Syllabus
BA539D: Empirical Methods in Finance
Spring Semester 2016

Instructor: Jason Greene
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Office Hours: Friday 2:00 PM – 5:00 PM, by appointment
Course time: Wednesday 2:00 PM – 5:00 PM
Location: Rehn 115 (Finance Conference Room)


Prerequisites: Enrollment in Finance PhD program and/or permission of instructor. Some exposure to statistics and econometrics is necessary for success in the course. See technical requirements (below) for more prerequisites.

Course Description and Objectives: The purpose of this course is for students to learn how to conduct empirical research in finance and related disciplines. The focus will be on quantitative methods and data analysis, although alternative research approaches will also be considered. Research methods in finance will be examined from the perspective of the scientific method and compared to methodological approaches from other disciplines. Unlike most other doctoral seminars, this course will primarily be composed of hands-on research projects, rather than reviewing the literature in the field.

Technical Requirements: The course requires sophisticated data manipulation and statistical analysis. At a minimum, students must have access to, and basic knowledge of, Microsoft Excel and SAS. Students must have access to a reliable high-speed internet connection and computers with sufficient power to run the analysis of large datasets in SAS. Any student who wishes to use an alternative software platform, such as STATA instead of SAS, must have prior approval from the instructor. Such approval will be given only on demonstration of sufficient ability with the alternative software. Relying solely on SPSS, Matlab, or Eviews is insufficient for the needs of this course.

Guidelines on Collaboration and Exchange of SAS code and data: You are not to share directly or indirectly with anyone else data or computer code (including, but not limited to raw data, processed data files, SAS code or Excel code), except as allowed for in the following. We encourage you to share code snippets by posting on the course D2L discussion board. This is a good way for you and others to learn new techniques or thoughtful approaches. We will count constructive contributions to the course website as part of your overall class participation. A code snippet is a piece of code that accomplishes a single task. It might contain a number of steps, but all steps are relevant to the targeted task. A SAS program is more than a code snippet and we generally prefer not to have complete programs posted. If you would like to share SAS code, we certainly encourage it. If you are uncertain about whether it fits under this policy, you can go ahead and post it without fear of penalty, understanding that we might ask you to revise your post. Otherwise, we are happy for you to ask us for guidance.
You are still welcome to discuss the projects outside class and exchange ideas. However, the exchange of actual SAS code or data should be restricted, as described here.

In addition, you are to e-mail all of your code used in a project to the instructor on the day that the project is due. Your code should cite any and all contributions that you sourced from the course D2L discussion board. Cites should be in the form of a comment in SAS code, a note in an Excel file, and/or a footnote in the write-up, as appropriate to the context of the citation. For example, if you use a code snippet from a post on D2L, then the code should be preceded by a simple comment in your code as to the original author of the code and the date of the code snippet post. As another example, if you conduct a hypothesis test, specify a regression model, or construct a sample as substantially suggested by a D2L post, you should cite this in your write-up in a footnote.

Presentations and write-ups are to be your own work and not the work of others in whole or in part. All write-ups will be submitted through D2L.

**Academic Dishonesty:** Cheating will not be tolerated—we will refer any case of suspected cheating to the university and recommend an F in the class as the minimum penalty.

**Class Disruption or Cancellation:** In the event that class is cancelled, and/or SIU campus is closed, students should proceed as given by SIU policies and procedures. Instructions for this class will be given via the course website, and/or email. If internet access is unavailable then students are expected to continue to work on the assigned projects as indicated in the syllabus. Upon the resumption of class, students will be expected to have made progress on all material required up to that point.

**Emergency Procedures:** Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, on the BERT’s website at [www.bert.siu.edu](http://www.bert.siu.edu), the Department of Public Safety’s website [www.dps.siu.edu](http://www.dps.siu.edu) (disaster drop down) and in the Emergency Response Guidelines pamphlet. Know how to respond to each type of emergency.

The instructor will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. **It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.** The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.

**Grading** (subject to change at the discretion of the instructor):

- Class Participation: 16%
- Final Exam: 20%
- Projects and Presentations: 64%

This first section of the course will be structured around a series of projects. These projects are designed to familiarize you with increasingly complex research methods using the most useful datasets for finance research.

The write-ups and presentations should include the following:

1. Introduction, context, and research questions.
2. Very brief literature review focusing on the papers whose methods and sample are the most similar to this project. I will provide 1 reference. You should then find at least 1 paper published on a top finance or economics journal and one working paper. Limit the literature to at most 5 papers. PDFs of your references must be uploaded to the course website.

3. Two or three precisely-specified and testable hypotheses. Express these both qualitatively (in words) and quantitatively (by formula).

4. A description of the database to be used, the data collection methods, and alternative data sources. Carefully describe and provide statistics on the variables included, the number of observations at all stages of sample construction, sample biases, and data errors. Include detailed descriptive statistics of the final sample.

5. Empirical Analysis: focus on the simplest possible econometric tests of your hypothesis (t-tests for differences in means are usually sufficient). Include additional analysis of the robustness based on alternative variables and sample construction methods rather than more advanced econometric techniques.

6. Clearly indicate if the hypotheses are rejected or not rejected by the analysis. Interpret the results with regard to the research questions that were first proposed. Compare these results to other studies.

7. Discuss the limits, shortcomings, and potential problems with the analysis.

8. Propose improvements to the analysis and paths for further research.

9. Any SAS code, online resources, or other documentation of analysis should be submitted as an appendix to each final report.

For most projects there will be 2 presentations.

**Introductory Presentation:** The presentation will describe items 1-3 given above, as well as proposals and initial experiences for item (4).

**Empirical Analysis Presentations:** This presentation will describe the final results for item (4), as well as items 5 and 6.

**Draft Reports:** For each project, all students should submit a draft report for items 1-4. The draft report will be submitted by the beginning of class on the day of the introductory presentation. These reports should be about 4-6 pages and will cover the same material as the introductory presentation.

**Full reports:** Each student will complete and submit a final 10-20 page (5-10 pages of text and 5-10 pages of tables and figures) full report (items 1-9) on the day of the second presentation.

Some projects will be done in one week, with the two presentations and reports combined.

**Class Participation:** Every student must participate in every class meeting to discuss the presenters’ work, your own experiences (for all items), and the related literature. Non-presenters should take the lead in discussing items 7 and 8 given above.

**Exams:** The exams will be similar in format and difficulty to what one could expect on a Ph.D. comprehensive exam. You will be given one or more potential research projects similar to the ones we have done in the course. The mid-term will be take-home and the final exam will be in-class. The exams will require you to propose the hypotheses, data sources, and basic methodology for a research study. Your response should be similar to one of the draft reports from the class.
Project Descriptions

1. CRSP Project (2 weeks)

Part 1: Characterize the CRSP monthly and daily databases by creating tables of summary statistics. Items that must be included in the analysis are the distributions of:

- Number of stocks
- Capitalizations
- Volume
- Length of return record
- Surviving and non-surviving firms
- Month of year / Year / Decade
- Delistings
- Missing dates
- Type of security

Part 2: Describe and test simple hypotheses about the standard deviation of daily stock returns. Pay attention to cross-sectional vs time-series aggregation of data. Some questions that you should address are: What is the average stock’s standard deviation of daily returns over time? What is the average day’s standard deviation of daily returns across stocks? What is the standard deviation of daily returns across all daily observations in the CRSP database? How is the standard deviation of daily returns related to the level of returns? What variables are related to variation in the standard deviation of daily returns over time? What variables are related to variation in the standard deviation of daily returns across stocks? What variables are related to variation in the standard deviation of daily returns across return-day observations?

New programming procedures to learn and use: Data step; Proc means; proc sort.

2. CRSP Event Study Project

Using the CRSP database, formulate and test hypotheses regarding return and volume behavior around stock splits. (2 weeks)


Part 2: Compute CARs and test hypotheses about return and volume behavior around splits. Use a mean return model, a 1-factor (CAPM) market model, and a 3-factor (Fama-French) model to compute the ARs. Also state and test hypotheses about cross-sectional and/or time-series variation in your test results. Use regressions to test these hypotheses.


New programming procedures to learn and use: Proc reg; proc ttest; do statement.

3. CRSP MF Project

Using the CRSP Survivorship Free Mutual Fund database, characterize the distribution of mutual fund returns by fund age, size, style, fees, and turnover. Use monthly return data to construct a panel of
rolling 3-year portfolio periods. Develop and test hypotheses that relate risk-adjusted performance to fund age, size, style, fees, and turnover. (2 weeks)

New programming procedures to learn and use: counters; date functions.

4. CRSP MF Holdings Project

Using the CRSP Survivorship Free Mutual Fund database, merge the MF holdings with CRSP data on spreads and volume. Compute and test hypotheses that relate the performance of the fund to the liquidity of the fund’s holdings, as measured by the average spread and volume of its holdings. (1 week)

5. CRSP-Compustat Project

Obtaining annual leverage information from Compustat and daily returns data from CRSP, formulate and test hypotheses relating returns to beta and book/market ratios. Use daily returns from CRSP to compute annual betas. Use Fama-MacBeth style regressions to test your hypotheses in the context of the cross-sectional of stock returns. (2 weeks)

New programming procedures to learn and use: Merging, transpose, macros, formatting, proc syslin.

6. Execucomp Project

Merge data from Execucomp with data from CRSP and Compustat. Develop and test hypotheses that relate compensation to risk (beta and SD). (1 week)

New programming procedures to learn and use: fixed effects.

7. Dealscan and Mark-to-Market (Loan) Pricing database Project

Merge data from Dealscan or the Loan Pricing Database with one of our other databases. Develop and test basic hypotheses relating variables from the new database to the existing one. (1-week)

New programming procedures to learn and use: interaction terms; proc probit; proc logistic; proc npar1way.

8. Sentiment Project:

Details forthcoming at a future time.
**Required topics:**
You must use each of the following procedures/methods in at least one project. Failure to do so will result in a deduction of 3 percentage points from your participation grade for each one missed:

1. Probit and Logit models
2. Interaction terms
3. 2SLS and/or Instrumental Variables
4. Orthogonalization
5. Fama-MacBeth style regressions
6. 3-factor model of stock returns
7. Data from Bloomberg
8. AR and MA corrections (from Proc Autoreg, VARMAX, or ARIMAX)
9. Rolling portfolio periods
10. Matched sample
11. Non-parametric statistics
12. Fixed effects
13. Clustering adjustments
14. HCC error adjustments
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<tr>
<th>Date</th>
<th>Topic</th>
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<tr>
<td>1/20</td>
<td>Course Introduction and Overview</td>
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<td>Review of resources: Programs, Journals and Databases.</td>
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<td>1/27</td>
<td>CRSP Project. Introductory Presentation 1: __________</td>
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<td>CRSP Project. Analysis Presentation 1: __________</td>
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