

Math 420, Spring 2017

First Team Homework

due Thursday, 23 February, 2017

Exercise 1. For each of the years ending December 31 of 2012-2016 use one-year histories with uniform weights to compute \mathbf{m} and \mathbf{V} for the risky assets in group (A), in groups (A) and (B) combined, and in groups (A), (B), and (C) combined.

Exercise 2. For each \mathbf{m} and \mathbf{V} computed in Exercise 1 compute the minimum volatility portfolio allocation \mathbf{f}_{mv} . Present these in three tables (one for group (A), one for groups (A) and (B) combined, and one for groups (A), (B), and (C) combined) that lists years and the allocations for each asset rounded to the nearest thousandth. Determine if each of these portfolios is long or solvent. Comment on how these change from year to year for the same groupings of assets.

Exercise 3. For each year graph in the $\sigma\mu$ -plane:

- the three frontiers associated with the appropriate \mathbf{m} and \mathbf{V} were computed in Exercise 1;
- the volatility and return mean for that year of each asset;
- the volatility and return mean for that year of the three minimum volatility portfolios;
- the volatility and return mean for that year of the three Markowitz portfolios that are equidistributed in group (A), in groups (A) and (B) combined, and in groups (A), (B), and (C) combined.

There should be 5 graphs — one for each year — each with three frontiers, nine assets, and six portfolios plotted. Use different symbols or colors to distinguish points associated with the different groups (A), (B), and (C). Comment on any relationships that you see between the objects plotted on each graph. (This will be easier to do if you use the same scales for each of the graphs. Each σ -axis should begin at $\sigma = 0$.)