

Math 420, Spring 2016

First Project: Rolling Frontiers

presentation Tuesday, 8 March, 2016

report due Thursday, 10 March, 2016

This project explores how efficient frontiers evolve over time. Consider the following groups of assets.

- (A) VFINX, VBTIX, VGSIX.
- (B) DFSTX, VFITX, DFEMX.
- (C) Google, Exxon-Mobil, UPS.

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

Show how the frontiers for the risky assets in group (A), groups (A) and (B) combined, and groups (A), (B), and (C) combined evolve in time using one-year histories with uniform weights. Do this for the year ending December 31 of 2010 and every quarter thereafter until December 31 of 2015 — i.e. for the year ending March 31 of 2010, the year ending June 30 of 2010, and so forth for every quarter until December 31 of 2015. Show these results as a slide-show or as a slow-frame movie. Do the same for \mathbf{f}_{mv} . Comment on the implications of what you see. (If you have things well automated, you can try looking at these evolutions with a frame every month or every week.)

Assuming that the safe investment is U.S. T-Bills, show how \mathbf{f}_{st} evolves. Assuming that the credit-line is three points higher than the U.S. T-Bill rate show how \mathbf{f}_{ct} evolves. (You should identify when these tangency portfolios either do not exist or are not solvent.) Show how the associated efficient frontiers evolve. Comment on the implications of what you see.

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