ Filip Mori
0.0621242 0.0686579
0.0432755 0.0631038
0.0451245 0.0403551
-0.007362 -0.01073
-0.052464 -0.027582
-0.036208 0.0081131
-0.088754 -0.057437
-0.085531 -0.067805
-0.058855 0.0254118
-0.023281 0.0147631
0.0379724 -0.019393
0.0336537 0.00064
0.0271538 0.0034656
0.0499905 0.0027273
0.0387814 0.0016555
-0.012142 -0.044505
-0.021531 -0.032899
-0.001236 0.0116826
0.0328282 0.0209333
0.0371257 0.021653
-0.009656 0.0092598
0.0015261 0.0163169
0.0519113 0.0140853
0.0488834 -0.013502
0.0394757 -0.017237
0.0152445 0.0035069
-0.010804 -0.000689
-0.002265 -0.006913
0.0075944 -0.026218
0.0337067 -0.038703
0.0464347 -0.028382
0.0250893 -0.010143
0.0205104 0.0146019
0.0353503 0.0484312
0.026597 0.0270143
0.0089738 0.0103718
0.0065786 0.0176539
-0.001309 0.0209057
-0.012373 0.0209555
-0.005461 0.0171776
-0.001523 0.0344828
-0.002259 0.035163
0.0226722 0.0145291
0.0195147 -0.003362
-0.002388 0.0059033
-0.016837 -0.000854
-0.022283 -0.030182

0.00731 0.0033401

| KB | | výnosnosti | | ČEZ | Philip Mori |
|-----------|--|-------------|-----------|-----------|-------------|
| 0.0002323 | | ČEZ | 0.0037151 | 0.0011575 | 0.0004246 |
| 0.0001136 | | Philip Mori | 0.0016257 | 0.0004246 | 0.0007801 |
| 0.0005299 | | Unipetrol | 0.0083706 | 0.0020756 | 0.0003954 |
| 0.0001934 | | KB | 0.0020829 | 0.0005976 | 0.0002477 |

| | | vektor pravých stran | | | |
|-----------|---|----------------------|---|-----------|-----------|
| 0.0004647 | 1 | | 0 | 0.002315 | 0.0008492 |
| 0.0002272 | 1 | | 0 | 0.0008492 | 0.0015602 |
| 0.0010598 | 1 | | 0 | 0.0041512 | 0.0007908 |
| 0.0003869 | 1 | | 0 | 0.0011952 | 0.0004953 |
| 1 | 0 | | 1 | 1 | 1 |

| | | minimální riziko bez bezrizikové | | | |
|-----------|-----------|----------------------------------|-----------|-----------|-----------|
| -2905.16 | -0.126676 | ČEZ | -0.126676 | výnosnost | 0.10% |
| -1726.083 | 0.1202054 | Philip Mori | 0.1202054 | riziko | 1.17% |
| -270.9115 | -0.126309 | Unipetrol | -0.126309 | | |
| 4902.1552 | 1.1327795 | KB | 1.1327795 | | |
| 1.1327795 | -0.000273 | | -0.000273 | | |
| | | | | 1515.9298 | -221.9602 |
| | | | | -221.9602 | 883.54454 |
| | | | | -178.2969 | 156.59744 |
| | | | | -1115.673 | -818.1818 |
| | | | | -0.247366 | 0.091378 |

| | | vektor pravých stran | | | |
|-----------|--|----------------------|-----------|-----------|-----------|
| -6862.213 | | | 0.0035802 | 3296.3386 | -541.6202 |
| -2454.008 | | | 0.0014908 | -541.6202 | 1803.1798 |
| -1590.662 | | | 0.0082357 | -203.2995 | 256.56728 |
| 19210.663 | | | 0.001948 | -3620.602 | -1123.166 |

| | Z | X | |
|-------------|-----------|-----------|-----------|
| ČEZ | 7.4007436 | 1.1317753 | výnosnost |
| Philip Mori | 1.5105853 | 0.2310097 | 0.53% |
| Unipetrol | 1.5327186 | 0.2343944 | riziko |
| KB | -3.90499 | -0.597179 | 2.81% |
| | 6.5390572 | | |

| Unipetrol | KB |
|-----------|-----------|
| 0.0667869 | 0.0263755 |
| 0.0401962 | 0.0196061 |
| 0.0539192 | 0.0247002 |
| 0.0055286 | 0.0087018 |
| -0.004885 | -0.012636 |
| -0.031826 | -0.004985 |
| -0.187452 | -0.067869 |
| -0.192418 | -0.062864 |
| -0.262512 | -0.033206 |
| -0.174988 | -0.033737 |
| 0.0547809 | 0.0045596 |
| 0.1066667 | 0.0175679 |
| 0.0872861 | -0.00024 |
| 0.040626 | 0.019136 |
| -0.009759 | 0.0375902 |
| -0.019695 | 0.005201 |
| -0.00294 | -0.006431 |
| 0.0180569 | 0.0095008 |
| 0.0977113 | 0.0210455 |
| 0.0660762 | 0.0238928 |
| 0.0119366 | 0.0118399 |
| -0.034713 | -0.003995 |
| 0.1052839 | 0.0110231 |
| 0.2513552 | 0.0250022 |
| 0.1109086 | 0.0188646 |
| 0.0268053 | -0.000609 |
| 0.02873 | -0.002363 |
| 0.0642245 | 0.0061317 |
| 0.0592769 | 0.005988 |
| 0.062174 | 0.0211091 |
| 0.0093031 | 0.0129337 |
| -0.029721 | -8.94E-05 |
| 0.009227 | 0.0110931 |
| 0.0268063 | 0.0115806 |
| -0.024862 | 0.0018975 |
| -0.04865 | 0.0023578 |
| -0.006197 | 9.037E-05 |
| -0.027101 | 0.0059296 |
| 0.0051246 | 0.003992 |
| 0.0710548 | 0.0018278 |
| 0.0413793 | 0.0035509 |
| -0.02113 | -0.000183 |
| 0.0375671 | 0.0330135 |
| 0.1387167 | 0.0361674 |
| 0.135959 | 0.009399 |
| 0.0658636 | -0.004618 |
| 0.0078018 | -0.014226 |

rf

0.0176231 0.0043323 0.0002698

| Unipetrol | KB | | výnosnosti |
|-----------|-----------|--|-----------------------|
| 0.0020756 | 0.0005976 | | ČEZ 0.00731 |
| 0.0003954 | 0.0002477 | | Philip Mori 0.0033401 |
| 0.007719 | 0.0013971 | | Unipetrol 0.0176231 |
| 0.0013971 | 0.0004286 | | KB 0.0043323 |

| | | | |
|-----------|-----------|---|---|
| 0.0041512 | 0.0011952 | 1 | 0 |
| 0.0007908 | 0.0004953 | 1 | 0 |
| 0.015438 | 0.0027942 | 1 | 0 |
| 0.0027942 | 0.0008571 | 1 | 0 |
| 1 | 1 | 0 | 1 |

| | | | | | | |
|-----------|-----------|-----------|-------------|-----------|-----------|-------|
| -178.2969 | -1115.673 | -0.247366 | ČEZ | -0.247366 | výnosnost | 0.16% |
| 156.59744 | -818.1818 | 0.091378 | Philip Mori | 0.091378 | riziko | 1.52% |
| 134.37905 | -112.6796 | -0.143375 | Unipetrol | -0.143375 | | |
| -112.6796 | 2046.53 | 1.2993629 | KB | 1.2993629 | | |
| -0.143375 | 1.29936 | -0.000463 | | -0.000463 | | |

| | | vektor pravých stran | |
|-----------|-----------|----------------------|-----------|
| -203.2995 | -3620.602 | | 0.0070402 |
| 256.56728 | -1123.166 | | 0.0030703 |
| 357.60876 | -1030.584 | | 0.0173532 |
| -1030.584 | 11390.556 | | 0.0040625 |

| | Z | X | |
|-------------|-----------|-----------|-----------|
| ČEZ | 3.3074543 | 0.5754948 | výnosnost |
| Philip Mori | 1.6125652 | 0.2805852 | 0.89% |
| Unipetrol | 1.3754045 | 0.2393195 | riziko |
| KB | -0.548275 | -0.0954 | 3.89% |
| | 5.7471488 | | |