

Statistics 956 Homework No. 9
Due Monday April 4.

Reading: Browse the articles on stylized facts.

First Task: Exploration of the “Coarse-Fine Volatility Correlation”

If $\{R_t\}$ is a real or simulated sequence of returns, we set

$$C_n = |R_{5n} + R_{5n+1} + \cdots + R_{5n+4}| \quad n = 1, 2, \dots$$

$$F_n = |R_{5n}| + |R_{5n+1}| + \cdots + |R_{5n+4}| \quad n = 1, 2, \dots$$

Both of these quantities are measures volatility. The value C_n measures time n volatility coarsely and F_n measures it more finely. In the literature on stylized facts, there are articles that suggest that the relationship

$$\text{Cor}(C_n, F_{n-1}) < \text{Cor}(F_n, C_{n-1})$$

holds for a variety of return series. Crudely interpreted, this relationship suggest that coarse-grained estimates of volatility tend to predict fine-grained estimates of volatility better than vice versa. This is a bizarre but intriguing assertion.

1. Your task is to explore this assertion and to write a report on your discoveries.
2. Your exploration should include several flavors of real data and several flavors of simulated data.
3. You can think of this as a typical way to get started on your final project. One finds (or invents) a relatively simple assertion. To get started one simply probes the assertion in a convenient fashion with just the data and tools at hand. One then proceeds by “peeling the onion;” each time a fact is uncovered, a new avenue for exploration is suggested.
4. For the homework, you should explore the Coarse-Fine Problem to the a level that really *requires* a two-page report. At the end of your report, you should add paragraph or two about what would be the next layer to your investigation, if you were to continue it.

Second Task: Prepare Yourself to Discuss Your Final Project

On Monday April 4, each and every person will be asked to say a few words about his or her project. At this stage all you really have to do is to describe a question that you hope to answer and to suggest how you will organize your investigation. In class, you will be invited to help other students refine their question and their project organizations.

Suggestion: If you have not yet formulated a question, you should look at the papers on stylized facts for guidance.