

# Math 420, Spring 2016

## First Project: Leveraged Portfolios

presentation Tuesday, 8 March, 2016

report due Thursday, 10 March, 2016

This project explores frontiers for leveraged portfolios. Consider the following groups of assets.

(A) VFINX, VBTIX, VGSIX.

(B) PESPX, VFIDX, MAIIX.

(C) GE, Ford, UPS.

Identify the funds in (A) and (B) and describe their holdings. (This information should inform some of your subsequent answers.)

Compute the frontiers for the risky assets in group (A), groups (A) and (B) combined, and groups (A), (B), and (C) combined using one-year histories with uniform weights for each of the years ending December 31 of 2010-2015. Do the same for  $\mathbf{f}_{mv}$ . Comment on the implications of what you find.

Assuming that the safe investment is U.S. T-Bills, compute  $\mathbf{f}_{st}$ . Assuming that the credit-line is three points higher than the U.S. T-Bill rate, compute  $\mathbf{f}_{ct}$ . (You should identify when these tangency portfolios do not exist.) Graph the associated efficient frontiers. Comment on the implications of what you find.

In a similar manner, graph the efficient long frontiers, for the risky assets in group (A), groups (A) and (B) combined, and groups (A), (B), and (C) combined, both with and without a safe investment of U.S. T-Bills. Comment on the implications of what you find.

In a similar manner, graph the efficient frontiers for leveraged portfolios with leverage  $\ell = 1$  and  $\ell = 5$  for the risky assets in group (A), groups (A) and (B) combined, and groups (A), (B), and (C) combined, both with and without risk-free assets. Determine if these leveraged portfolios are solvent for the entire history that you are using. Comment on the implications of what you find.