MSCF Finance
Homework Set 1

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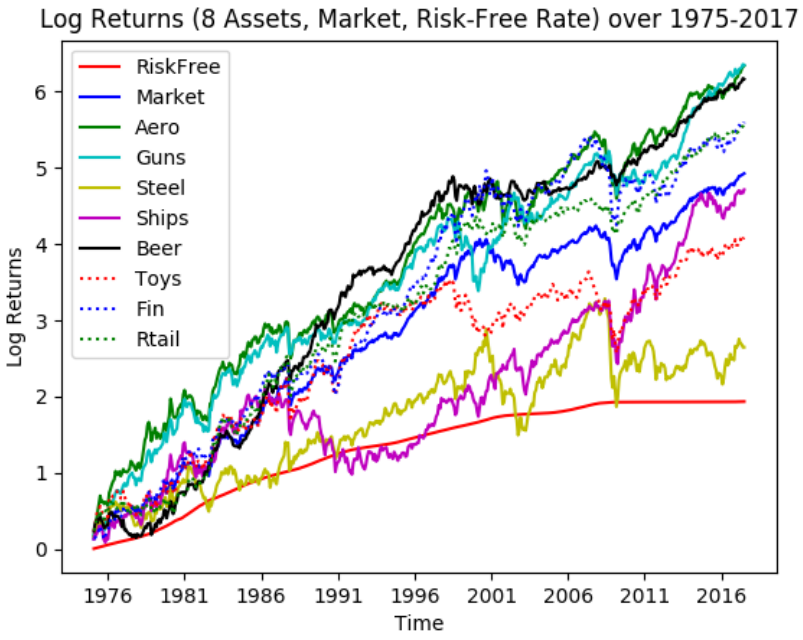
1 Question 1

1.1 part a



1.2 part b

The market portfolio exhibits characteristics spanning across the entire market, specifically more than these eight different assets. Therefore, it is like an average, placing it mainly in the middle rather than primarily above or below any specific asset. The market is constantly reacting to supply and demand, and seeing a drop in one particular asset may simultaneously occur while there is a upward momentum in another (and vice-versa). This being said, the middle is a good fit for it.

1.3 part c

- October 19, 1987: "Black Monday" (or "Black Tuesday"), this financial crisis began in Hong Kong, went through London, and arrived with shock in the U.S. Although a variety of volatile events were occurring around that time (London closing early due to 'The Great Storm', the U.S. responding to the Iran's silkworm missile attack, and the collapse of OPEC), the popular opinion asserts that the crash was due to 'program traders' (i.e. quants, fantastic).

- Early 2000s recession: This is more widely, and informally, known as the 'dot-come bubble'. Despite the 1997 financial crisis in Asia, and the lesser known problems in the early 1990s in the United States, the market was proliferating in the late 1990s, early 2000s. This was due in large part to the growth of the internet, and the excessive speculation for the 'age of the internet' during that time.

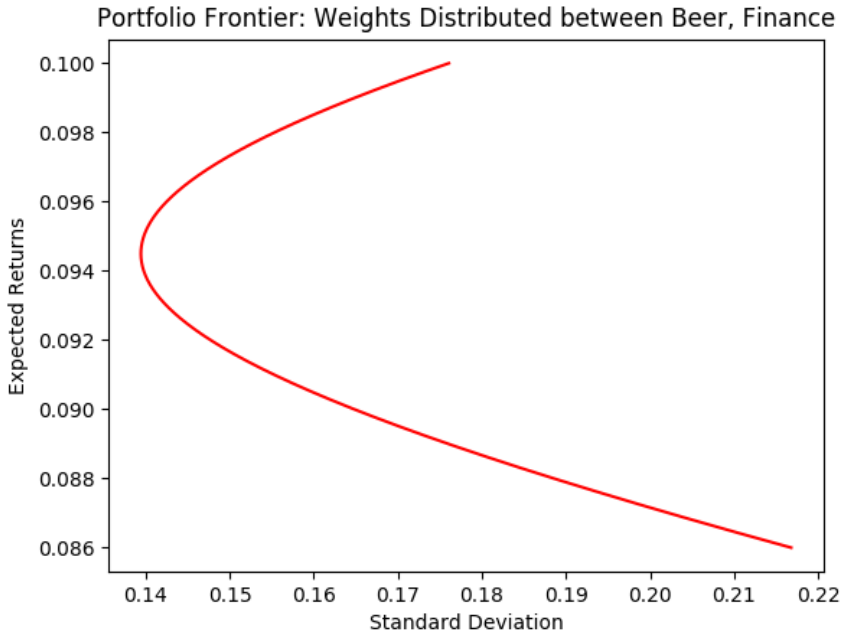
- 2008 Financial Crisis: This is the most recent of the crises, and probably the most widely 'known'. Many claim to understand the causality of the financial crisis in 2007-2009, attributing the crash mainly to the fraudulent loans underwritten within MBS. Despite this rather mundane point, Gorton offers a refreshing take on the crisis and the other factors, such as , that eventually led to the crisis felt by so many.

2 Question 2

2.1 part (a), (b), (c)

Asset	Annual Average Excess Return	Annual Variance	Sharpe Ratio
Market	0.08	0.024	0.452
Aero	0.114	0.051	0.461
Guns	0.114	0.049	0.47
Steel	0.027	0.075	0.062
Ships	0.075	0.067	0.251
Beer	0.11	0.031	0.568
Toys	0.061	0.056	0.216
Fin	0.096	0.047	0.397
Rtail	0.094	0.035	0.449

2.2 part (d)



2.3 part (e)

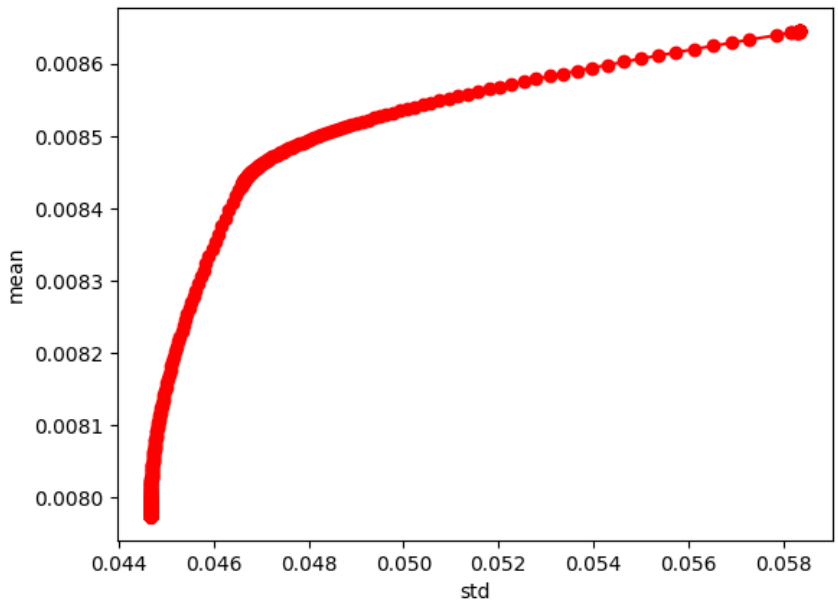
To find the tangency portfolio, we determined the weighting that maximizes the Sharpe ratio.

$$SharpeRatio_{max} = 0.608$$
$$PortfolioAllocations : [\Delta_{Beer}, \Delta_{Fin}] = [0.65, 0.35]$$

3 Question 3

3.1 part (a)

Here is a graph of just the efficiency frontier, not the entier mean-variance portfolio.



Asset	Portfolio Weight
Aero	.02568
Guns	0.97431
Steel	0.0
Ships	0.0
Beer	0.0
Toys	0.0
Fin	0.0
Rtail	0.0

This is clearly wrong, but I didn't have enough time to finish it (I realize that's ridiculous since we were given more than 2 weeks, I just didn't realize how much time the third one would take since I did the first two relatively quickly and left this for the last minute). I'm using a nonlinear solver in Python and don't think I set up my constraints the correctly - I'll make sure to better manage my time.

3.2 part (b)

Because of the incorrect answer on Part (a), the Sharpe Ratio I find in Part (b) would be incorrect as well.