Creating efficient frontiers using excel

Suppose we have 3 risky assets whose net returns correspond to the mean vector and variance-covariance matrix given below:

Asset	stddev	Mean	Variance-Covariance Matrix			Weights	Ones
AAPL	10.77%	1.05%	1.16%	0.12%	0.60%	-42.87%	100.00%
BRK/A	6.03%	0.05%	0.12%	0.36%	0.14%	-83.99%	100.00%
BHP	11.10%	3.12%	0.60%	0.14%	1.23%	226.86%	100.00%

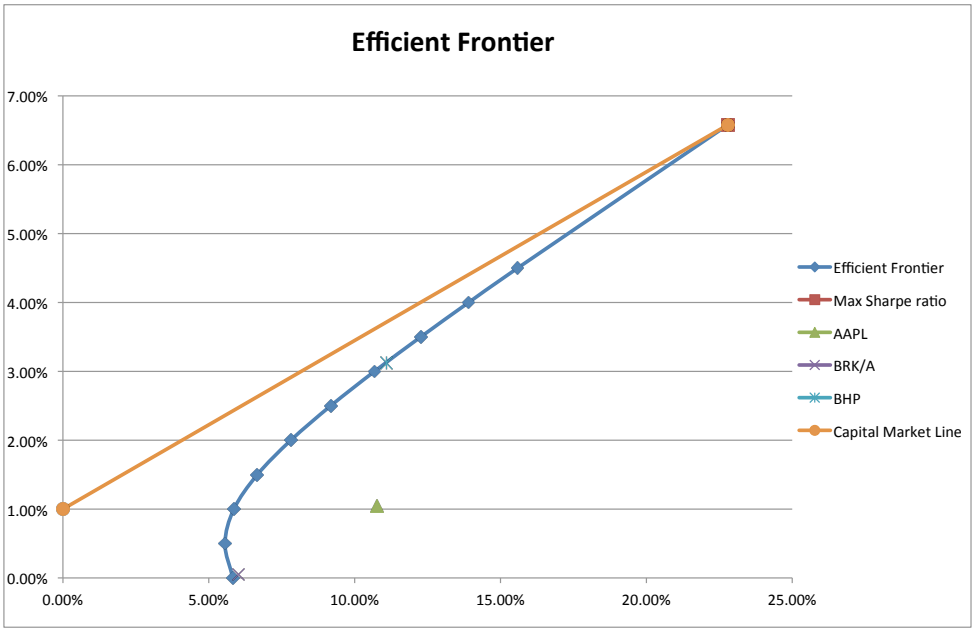
	Mean retur	Variance of	Standard deviation		Constraint
	6.58%	5.20%	22.80%		100.00%

Results

	weights		mean	variance	std	
-23.50%	-29.16%	152.66%	4.50%	2.43%	15.59%	Note: This line contains points for the minimum variance portfolio.
-18.85%	-15.99%	134.84%	4.00%	1.93%	13.91%	
-14.20%	-2.82%	117.02%	3.50%	1.50%	12.27%	
-9.55%	10.35%	99.20%	3.00%	1.14%	10.68%	
-4.90%	23.52%	81.38%	2.50%	0.84%	9.18%	
-0.24%	36.69%	63.55%	2.00%	0.61%	7.81%	
4.41%	49.87%	45.73%	1.50%	0.44%	6.66%	
9.06%	63.04%	27.90%	1.00%	0.34%	5.86%	
13.71%	76.20%	10.09%	0.50%	0.31%	5.55%	
18.36%	89.38%	-7.74%	0.00%	0.34%	5.83%	
-42.87%	-83.99%	226.86%	6.58%	5.20%	22.80%	Note: This line contains points for the maximum Sharpe ratio portfolio.

Graph:

		Risk free	Sharpe Ratio
22.80%	6.58%	0.10%	28.43%
15.59%	4.50%		
13.91%	4.00%		
12.27%	3.50%		
10.68%	3.00%		
9.18%	2.50%		
7.81%	2.00%		
6.66%	1.50%		
5.86%	1.00%		
5.55%	0.50%		
5.83%	0.00%		



	weights		mean	variance	std
-42.87%	-83.99%	226.86%	6.58%	5.20%	22.80%