

FINAL PROJECT

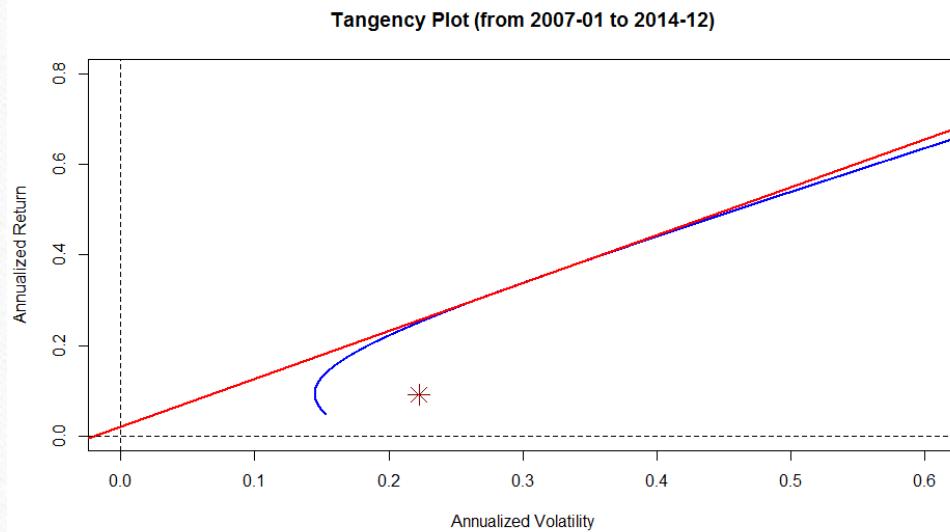
AAPL, XOM, MSFT, JNJ, GE, WFC, PG, JPM, CVX, VZ, PFE, INTC, BAC, T, MRK, KO, C, IBM, GOOGL, GILD

Ricky Cherival, Wen Dai, Jing Shuai, Jose Zuniga

STA9713 Financial Statistics

PORTFOLIO BENCHMARK

- Period
 - start = "2007-01-01"
 - end = "2014-12-01"
- SPDR S&P 500 ETF (SPY)
 - Mean = 0.09166378
 - Standard Deviation = 0.2224576
 - Sharpe Ratio = 0.3221458
 - Maximum Draw Down = 1.852949



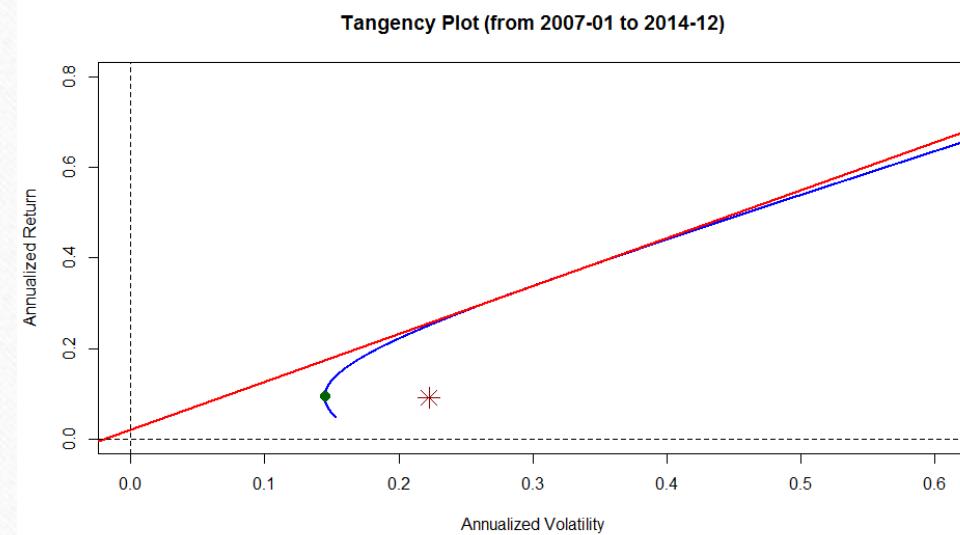
Minimum Variance Portfolio

Mean = 0.09305468

Standard Deviation = 0.1450562

Sharpe Ratio = 0.5036302

Maximum Draw Down = 2.968063



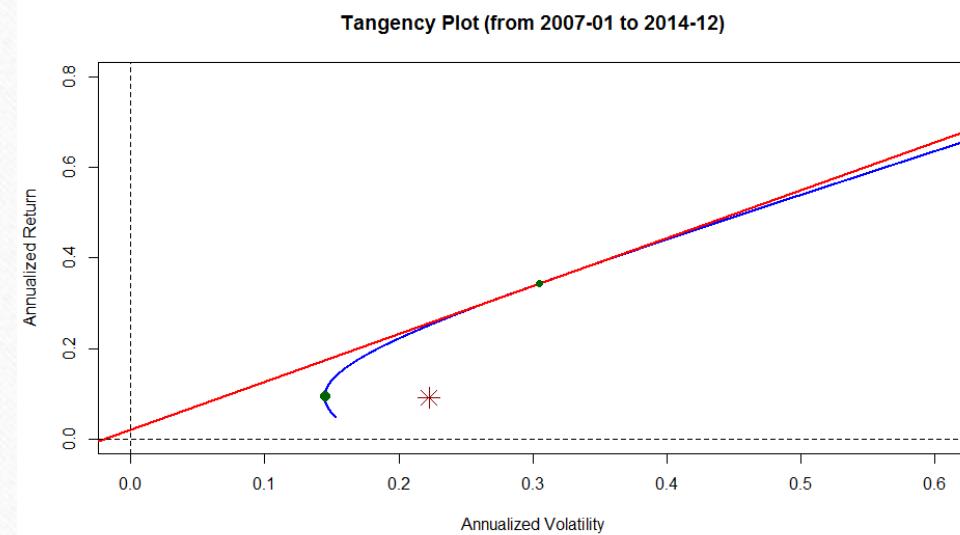
Tangency Portfolio with Risk Free Asset

Mean = 0.34323781

Standard Deviation = 0.3051219

Sharpe Ratio = 1.0593728

Maximum Draw Down = 1.794105



Capital Asset Pricing Model

Residuals:

Min	1Q	Median	3Q	Max
-54.403	-2.184	-0.042	2.022	67.138

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	0.29336	0.09965	2.944	0.00328 **
t(R_SPY)	0.54413	0.02822	19.284	< 2e-16 ***

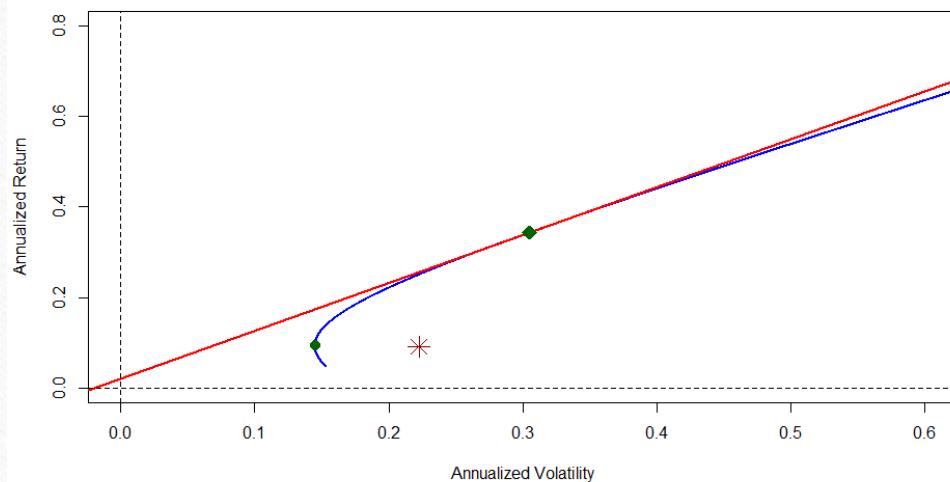
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 4.447 on 1991 degrees of freedom

Multiple R-squared: 0.1574, Adjusted R-squared: 0.157

F-statistic: 371.9 on 1 and 1991 DF, p-value: < 2.2e-16

Tangency Plot (from 2007-01 to 2014-12)



Parametric Bootstrap Tangent Portfolio

Resamples = 10^5

Time @ 1.8 GHz = 10.46968 mins

Robust Mean (0.05 Trim) =
0.71230152

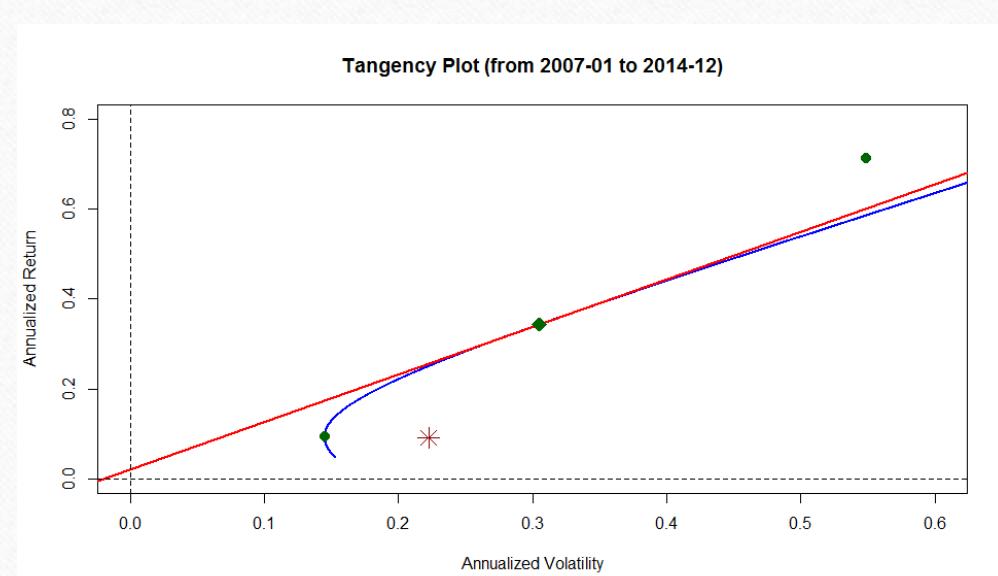
[1] 0.5782493 8.7699115

[1] -0.5066259 -0.5012057 -0.5030242 -0.4965201 -0.8548569

Standard Deviation = 0.5486998

Sharpe Ratio = 1.2617126

Maximum Draw Down = 3.056742



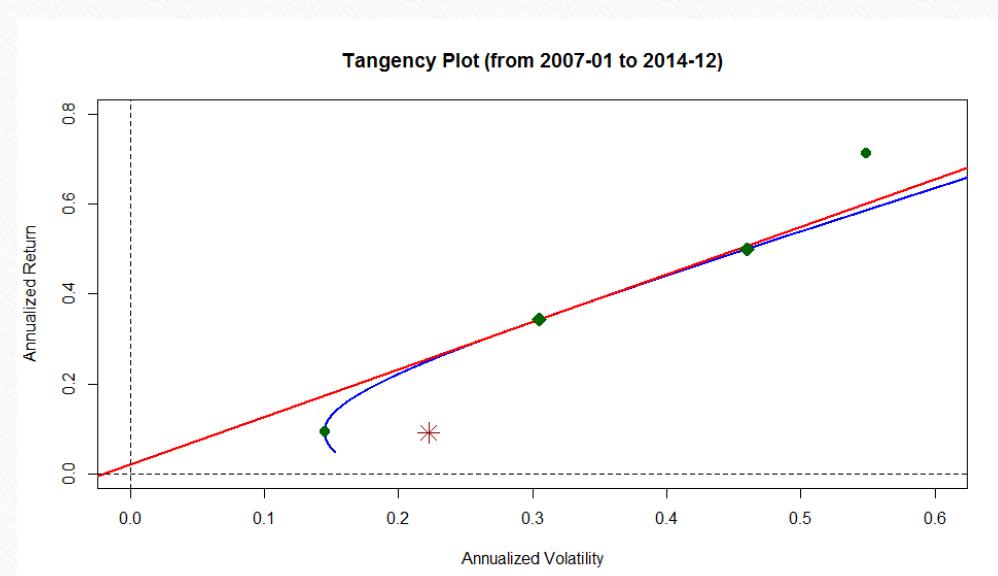
Target Return Portfolio

Mean = 0.5

Standard Deviation = 0.4601001

Sharpe Ratio = 1.0432513

Maximum Draw Down = 1.765257



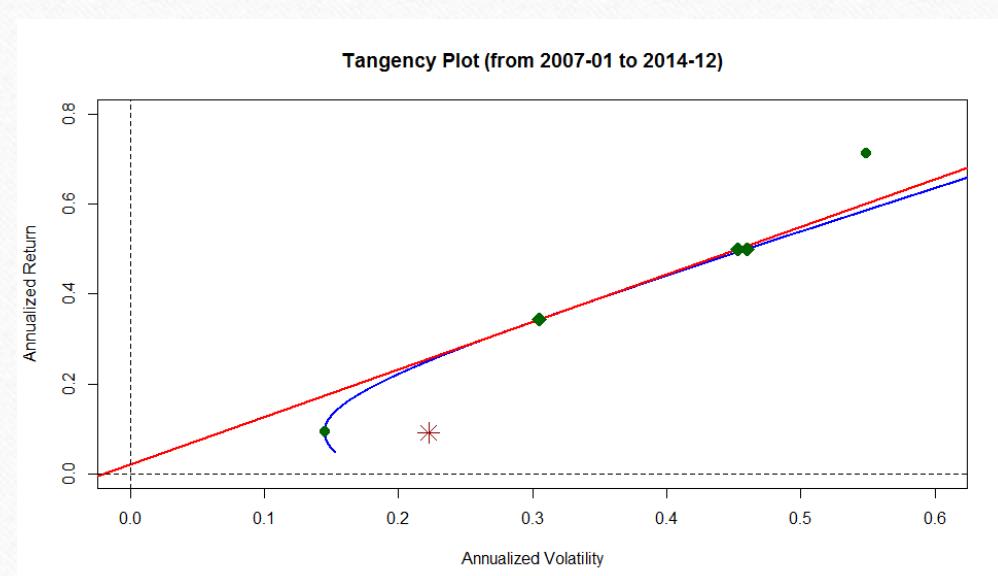
Target Return Portfolio with Risk-free Asset

Mean = 0.5

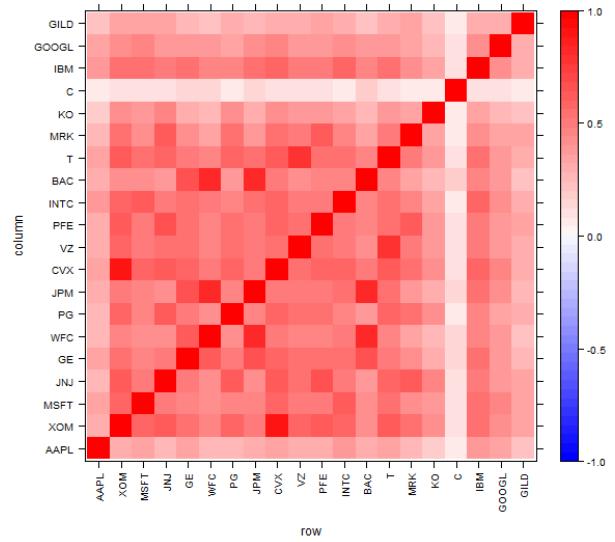
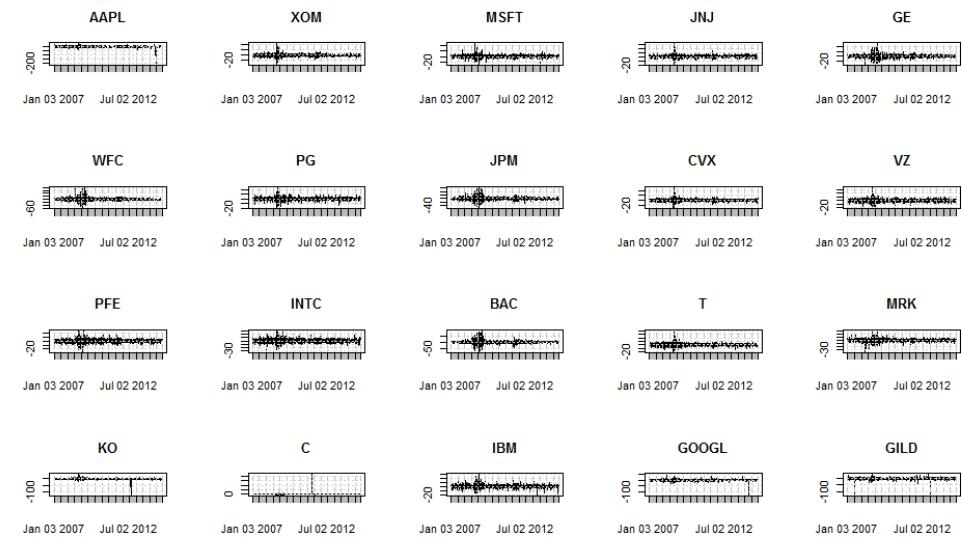
Standard Deviation = 0.4530983

Sharpe Ratio = 1.0593728

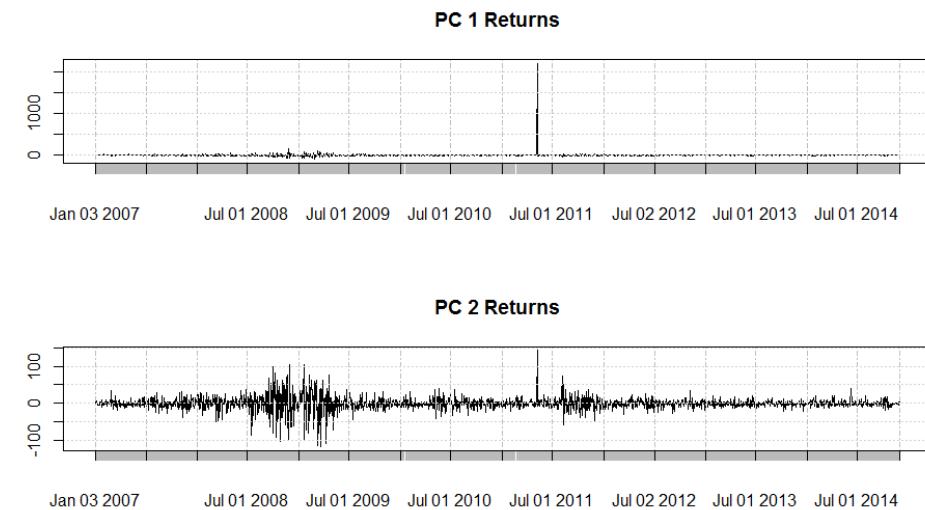
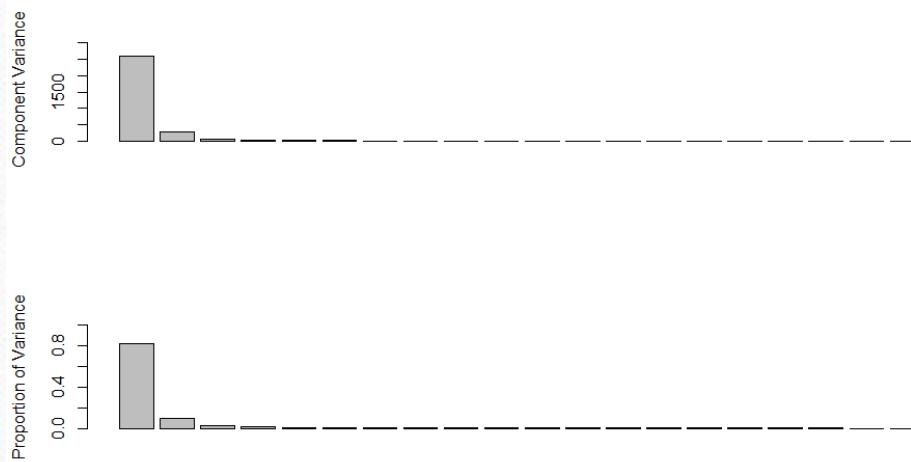
Maximum Draw Down = 1.765257



Principal Component Analysis



Principal Component Analysis (cont.)



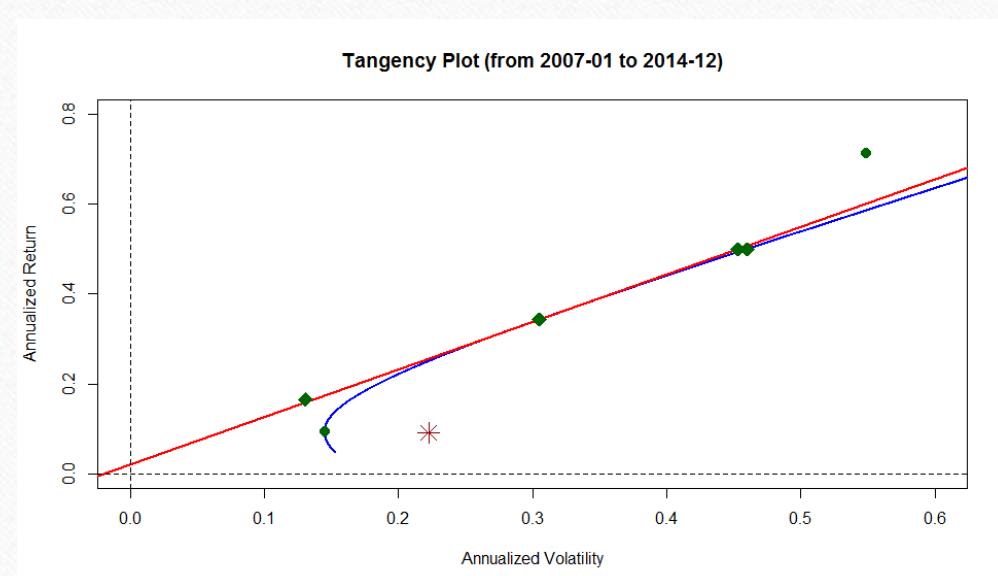
Principal Component Analysis (cont.)

Mean = 0.16556244

Standard Deviation = 0.1307560

Sharpe Ratio = 1.1132370

Maximum Draw Down = 1.615135



Value-at-Risk and Expected-Shortfall (\$10MM)

VarR			VarR		
,, Benchmark: SPY			,, Bootstrap Tangent Portfolio (iid)		
1	10	20	1	10	20
95%	226864.33	692536.12	95%	540275.11	1515225.30
99%	322365.62	994537.71	99%	775832.51	2260123.22
					3030718.90
,, Minimum Variance Portfolio			,, Target Return Portfolio		
1	10	20	1	10	20
95%	146608.83	438368.55	95%	456896.21	1309163.59
99%	208881.60	635292.34	99%	654417.65	1933781.22
					2618552.16
,, Tangency Portfolio			,, Target Return + Risk-free Asset		
1	10	20	1	10	20
95%	302534.65	863565.03	95%	449641.22	1286221.30
99%	433523.78	1277789.03	99%	644156.78	1901333.49
					2572664.14
,, Capital Asset Pricing Model			,, Principal Component Analysis		
1	10	20	1	10	20
95%	302534.65	863565.03	95%	128914.28	362739.33
99%	433523.78	1277789.03	99%	185047.97	540249.66
					725542.59

ES			ES		
,, Benchmark: SPY			,, Bootstrap Tangent Portfolio (iid)		
1	10	20	1	10	20
95%	285421.08	877708.83	95%	684707.47	1971960.53
99%	369852.70	1144705.05	99%	892961.13	2630516.42
					3554533.99
,, Minimum Variance Portfolio			,, Target Return Portfolio		
1	10	20	1	10	20
95%	184791.47	559112.65	95%	578006.77	1692148.79
99%	239846.13	733210.77	99%	752633.25	2244366.22
					3057785.68
,, Tangency Portfolio			,, Target Return + Risk-free Asset		
1	10	20	1	10	20
95%	382850.82	1117547.07	95%	568908.72	1663378.23
99%	498656.84	1483757.86	99%	740877.73	2207192.01
					3005213.41
,, Capital Asset Pricing Model			,, Principal Component Analysis		
1	10	20	1	10	20
95%	382850.82	1117547.07	95%	163332.74	471580.05
99%	498656.84	1483757.86	99%	212959.91	628514.94
					850368.55

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THANK YOU

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