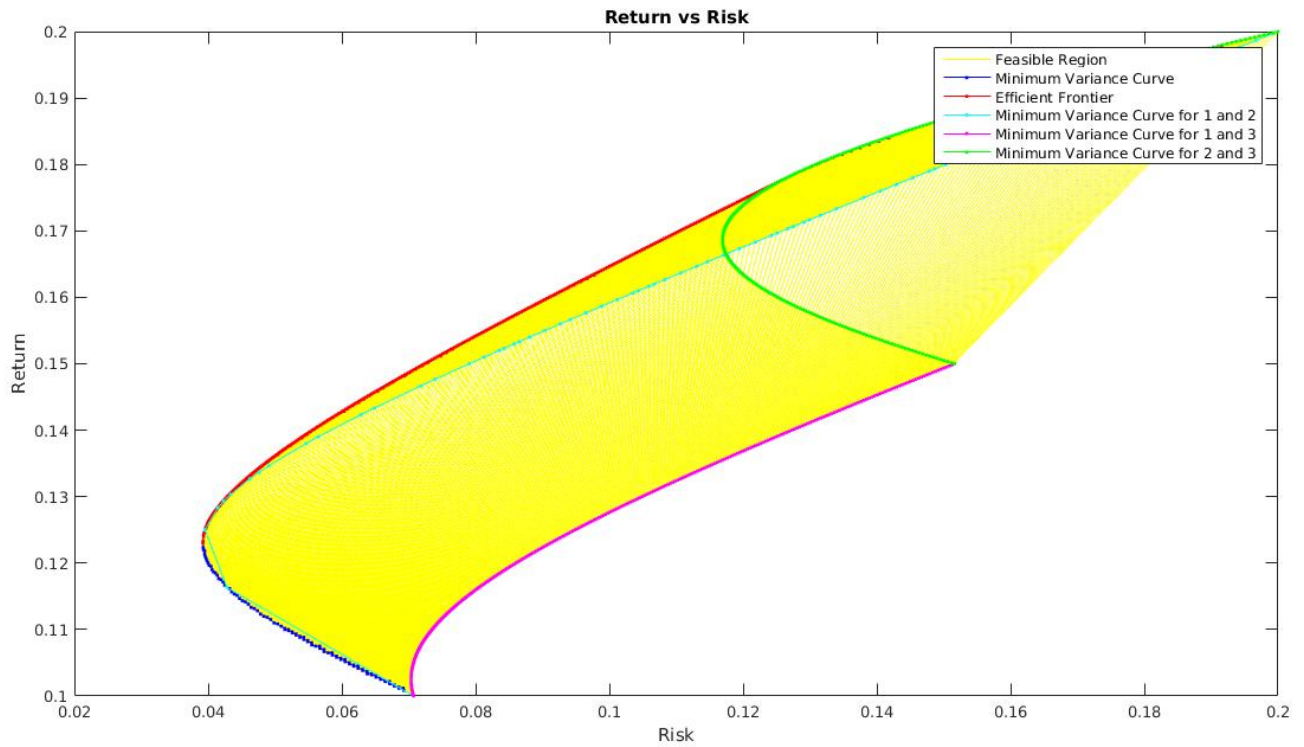
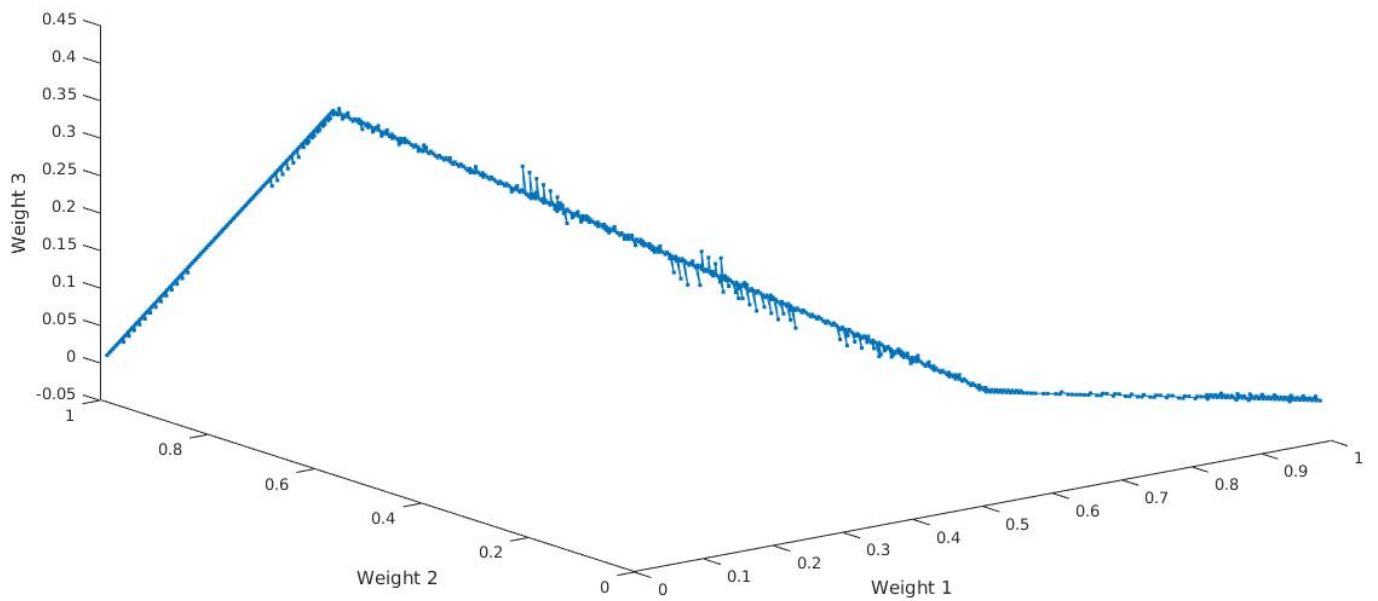


MA 374: Financial Engineering Lab
LAB 5 Report
Abheek Ghosh - 140123047

Question 1:



Weights corresponding to Minimum Variance Curve



Defining suitable terms:

Weights, $w = [w_1, w_2, w_3]$
 Return, $m = [m_1, m_2, m_3]$
 Covariance matrix, C (3x3 matrix)
 vector, $u = [1 \ 1 \ 1]$

Equations:

minimize: w^*C*w' (variance of portfolio)
 s.t.
 $w * m' = \mu$ (given return of portfolio)
 $w * u' = 1$ i.e, $w_1 + w_2 + w_3 = 1$
 $w \geq [0, 0, 0]$ i.e, $w_1 \geq 0, w_2 \geq 0, w_3 \geq 0,$

Question 2:

BSE

Index Portfolio

Return = 0.108065, Risk = 0.151154

Stock	Calculated beta	Expected return (CAPM)	Actual Return	Overpriced
Stock 1 (In index)	0.070971	0.054121	-0.031813	Yes
Stock 2 (In index)	0.751111	0.093613	-0.007658	Yes
Stock 3 (In index)	0.883900	0.101323	0.024756	Yes
Stock 4 (In index)	0.667974	0.088786	-0.204303	Yes
Stock 5 (In index)	0.932500	0.104145	0.347745	No
Stock 6 (In index)	0.350648	0.070360	-0.384658	Yes
Stock 7 (In index)	0.662055	0.088442	0.114579	No
Stock 8 (In index)	0.510522	0.079643	0.144018	No
Stock 9 (In index)	0.738288	0.092868	0.038892	Yes
Stock 10 (In index)	0.497800	0.078905	0.133835	No
Stock 1 (Outside index)	1.126186	0.115392	0.054552	Yes
Stock 2 (Outside index)	0.062728	0.053642	0.174838	No
Stock 3 (Outside index)	0.174625	0.060140	-0.108425	Yes
Stock 4 (Outside index)	0.194904	0.061317	0.064072	No
Stock 5 (Outside index)	0.122334	0.057103	0.073854	No
Stock 6 (Outside index)	0.586821	0.084074	-0.381465	Yes
Stock 7 (Outside index)	0.371500	0.071571	-0.016761	Yes
Stock 8 (Outside index)	0.353829	0.070545	-0.388069	Yes
Stock 9 (Outside index)	1.499518	0.137069	-0.054003	Yes
Stock 10 (Outside index)	0.876301	0.100882	0.097327	Yes

The stocks with overpriced = Yes, are overpriced i.e., have less relative return compared to market portfolio. And with overpriced = No, have more relative return relative to market portfolio, and can be invested on against market.

Comparing Beta Values

Stock	Calculated beta	Official beta
Stock 1 (In index) airtel	0.070971	0.55
Stock 2 (In index) coal	0.751111	0.85
Stock 3 (In index) gail	0.883900	0.93
Stock 4 (In index) infosys	0.667974	0.69
Stock 5 (In index) maruti	0.932500	0.81
Stock 6 (In index) sbi	0.350648	1.28
Stock 7 (In index) cipla	0.662055	0.93
Stock 8 (In index) hul	0.510522	0.40
Stock 9 (In index) itc	0.738288	0.64
Stock 10 (In index) reddy	0.497800	0.62
Stock 1 (Outside index)	1.126186	1.12

Stock 2 (Outside index)	0.062728	0.10
Stock 3 (Outside index)	0.174625	0.19
Stock 4 (Outside index)	0.194904	0.30
Stock 5 (Outside index)	0.122334	0.18
Stock 6 (Outside index)	0.586821	0.90
Stock 7 (Outside index)	0.371500	0.27
Stock 8 (Outside index)	0.353829	0.59
Stock 9 (Outside index)	1.499518	1.37
Stock 10 (Outside index)	0.876301	0.75

NSE

Index Portfolio

Return = 0.108295, Risk = 0.154712

Stock	Calculated beta	Expected return (CAPM)	Actual Return	Overpriced
Stock 1 (In index)	0.045060	0.052627	0.030141	Yes
Stock 2 (In index)	0.086307	0.055031	0.057195	No
Stock 3 (In index)	0.143925	0.058390	0.410285	No
Stock 4 (In index)	0.127453	0.057430	0.113124	No
Stock 5 (In index)	0.150916	0.058798	-0.134015	Yes
Stock 6 (In index)	0.162222	0.059457	0.160404	No
Stock 7 (In index)	0.160030	0.059329	-0.217834	Yes
Stock 8 (In index)	-0.023114	0.048653	-0.113722	Yes
Stock 9 (In index)	0.313309	0.068264	-0.304613	Yes
Stock 10 (In index)	0.028466	0.051659	0.055934	No
Stock 1 (Outside index)	0.150975	0.058801	0.054552	Yes
Stock 2 (Outside index)	0.171377	0.059991	0.174838	No
Stock 3 (Outside index)	0.285932	0.066669	-0.108425	Yes
Stock 4 (Outside index)	-0.025433	0.048517	0.064072	No
Stock 5 (Outside index)	0.413307	0.074094	0.073854	Yes
Stock 6 (Outside index)	0.110042	0.056415	-0.381465	Yes
Stock 7 (Outside index)	-0.009610	0.049440	-0.016761	Yes
Stock 8 (Outside index)	0.500230	0.079161	-0.388069	Yes
Stock 9 (Outside index)	0.144596	0.058429	-0.054003	Yes
Stock 10 (Outside index)	0.105670	0.056160	0.097327	No

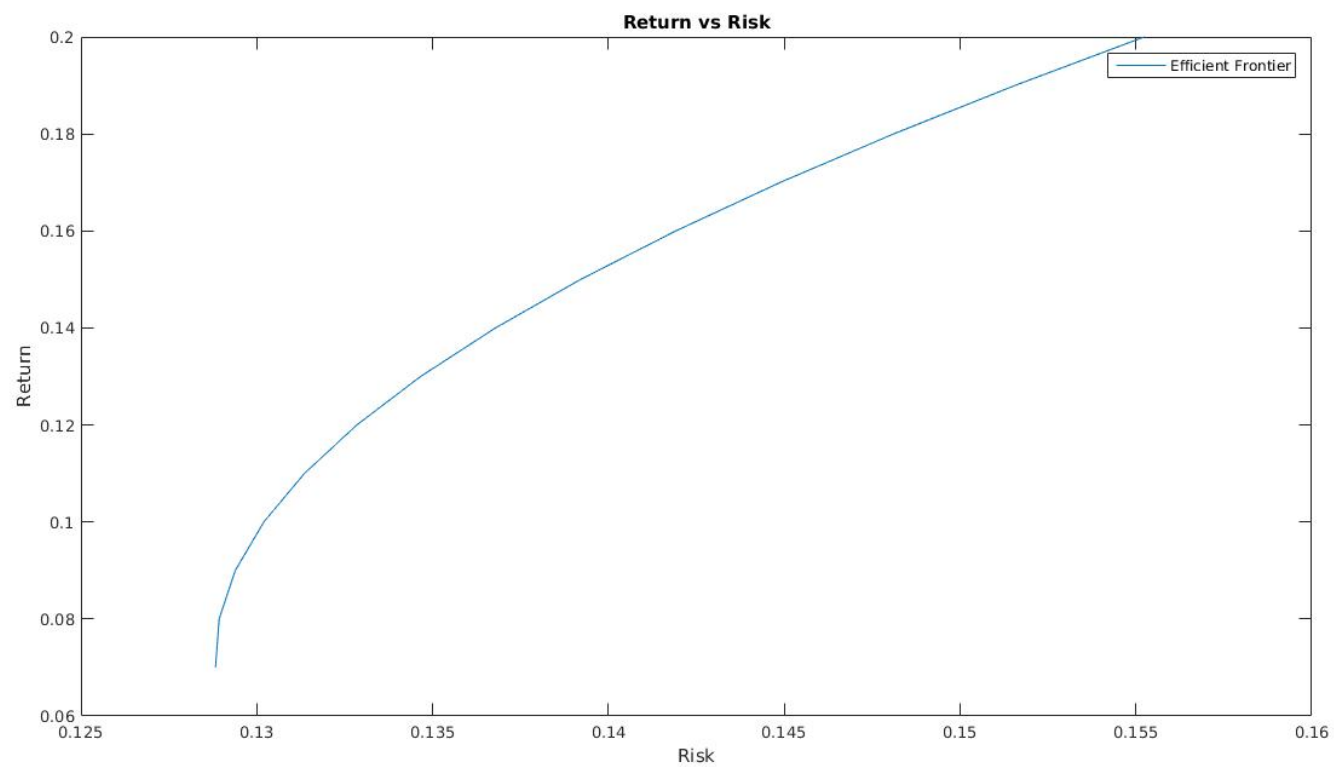
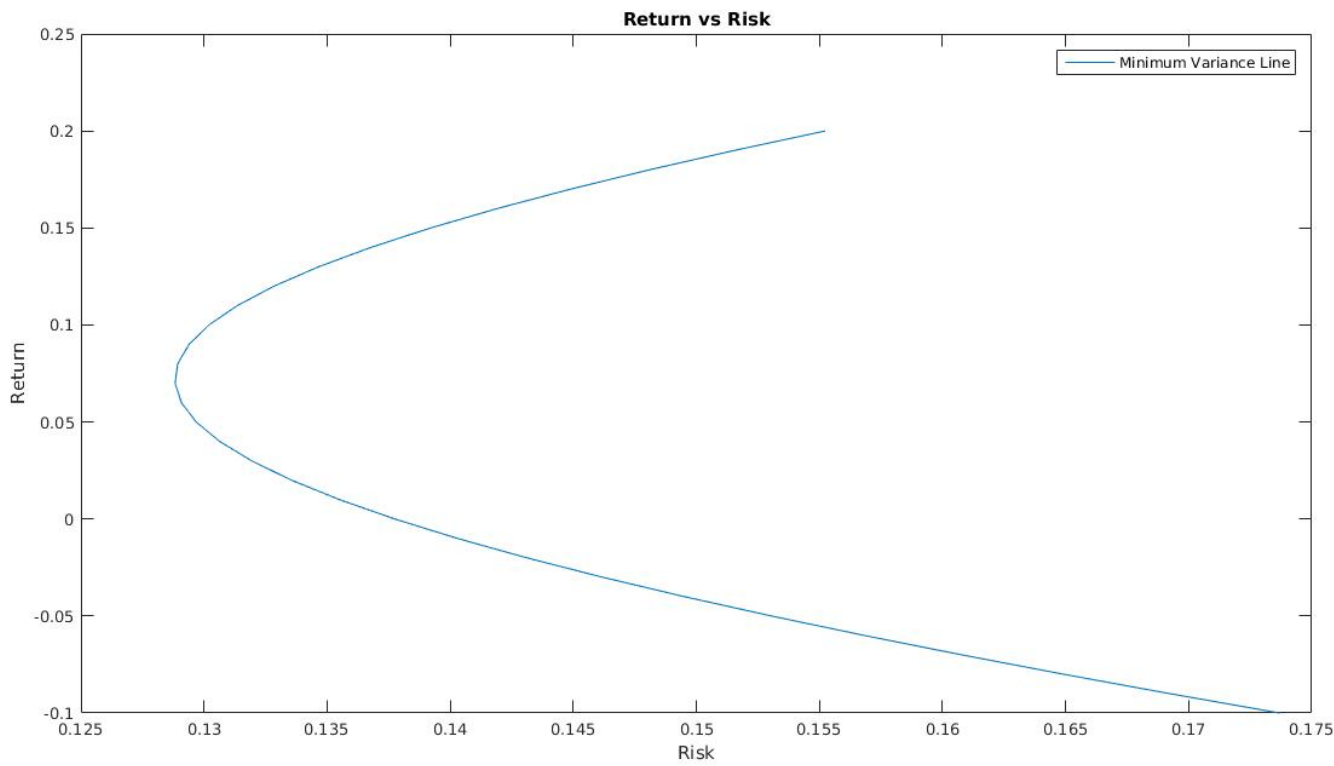
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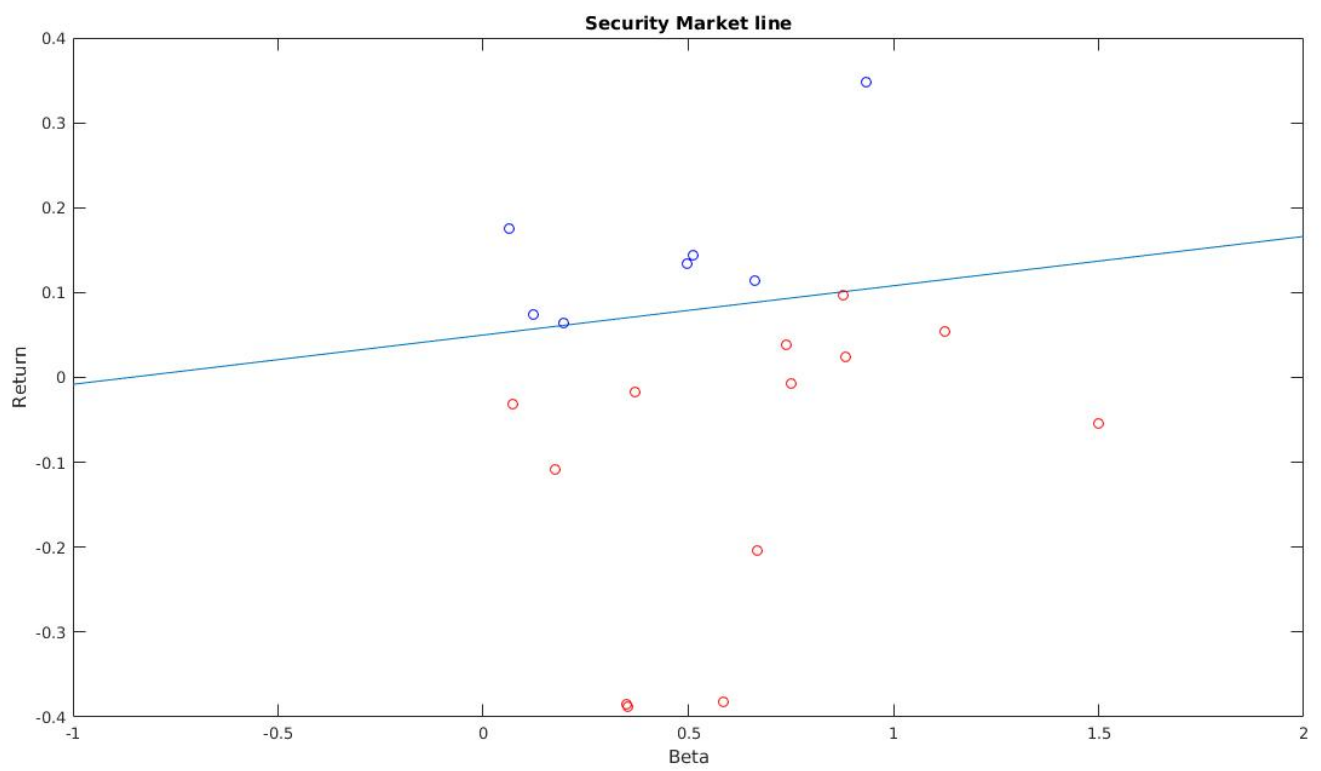
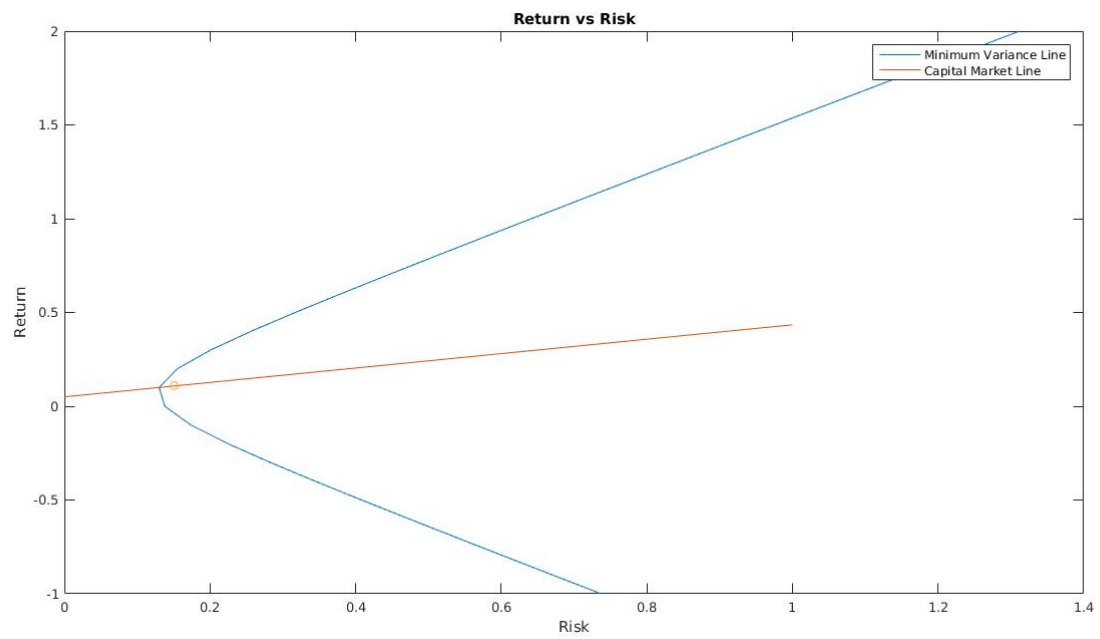
Comparing Beta Values

Stock	Calculated beta	Official beta
Stock 1 (In index) acc	0.045060	0.086323
Stock 2 (In index) ambuja	0.086307	0.0613015
Stock 3 (In index) auropharma	0.143925	0.138799
Stock 4 (In index) bajaj	0.127453	0.322293
Stock 5 (In index) bhel	0.150916	0.927927
Stock 6 (In index) adani	0.162222	0.150914
Stock 7 (In index) asianpaints	0.160030	0.682959
Stock 8 (In index) axis	-0.023114	0.170484
Stock 9 (In index) baroda	0.313309	0.224685
Stock 10 (In index) bpc	0.028466	0.262621
Stock 1 (Outside index)	0.150975	-
Stock 2 (Outside index)	0.171377	-
Stock 3 (Outside index)	0.285932	-
Stock 4 (Outside index)	-0.025433	-
Stock 5 (Outside index)	0.413307	-
Stock 6 (Outside index)	0.110042	-

Stock 7 (Outside index)	-0.009610	-
Stock 8 (Outside index)	0.500230	-
Stock 9 (Outside index)	0.144596	-
Stock 10 (Outside index)	0.105670	-

Plots for BSE





Plots for NSE

