

M524 Financial Econometrics

Indiana University, Department of Economics

Fall 2021, Syllabus (Last updated on October 25, 2021)

Instructor: Myong Jong(MJ) Shin

Email: : myonshin@iu.edu

Office Hours: Via appointments

Class Hours: TR 01:10 PM~02:25 PM

Office: Wylie Hall(WY) 250

Class Room(Hybrid): Ballantine Hall(BH) 135

Office hours held **in-person** or via **Zoom**

Link: Generated appointment-specific

Course overview

This course is for MS students in the department of economics to serve as an introduction to the field of financial econometrics. The class is designed for students wishing to gain a solid understanding of theory and tools for implementation. First we will cover basic and more advanced econometric tools needed for analyzing financial data. These will become our friends in tackling the topics later where we discuss from classical papers of the field to more recent ones in the literature. We will also learn how to implement your understanding of financial econometrics via programming. After the class, you will be able to analyze and model economic time series data as well as different financial asset prices to the degree expected of a graduate student in economics¹.

Please note that this is not a course in finance. Financial econometrics discussed in this class is first and foremost an econometrics class and we will not be focusing solely on finance. Rather, this class is targeted for economists, like ourselves, to solve econometric problems in the finance literature. Sometimes, few econometric aspects of the research in finance is left unchecked and possible problems regarding handling some of the financial data remains unanswered. One important job for us is to check their work and find parts of their research involving econometrics that needs to be fixed. If there are issues found, we provide the tools to correct them. The work is similar to that of a computer engineer trying to find bugs in computer programs by checking code for fixing and providing tools needed for repair.

Although we will use MATLAB for programming, do not worry about your computer programming language skills. This is not a computer science class and as you shall see later, our use of programming is limited to calculations and simulating data. With that said, the syntax of MATLAB language might take some getting used to at first for those of you who are unfamiliar with it. Ask for my help should you have problems with it.

¹I reserve the right to update the syllabus when necessary. I will notify you when changes have been made.

Prerequisites

One semester of graduate course in econometrics (linear regression, hypothesis testing, time series analysis, basic asymptotic theory) is expected. In particular, I will reference materials from your past enrollments in the department such as M504 and M514. Although I expect you to be familiar with them, quick reviews will be done so that everyone can progress at the same starting point. I will do my best to keep the course self contained and minimize discussing topics beyond the scope of this class.

Main Course materials

For good understanding of the material discussed and a satisfactory grade, the most important course material that you should rely on are the lecture notes and assignments provided to you on Canvas. For more general econometric tools we will use throughout, we will mainly reference freely accessible texts. Other materials I have included are not free but I do not require you to have them. I will show during class where you can find these freely accessible materials, marked with †.

† Diebold, *Forecasting, Time Series Econometrics*, and *Econometrics*

† Cochrane, *Time Series for Macroeconomics and Finance*

Stock&Watson, *Introduction to econometrics*, Pearson, 3rd (basic econometric theory)

Hayashi, *Econometrics*, Princeton University Press

Hamilton, *Time series analysis*, Princeton University Press

† Hansen, *Probability and Econometrics*

Authors to the list of texts mentioned, regardless of accessibility, own the copyright to their material. Therefore, their work should not be modified or used for commercial use in any way.

Technology & Software

The use of a personal computer (Windows, Mac, or Linux) with internet connection is needed for our course. All of the course-related material will be handled on our class Canvas. Announcements to the class will be made via Canvas also. For software, we will mainly use MATLAB (use the most recent one available). If you don't have MATLAB installed on your work station, you can go to the following sites, (1) and (2), to use MATLAB online (your IU username and password needed). I mainly work in the Windows environment and I do not have much experience using other types of OS. If some issues occur, I will try my best to fix them. For research desktop help, refer to <https://kb.iu.edu/d/apum>.

1. IUanyWARE (windows): <https://iuanyware.iu.edu> (1)

2. Research Desktop (Linux): <https://red.uits.iu.edu> (2)

A lot of work in econometrics is done by MATLAB and it has a collection of helpful toolboxes that can make our lives easier. A useful MATLAB econometrics toolbox is by James

P. LeSage. The package can be downloaded <https://www.spatial-econometrics.com/>. After downloading the zipped folder(jplv7.zip), extract the toolbox and save it under your MATLAB working directory. Then add it to your MATLAB search path(Set Path→Add with Subfolders) so that you can call any function in the package. There are many useful ones such as `ols.m`, `hwhite.m`, `garchpq.m` as well as others. You are welcome to use any other MATLAB packages you can find online or are shared by other researchers but you **MUST reference them** when using for any of the graded assignments and exams in class. On some assignments, the use of certain toolboxes may be restricted.

Grading Policy

There will be **6 random attendance checks** throughout the semester during class time(except exams) that will be part of the grade. With exceptions to certain circumstances, I expect everyone to be present for the entire class period and do not arrive late or leave early. For assignments, I will go over them with you during class after the deadline for feedback. It will be done only for ones that could benefit from in-class discussion and not all. Additionally, each student is to work on presenting a **replication of recent papers** in financial econometrics with additional results of your own. You must be in class to present your work and attendance will be taken during presentation class. Finally, we have **2 exams** during class time.

Grade proportions are as follows;

Attendance (3%), Assignments (25%), Exam 1 (25%), Exam 2 (25%), Presentation (22%)

Timing on the Assignments and Late Submissions

Each assignment will require you to either (1) turn in your assignments on Canvas or (2) turn in on the day before beginning of the class to me. This will depend on the assignment at hand and more will be discussed later. For the latter, you must be present in class to hand in your own work. If you are unable to, you need to set up an earlier time with me to turn in your work separately. Except for certain circumstances, no late work will be accepted and graded. You are encouraged to submit your work **even if it's incomplete** to receive partial credit before the deadline. One of the most important parts of this course is you learning and getting feedback.

Important Dates

Exam 1: Oct 14th

Thanksgiving break: Nov 21th ~ Nov 28th(no class)

Presentation: Nov 30th and Dec 2nd, approximately 30 minutes long per person

Exam 2: Dec 14th, Take-home Exam

Both presentation and exam 1 will take place during class time at our usual classroom unless notified otherwise. The dates can be changed during the semester and it will be notified to class beforehand.

COVID-19 related policies and support

IU is following recommended public health guidance in response to the pandemic. In recognition of all IU community members owe to each other, the university expects every member of the IU community will adhere to all current policies and practices. Therefore, if you have a positive COVID-19 test, have COVID-like symptoms, or have been instructed to quarantine you should NOT attend class. An individual's vaccination status is protected information and you do not have to disclose that with me. For the most up-to-date information on issues related to Covid, see <https://covid.iu.edu/>.

In order to continue following guidance from the Centers for Disease Control and Prevention (CDC) and Indiana Department of Health (IDOH), we are required to wear a mask indoors for everyone's safety. Go to <https://www.iu.edu/covid/prevention/masks-and-ppe.html> for more details. I have also uploaded an Interim Guidance on Masks (Face Coverings) for Individuals Fully Vaccinated for COVID-19 and also one for not Fully Vaccinated for COVID-19 on Canvas for your information.

In particular, as of August 5th 2021, masks are required when in public spaces inside buildings, and when attending meetings or in spaces where one cannot socially distance. The university mandate is in alignment with that of the local Monroe County mandate that includes exceptions that masks are not required indoors if you are making a presentation and are able to maintain six feet of distance from others. The latter is being interpreted to include instructors not having to wear a mask if teaching in person to students that are six feet away or more. For one-on-one meetings and other small meetings where there is enough room to socially distance and everyone agrees, we may remove masks.

Support for your health and well-being is important. Many students are struggling with a variety of challenges, especially during COVID, and there are places where you can get help. If you are concerned with your mental health, you can visit the Counseling and Psychological Services(CAPS) website at <https://healthcenter.indiana.edu/ounseling/index.html>. Also, <https://studentaffairs.indiana.edu/student-support/get-help/index.html> is the Dean of Students' Office website for more information on where to find support you need.

Academic integrity & Class Policy

As a student at IU, you are expected to adhere to the standards contained in the Code of Student Rights, Responsibilities, and Conduct (<http://studentcode.iu.edu/>). Academic misconduct is defined as any activity that tends to undermine the academic integrity of the institution. Academic integrity violations include: cheating, fabrication, plagiarism, interference, violation of course rules, and facilitating academic dishonesty. When you submit an assignment with your name on it, you are signifying that the work contained therein is yours, unless otherwise cited or referenced. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged. In addition, posting questions from quizzes/exams or assignments to or downloading answers from online sources is considered academic misconduct. All suspected violations of the Code will be reported to the Dean of Students (Office of Student Conduct) and handled according to University poli-

cies. Sanctions for academic misconduct in this course may include a failing grade on the assignment, a reduction in your final course grade, or a failing grade in the course, among other possibilities. If you are unsure about the expectations for completing an assignment or taking a test or exam, be sure to seek clarification from your instructor in advance.

I reserve a right to not respond or reply with a short "Please, check the Canvas page" to the emails asking me to reiterate information from the announcement on Canvas. Also I will not answer questions via email that would require more than a simple one line answer. Instead I will ask you to schedule a meeting.

I hold the exclusive right to distribute, modify, post, and reproduce our course materials, including all written materials, videos, study guides, lectures, assignments, exercises, and exams. Some of the course content may be downloadable, but you should not distribute, post, or alter the instructor's intellectual property. While you are permitted to take notes on the online materials and lectures posted for this course for your personal use, you are not permitted to re-post in another forum, distribute, or reproduce content from this course without the express written permission of the instructor. Various commercial services have approached students regarding selling class material. Selling instructor's notes/study guides or uploading course assignments to them in exchange for access to materials for other courses is not permitted. Violations of this policy will be reported to the Dean of Students (Office of Student Conduct) as academic misconduct. Sanctions for academic misconduct for this action may include a failing grade on the assignment for which the notes/study guides or assignments are being uploaded, a reduction in your final course grade, or a failing grade in the course, among other possibilities. Additionally, you should know that selling a faculty member's material individually or on behalf of one of these services using IU email, or Canvas may also constitute a violation of IU information technology and IU intellectual property policies; additional consequences may result.

DSS & Religious and Civic observances & Bias-Based Incident Reporting

Accommodations will be made for students registered with the Office of Disability Services for Students (DSS). If you need accommodations for a disability, then it is your responsibility to contact the DSS office and contact me to present the written supporting memorandum of accommodation from the DSS office. Note that requests for accommodations for disability must be received and authorized by your instructor no less than two weeks in advance of a need in order to allow adequate time to make appropriate arrangements. No accommodations should be assumed until authorized by your instructor. Additional information can be found at <https://studentaffairs.indiana.edu/disability-services-students/>.

Students missing class for a religious observance can find the officially approved accommodation form by going to the Vice Provost for Faculty and Academic Affairs webpage for religious accommodations. The form must be submitted at least two weeks prior to the anticipated absence. Refer to <https://vpfaa.indiana.edu/faculty-resources/teaching-resources/religious-observances-information.html> for more details.

Bias-based incident reports can be made by students, faculty and staff. Any act of dis-

crimination or harassment based on race, ethnicity, religious affiliation, gender, gender identity, sexual orientation or disability can be reported through any of the options: 1) email biasincident@indiana.edu or incident@indiana.edu; 2) call the Dean of Students Office at (812) 855-8188; or 3) use IU mobile App(m.iu.edu). Reports can be made anonymously.

Sexual Misconduct & Title IX

As your instructor, one of my responsibilities is to create a positive learning environment for all students. IU policy prohibits sexual misconduct in any form, including sexual harassment, sexual assault, stalking, sexual exploitation, and dating and domestic violence. If you have experienced sexual misconduct, or know someone who has, the University can help. If you are seeking help and would like to speak to someone confidentially, you can make an appointment with the IU Sexual Assault Crisis Services at (812)855-5711, or contact a Confidential Victim Advocate at (812) 856-2469 or cva@indiana.edu. It is also important that you know that University policy requires me to share certain information brought to my attention about potential sexual misconduct, with the campus Deputy Sexual Misconduct & Title IX Coordinator or the University Sexual Misconduct & Title IX Coordinator. In that event, those individuals will work to ensure that appropriate measures are taken and resources are made available. Protecting student privacy is of utmost concern, and information will only be shared with those that need to know to ensure the University can respond and assist. Visit <http://stopsexualviolence.iu.edu/index.html> to learn more.

Tentative outline & references per topic

The schedule is flexible to change with possibly more added topics and omitting some due to time constraint. Any changes will be notified prior via announcement on Canvas. The list per topic also provides sources where I reference materials for class. It also offers further readings if you are interested in studying a particular type of area or intend to pursue a professional career in research for econometrics or empirical finance. However, you only need to be comfortable with the materials on the lecture notes, assignments, and exams for the class. Others are not required for our course.

1. Review of econometric methods for time series

- Stock&Watson, *Introduction to econometrics*, Pearson, 3rd
- Diebold, *Forecasting, Time Series Econometrics*, and *Econometrics*
- Cochrane, *Time Series for Macroeconomics and Finance*
- Hayashi, *Econometrics*, Princeton University Press
- Hamilton, *Time series analysis*, Princeton University Press

2. Time series forecasting and predictive regression

- Amihud, Hurvich, and Wang(2009) ‘Multiple-Predictor Regressions: Hypothesis Testing’. *Review of Financial Studies*
- Chiquoine and Hjalmarsson(2009) ‘Jackknifing Stock Return Predictions’. *Journal of Empirical Finance*
- Efron(1993) ‘An Introduction to Bootstrap’. *Chapman & Hall/CRC*

- Golez and Koudijs(2018) ‘Four Centuries of Return Predictability’. *Journal of Financial Economics*
- Jiang, Lee, Martin, and Zhou(2019) ‘Manager Sentiment and Stock Returns’. *Journal of Financial Economics*
- Phillips(2015) ‘Pitfalls and Possibilities in Predictive Regressions’. *Journal of Financial Econometrics*
- Rapach, Ringgenberg, and Zhou(2016) ‘Short Interest and Aggregate Stock Returns’. *Journal of Financial Economics*
- Rapach, Strauss, and Zhou(2013) ‘International Stock Return Predictability: What is the Role of the United States’. *Journal of Finance*
- Stambaugh(1999) ‘Predictive Regressions’. *Journal of Financial Economics*

3. Predictability at long horizons

- Boudoukh, Richardson, and Whitelaw(2008) ‘The Myth of Long-horizon Predictability’. *Review of Financial Studies*
- Cochrane(2008) ‘The Dog that Did Not Bark: A Defense of Return Predictability’. *Review of Financial Studies*
- Hodrick(1992), ‘Dividend Yields and Expected Stock Returns: Alternative Procedures for Inference and Measurement’. *Review of Financial Studies*
- Lazarus, Lewis, Stock, and Watson(2018) ‘HAR Inference: Recommendations for Practice’. *Journal of Business & Economic statistics*
- Müller(2014) ‘HAC Corrections for Strongly Autocorrelated Time Series’. *Journal of Business & Economic statistics*

4. Out-of-sample prediction

- West(2006) ‘Forecast Evaluation’. *Handbook of Economic Forecasting, Vol 1. Elsevier*
- Clark and McCracken(2013) ‘Advances in Forecast Evaluation’. *Handbook of Economic Forecasting, Vol 2. Elsevier*
- Welch and Goyal(2008) ‘A Comprehensive Look at the Empirical Performance of Equity Premium Prediction’. *Review of Financial Studies*
- Campbell and Thompson(2008) ‘Predicting Excess Stock Returns Out of Sample: Can anything Beat the Historical Average?’. *Review of Financial Studies*
- Hamilton, *Time series analysis*, Princeton University Press

5. Cross-section of returns

- Cochrane(2005) ‘Asset Pricing’. *Princeton University Press*
- Campbell(2018) ‘Financial decisions and Markets: A course in Asset pricing’. *Princeton University Press*
- Bali, Engle and Murray(2016): ‘Empirical Asset Pricing: The Cross-Section of Stock Returns’. *Wiley*