Mandatory Assignment Robin Perälä 175910

Empirical Methods in Finance 17011, Autumn 2021

1.

**Pekka: The serial cheater**

Pekka is a serial cheater. Everywhere he goes, he cheats. During non-pandemic times he has all his tools in this tool belt available. Today there is an exam at Hanken. Pekka has written answers on his arms, legs, and belt. He can read those at will. He also has a small high-tech smart gadget with him, where he can google anything. It is integrated into the lens of his spectacles with a small partly transparent screen. If the spectacles fail, he has a reserve gadget built into his shirt. Both gadgets can be used with touch or voice control. The newest technology has also come to town, so that he can control them, by just using the movement of his eyes. In a coming update it can simply be controlled through the electromagnetic waves in his brain. The gadget will be connected to the nervous system. There was a metal detector at the front door, but fortunately this gadget is anti-detector. Pekka always stays one step ahead the administrators in his cheating career. He always gets the latest and greatest cheating tool. He has any and every tool you can imagine.

But one day, the course provides incentives which stop cheating, and the exam is made in a way where google is of no use. The exam requires some innovative thinking and deep understanding. It is not multiple-choice questions as always. Instead: essay style question! Pekka cannot stand essay style questions. He is hit by a crippling depression, and he ends his cheating career. He crawls back into the cave he came from. Pekka is defeated.

**Extra**

Unfortunately, I’m not very fond of how cheating and plagiarism is being mentioned all the time. The situation is starting to sound like the honest students should be responsible for the misconduct of dishonest students. We must remember that most students are honest. (Or possibly if the environment can cause people to become dishonest. E.g. look at all the wars in history and how humans behave like any kind of animal when being put into an environment which cultivates that behavior. This is built into human nature)

You don’t really achieve something by trying to threaten or by trying to tell people what not to do. I mean, you don’t stop criminals from committing crimes by telling them not to commit crimes or by threatening them. Otherwise, we would have no criminals in our society. Instead, you create a supportive atmosphere where all the incentives are in order so that cheating becomes unnecessary.

I have taken remote (and normal) courses at Helsinki University of Technology (Aalto university) and I heard very little of academic misconduct and dishonesty there. Seemed like they had it under control. The reason was not that the students were somehow less dishonest there. I’m quite convinced that the reason was that the exercises and exams were made in a way that made cheating hard. It’s all about how the exams are built. If you have questions that can be directly googled, then there will be cheating. If the questions are innovative and require the student to be deeply familiar with the content, cheating will not happen. Creating those kinds of exams will give an incentive to actually study the subject and not cheat. The honest students will be rewarded for their effort. Exams that can be googled makes the results more like a contest of who can google the fastest, and the honest students feel frustrated when the googlers get better results.

That can lead to some of the normally honest students to feel like they have to cheat to get good grades, because grades are important. It is all about how the administrators of the course build have built the course. They have to build the courses in a way which makes cheating not worth it! And all remote exams should be open book. No use in having remote closed book exams.

In the future more and more exams should have the option to be done by remotely, as it brings so many advantages. (Easier to study at 2 locations, work and study at the same time, taking university courses later on in your work life for continuous learning, taking exams when you are sick, etc.). It is a great asset for a university to provide the option of remote and flexible studying. It is a competition of the best universities and a competition for the best (and most honest) students. So all the best universities will have to learn how to build remote exams and exercises.

I myself am no expert on creating remote exams, but if Aalto can do it, Hanken can do it too. I strongly suggest Hanken to ask how Aalto have done it. They had many courses that were remote even during non-pandemic times, and the courses were very well made.

In general, at Hanken I see teachers quite often struggling with the technical software and tools. At Aalto I saw that very seldom. I think the Aalto teachers had prepared the courses and lecture well in advance so that there few problems. At the moment I can’t remember a single lecture that would have had problems. If Aalto can do it, Hanken can do it too. Hopefully these problems Hanken are not because of a lack of financial resources. I hope and believe they can be fixed!

2.

We have three assets: 1, 2 and 3. We estimate their expected return and summarize them inside a vector. We also have historical data on their returns spanning a finite time-period. From those returns we can calculate their variances, and the covariances with respect to each other. We put them inside a matrix, called covariance matrix. The expected returns and the covariance matrix are structured in the following fashion:

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where  is the vector of expected returns and is the covariance matrix. is the expected return of asset n, is the variance of asset n and is the covariance of assets n and m.

Some sample numbers follow (numbers are in annual percentages):

Risk-free rate = 1%

Positive semi definite means that a matrix is symmetric, and its eigenvalues are non-negative.

Why positive semi definite?

(Because it means that aTVa has to be non-negative for all a (where V is the covariance matrix). The variance of a portfolio is also defined as aTVa, where a is the vector of weights (or wTVw). The variance has to be non-negative for any weights)

Måst kollas!!!

b)

The weights of the minimum variance portfolio we receive using the following formula:

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Where is the covariance matrix and is a vector of ones of size n. The superscript “T” means the transpose and the superscript “-1” means the inverse. Using the formula we receive the following weights:

As a sanity check, we can see that the weights sum up to 1.

c)

The Sharpe ratio of portfolio *p* we calculate using the following formula:

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Where is the expected return of the portfolio, *Rf­* is the risk free rate and is the standard deviation of portfolio p. Using the formula we receive the following answer:

Sharpe ratio = 3.63

**Integrera!!!!!**

3.

Value investing (or something that has created better returns)

P/E (does low P/E create give higher returns)

B/M

Tobacco returns (search for tobacco companies in Capital IQ, and their financial statements. Take all variables and start creating regressions)

Sin companies have higher risk

How well does Fama-French explain these returns? What is the R squared? What else could explain these returns? (Amazing returns)

Why did we look at these? = because they have the highest return

Central limit theorem and normality quiz