

# Econ 493: Practicum in Quantitative Financial Economics

UNC at Chapel Hill, Department of Economics

Spring 2018



## Instructor

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TBD

TBD

## Class Schedule:

R 01/05/18 5pm-6:15pm

## Communication:

Assignments, announcements, grades, readings, and other information will be posted on sakai. The sakai site will be the primary method of communication for this course, so please check it frequently.

## Prerequisites:

Econ 425 (Financial Economics)

Econ 493 must be taken concurrently with Econ 525

Econ 410 (Intermediate Theory: Price and Distribution) with a grade of C or better

Econ 400 (Economic Statistics) with a grade of C or better

## Course Description:

Working in conjunction with Econ 525, this practicum provides students the opportunity to implement and test the models being developed in Econ 425. Students will work with multiple data sources and programming platforms, and engage in a series of practical experiments using live market information.

## Course Materials:

**Recommended Texts:** *A Beginners Guide to Matlab for Economics and Econometrics* by Frain (2014)

**Recommended Periodicals:** Keeping abreast of the financial and macro news is essential for this course. Although not officially required, reading the The Wall Street Journal and/or the Economist is highly recommended.

**Code of Conduct:** The University Honor Code is in effect. In particular, this implies that all work submitted is your own. Moreover, I expect professional behavior at all times. For example, the non-academic use of personal electronic devices is prohibited.

**Software:** We will be using Matlab extensively in this course. A prior familiarity with this program is helpful, but not required to succeed in Econ 493/525. There are several excellent primers available: Financial Modeling: Theory, Implementation, and Practice with Matlab Source by Kienitz and Wetterau (Wiley 2013), Beginners Guide to Matlab for Economics and Econometrics by Fraim (2014), as well as several tutorial videos from Matworks (creators of Matlab) <https://www.mathworks.com/videos/introduction-to-matlab-81592.html>. Also, remember that there are resources available to you from the Matlab bootcamp held in the previous fall semester. We will be using version R2016b and higher during the course, but older versions should suffice. However, keep in mind that if you are using an older version of Matlab you may not be able to utilize all of the same functions that will be seen in examples. Each Matlab version update usually involves retiring some functions and introducing new functions. In addition to the standard toolboxes, we will be using the DataFeed, DataBase, Econometrics, Financial, and Financial Instruments toolboxes. As a UNC student you can access Matlab via UNC's Virtual Lab: <https://virtuallab.unc.edu>, or obtain a free copy via UNC's Software Acquisition portal <https://sa.unc.edu/shop/home>. Note that at the time of writing this document, these two options do not have all of required toolboxes. You can purchase additional toolboxes and/or a base copy of Mathworks by visiting <https://www.mathworks.com/store>, click "Buy Now" in the Student box, and choose "Matlab Student" along with the aforementioned toolboxes. Note that there are dependencies, which might require the purchase of additional toolboxes for full functionality.

**Class Structure:** Upon entering the class, students form five groups of approximately five students each. These groups take on the role of investment teams, and are tasked each week with allocating their portfolios according to a certain set of rules. The Professor bases these rules upon the materials being developed Econ 525. Team members' individual contributions will be subject to peer review.

Grading	% of Course Grade	Date	Details & Policy
Codebook	(60%)	TBD	Teams will write, run, and maintain computer code to allocate their funds. That code will be stored in a "code book". Roughly 5 well commented entries are required during the semester.
Portfolio Summary	(40%)	3/23	Each week teams must run the assigned trading strategy. After all strategies are executed, teams will submit a written and visual summary of the performance of their investable universe. The summary must also provide rationale for the team's chosen allocations and should compare and contrast the performance of all trading strategies implemented throughout the semester.

Letter grades are computed from the total points earned during the semester and assigned based on the scale nearby. There is no maximum number of A's nor B's awarded. However, in previous courses 15% – 20% of my students have earned in the A range, 30% – 50% have earned in the B range, and 20% – 30% have earned in the C range. Although the grade distribution may change this semester, the past scores should give you a sense of my grading standards.

A	$x \geq 95\%$
A-	$90 \leq x < 95$
B+	$85 \leq x < 90$
B	$80 \leq x < 85$
B-	$75 \leq x < 80$
C+	$70 \leq x < 75$
C	$65 \leq x < 70$
C-	$60 \leq x < 65$
D+	$50 \leq x < 60$
D	$40 \leq x < 50$
F	$x < 40$

## **CodeBook**

Students will write, run, and maintain computer code to allocate their funds. That code will be stored in a "CodeBook".

- Each team is responsible for submitting approximately 5 CodeBook entries throughout the semester. Each code book is worth 20% of your CodeBook grade. The grading criterion will consist of two parts: i) accuracy 50-points, and ii) explanation 50-points. When judging accuracy we will be examining your code to determine if it accurately captures the theoretical objects it is meant to produce. For example, if you are attempting to compute a CAPM  $\beta$ , we want to ensure that you set up your regression appropriately. Moreover, your code must be "runnable"; i.e. we must be able to run your code. As such, your submission must be free of bugs and self-contained, including all associated data and supporting files. Note: you may assume that we are running the code on the Matlab platform described in the syllabus. When judging your explanation we are hoping to see very well documented code. Each file should have a preamble that outlines the task and approach. Each section of code must be titled and accompanied by a brief description of what that section is intended to achieve. Lastly, each line must have a brief comment on what it accomplishes.
- Each assignment is due on the date/time indicated by the course calendar. Submit all files (code and data) associated with the assignment via the Sakai dropbox. Label each file with the following convention: "Team#\_Codebook#". For example, "Team1\_CodeBook1.m" and "Team1\_CodeBook1.csv" would be acceptable submissions for CodeBook1.
- The code written should detail every step of the process to determine the weights for the portfolio: data acquisition, data processing, determination of weights, and performance reporting.
- Matlab must be used, unless you have express permission from the instructor to use an alternative platform. Unless otherwise indicated, all code used to complete the assignment must be your own, with the exception of built-in functionality within Matlab.
- No late assignments will be accepted, except in the case of an excused absence. If a team missed an assignment due to an excused absence (e.g. sickness or university affiliated event), then please complete the excused absence form on sakai and submit to the instructor. That CodeBook entry will be dropped from consideration, and the remainder of your CodeBook grade will be distributed evenly among the other entries.

## Portfolio Summary

In association with the CodeBook, student teams must submit written and visual summaries of their investable universe and suggested optimal portfolio(s). These summaries must also provide rationale for the team's chosen allocations. The content of the summary should grow as the students build familiarity with various pricing and allocation techniques.

- Each team is responsible for submitting approximately one comprehensive Portfolio Summary throughout the semester. Each code book is worth 20% of your Portfolio Summary grade. The Portfolio Summary will be scored on a scale of 100 points. The grading criterion will consist of three parts: i) content (45-points), ii) interpretation (45-points), and iii) presentation (10-points).
- When judging content we are trying to gauge your understanding of the proposed investment strategy. What might be a possible rationale for taking this strategy? Do you agree? If so, why? If not, why not? When judging interpretation, we are looking to the team's notes and commentary to determine if they understand the empirical results produced in the accompanying tables and figures. Moreover, a good Portfolio Summary will comment on the current market environment, and discuss how performance was impacted accordingly. Most importantly, we are also looking for a comprehensive examination of all trading strategies executed throughout the semester. Lastly, when judging presentation we are looking for a professional deliverable, with a logical flow of topics.
- For example, in a given week, your team might be tasked with allocating fund across the entire SP500, SP400, and SP600 universes by investing only in those assets that have HML betas greater than 1.1. We want you to explain why or why not this might be a sensible strategy. If you dislike the approach, you may under/overweight any given asset by  $\pm 5\%$ . A thorough explanation and justification of these over/under weights is required. You must then provide an accounting of the assets that are chosen and how you allocated among them. A careful review of your portfolio's performance will include tables/figures and discussion of returns, risk, and diversification. Commentary as to how/why the current economic and market environment impacted your portfolio is essential. Also, teams should address how this strategy fared in comparison to all other strategies executed throughout the semester. A detailed discussion why it is that some strategies performed better or why others performed worse is necessary.
- Each assignment is due at the date/time indicated by the course calendar. Submit all files associated with the assignment via email to the Professor and TA. Label each file with the following convention: “Team#\_PortfolioSummary”. For example, “Team1\_PortfolioSummary.pdf” would be acceptable submissions for the Portfolio Summary.
- No late assignments will be accepted, except in the case of an excused absence. If a team misses an assignment due to an excused absence (e.g. sickness or university affiliated event), then please complete the excused absence form on sakai and submit to the instructor.