

rf 0.04
rm 0.1
sigma_m 0.09

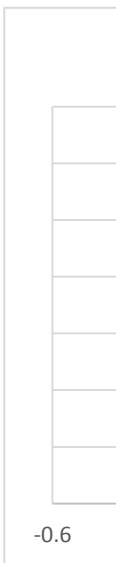
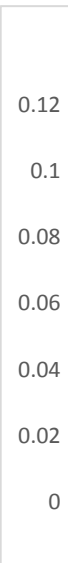
covar_i,m
1 0.0108
2 -0.0027
3 0.0054

Beta_i
1 1.333333
2 -0.333333
3 0.666667

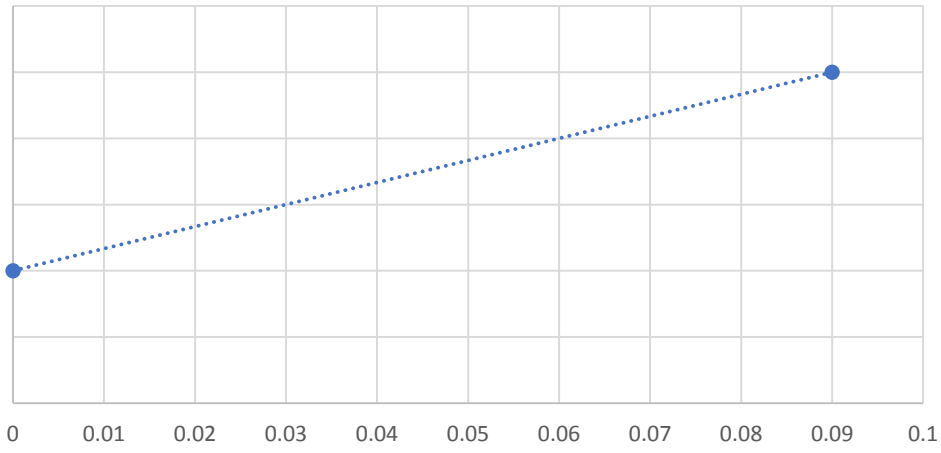
r_ei
1 0.12
2 0.02
3 0.08

x rm rf
y 0.09 0
0.1 0.04

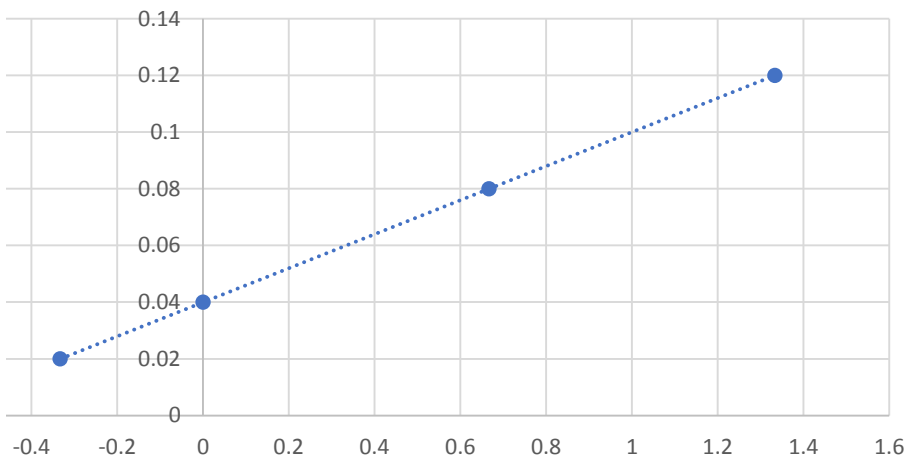
x rf r1 r2 r3
y 0 1.333333 -0.333333 0.666667
0.04 0.12 0.02 0.08



CML



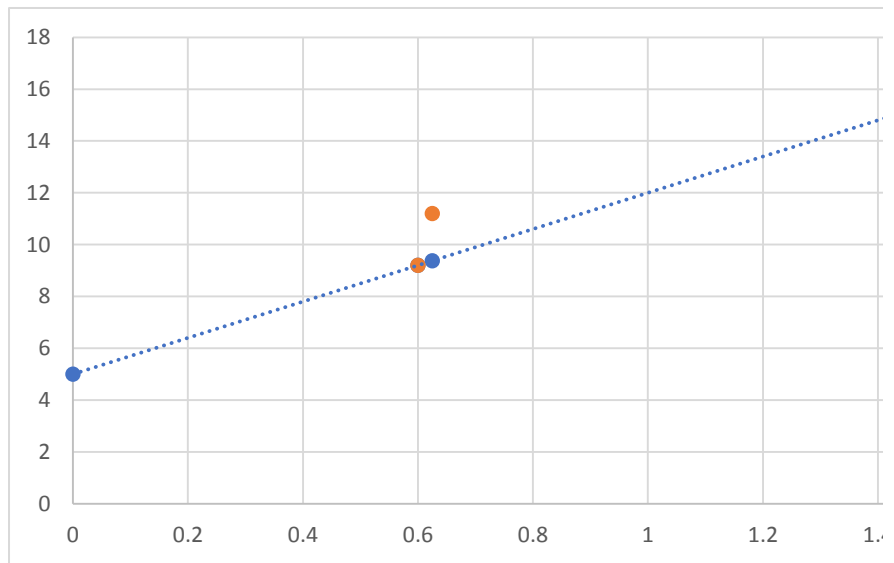
SML



	r_i	correlation a M	σ_i
S1	15.5	0.9	20
S2	9.2	0.8	9
S3	11.2	0.5	15
MP	12	1	12
rf	5	0	0

cov _{i,m}	beta _i	r _{ei}	Delta _i
216	1.5	15.5	0
86.4	0.6	9.2	0
90	0.625	9.375	1.825
144	1		

	rf	s1	s2	s3
x	0	1.5	0.6	0.625
y	5	15.5	9.2	9.375
		15.5	9.2	11.2



beta_i
r_ei
r_i



Day	A	B	C	D	E	Market Ind
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

A	B
-0.001755927	-0.00203
-0.009180855	-0.01643
0.020192065	-0.00104
0.033837815	0.005168
0.012856008	0.01433
-0.001660303	0.006079
-0.000831186	0.062643
0.022203034	0.103556
0.021402378	0.022834
0.001431867	-0.055
-0.016672396	-0.03323
0.030879423	-0.04196
0.027822506	-0.00095
0.009104767	0.003806
0.011116233	0.003791
0.045698047	0.026145
0.011775691	0.016454
0.005625894	0.020638
-0.007037327	0.011479
0.011410933	0.007699
Covar_i,m	-7.66363E-05
Beta_i	-0.246231127

rf 0.03 p.a.
0.000119 p.d. assume 252day/year

CovMatrix

0.000267119	0.000122
0.000122378	0.001223
0.000257158	-0.00011
0.000190277	0.000168
-0.000253024	-1.4E-05

MinVariance

0.000534238	0.000245
0.000244757	0.002447
0.000514316	-0.00021
0.000380554	0.000337
-0.000506048	-2.7E-05
1	1

InvMatrix

3135.688208	-308.358
-308.3583546	450.2518
-723.9039686	127.2655
-2041.711841	-269.301
-61.71404383	0.141659
0.518336137	0.091635

Tangency Portfolio

	CovarM		
ri		0.000267119	0.000122
0.011411		0.000122378	0.001223
0.007699		0.000257158	-0.00011
0.018532		0.000190277	0.000168
0.002479		-0.000253024	-1.4E-05
-0.00223			
	InvM	7518.836014	-396.182
		-396.1822772	939.4912
		-1270.206012	285.9287
		-3395.350697	-416.959
		-50.43558186	13.18743

C	D	E	Market Index
0.066349	-0.00186	-0.00484	0.016362
0.013889	-0.01122	-0.01074	0.023043
-0.01249	0.013072	-0.01882	0.002879
0.012491	0.031053	0.015873	0.008874
0.003442	0.024868	-0.00394	-0.00801
-0.0151	-0.04119	0.007874	0.003728
0.006815	0.016319	-0.00393	0.013644
-0.00403	0.005381	0.000984	0.019293
-0.00111	0.010676	-0.01187	0.031619
0.016168	-0.00177	0.028447	-0.00296
-0.03757	-0.02696	-0.0107	0.063344
0.066352	0.00182	0.004876	0.004285
0.050514	0.028676	-0.02962	0.021153
0.011833	0.005286	0.015905	-0.01339
0.007356	-0.01594	-0.00494	-0.01028
0.077651	0.012423	-0.0571	0.004026
0.07483	0.005277	-0.37193	0.006758
0.011875	-0.00351	0.414053	-0.0045
0.002842	-0.0053	-0.00201	0.004999
0.018532	0.002479	-0.00223	0.00973
-0.00014	-5.8E-05	-0.00035	0.000311
-0.46036	-0.18606	-1.12845	1

0.000257	0.00019	-0.00025
-0.00011	0.000168	-1.4E-05
0.001071	0.000203	-0.0015
0.000203	0.00033	-0.00026
-0.0015	-0.00026	0.017557

wi

vrs

0.000514	0.000381	-0.00051	1	0
-0.00021	0.000337	-2.7E-05	1	0
0.002143	0.000407	-0.00299	1	0
0.000407	0.000659	-0.00052	1	0
-0.00299	-0.00052	0.035114	1	0
1	1	1	0	1

wi

Rp

-723.904	-2041.71	-61.714	0.518336	0.518336
127.2655	-269.301	0.141659	0.091635	0.091635
713.6363	-162.924	45.92632	0.073796	0.073796
-162.924	2488.709	-14.7721	0.285904	0.285904
45.92632	-14.7721	30.41821	0.030329	0.030329
0.073796	0.285904	0.030329	-0.00043	LAMBDA1 -0.00043

0.008629

beta_P

SysVarP

UnsVarP

1

			vrs		w_i	
0.000257	0.00019	-0.00025		0.011292		
-0.00011	0.000168	-1.4E-05		0.00758		
0.001071	0.000203	-0.0015		0.018413		
0.000203	0.00033	-0.00026		0.00236		
-0.0015	-0.00026	0.017557		-0.00235		
			Z_i	w_i	Rp	
-1270.21	-3395.35	-50.4356	1	50.61484	1.281005	0.020282
285.9287	-416.959	13.18743	2	6.897144	0.174559	beta_p
1452.558	-227.887	102.2446	3	13.7916	0.34905	SysVarP
-227.887	5356.944	10.71687	4	-33.077	-0.83714	UnsVarP
102.2446	10.71687	65.10743	5	1.285201	0.032527	
sum_Z_i				39.51182	1	

0.518336137	0.091635	0.073796	0.285904	0.030329
7.17675E-05	5.81E-06	9.84E-06	2.82E-05	-4E-06
5.8127E-06	1.03E-05	-7.2E-07	4.41E-06	-3.8E-08
9.83657E-06	-7.2E-07	5.83E-06	4.29E-06	-3.3E-06
2.81979E-05	4.41E-06	4.29E-06	2.69E-05	-2.3E-06
-3.9777E-06	-3.8E-08	-3.3E-06	-2.3E-06	1.62E-05

VarP	SigmaP	ratio
0.000215376	0.014676	0.587975
-0.25492994		
2.02271E-05		
0.000195149		

1.281004945	0.174559	0.34905	-0.83714	0.032527
0.000438335	2.74E-05	0.000115	-0.0002	-1.1E-05
2.73652E-05	3.73E-05	-6.5E-06	-2.5E-05	-7.7E-08
0.000114984	-6.5E-06	0.000131	-5.9E-05	-1.7E-05
-0.00020405	-2.5E-05	-5.9E-05	0.000231	7.08E-06
-1.0543E-05	-7.7E-08	-1.7E-05	7.08E-06	1.86E-05

VarP	SigmaP	ratio
0.000510292	0.02259	0.897828
-0.36831598		
4.22214E-05		
0.000468071		