National Sun Yat-Sen University
Spring 2024
BM690 Industrial Data Analysis and Casual Inference
Professor Chien-Yuan Sher

Class: Thur. 910-1200 CM1032
Office Hours: Thur. 1400-1600 CM4067 & Fri. 900-1100
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Overview

This course will teach you quantitative research methods when you conduct an industrial analysis. I will also take several types of industrial datasets as examples to discuss how to apply these quantitative methods. Because our discussion in this course is based on the concepts in economics and statistics, I strongly suggest you have a good understanding in economics (microeconomics or managerial economics) and statistics before you take this course.

This course has two parts: basic analysis tool/quantitative method, and different types of datasets you will possibly face and advanced quantitative method to deal with these data. In the basic part, I will focus on regression analysis. We will discuss how to use this method, and how to properly interpret the regression result; I will then introduce topics regarding endogeneity, nonlinear regression, and interaction terms.

In the data part, I will introduce several types of datasets, including time-series cross-sectional data, housing or artwork transaction data, market equilibrium data, and business registration data. While introducing these datasets, we will discuss the proper way to observe/interpret these data, and advanced methods to deal with these data. These methods some of which can help you to do a proper casual inference include difference-in-differences estimation (DID), statistical matching, instrumental variable regression, quantile regression, and survival analysis.

Moreover, to let you have an opportunity to apply these quantitative methods to practice, you need to complete a group project. In this project, you must pick an industry first. Then, you must collect data, and try to find the demand or supply curve, or try to answer relevant questions in that industry via data. You can learn how to make decisions based on evidence; understand the idea of evidence-based management.

Learning Objectives

1. Understand the quantitative methods in industrial analysis.
2. Know how to use market or industrial data to get market or industrial insights.
3. Know how to answer managerial questions via data.

Examinations and Grades

1. Criteria

Participation	10%
Group project	30%
Midterm	25%
Final exam	35%

2. Grades

90~100	A+	77~79	B+
85~89	A	73~76	B
80~84	A-	70~72	B-
		~70	Failure!

Readings

1. Required reading

- James H. Stock and Mark W. Watson (2010) 胥愛琦與呂瓊瑜譯。*計量經濟學*。台北：台灣培生教育 (ISBN: 978-986-280-021-8)。
- Related papers or industry analysis reports, which will be regularly posted on the National Sun Yat-sen Cyber University

2. Reference

- 陳正倉、林惠玲、陳忠榮與莊春發 (2014)。*產業經濟學*。台北：雙葉書廊 (ISBN: 978-986-7433-80-0)。

Outside the Classroom

1. National Sun Yat-Sen Cyber University (http://cu.nsysu.edu.tw/)

TA and I will regularly post important messages on the National Sun Yat-sen Cyber University. We will also put some supplementary materials on that website. Hence, please check the website frequently.

2. Office Hours

If you have any question about the course contents, the project, quizzes or examinations, please feel free to drop by my office (CM4067) in my office hours. If you cannot make it during my office hours, you can make an appointment by sending me an email in advance. If you want to send us an email, please put the word, "[IDA]", in the Subject Line of your email message, so we can quickly identify your email message.

Attention

1. Early Alert

After the midterm, I will be asked to identify students who are struggling with the course contents. Alerts may be issued for excessive absences, and trouble with subject matter. Early Alerts are not grades but it indicates concerns that instructors have with students' progress in this course. Students who receive an alert should arrange to meet with me to understand why the alert was issued and we may talk about strategies for how you can survive in this class.

2. Group projects

As mentioned above, you must complete a group project. To run this project, I will divide this class into 6 groups. After the midterm, you must pick an industry/market (e.g., cabbage) and an issue/question relevant to this industry, collect data, and do data analysis. Possible issues/problems can be "estimating the demand curve or price elasticities", "estimating the effects of marketing strategies", or "what is the impact of technology improvement on production efficiency or market structure in some industry." The key point is that your analysis/discussion should be based on data; hence, before picking an industry and a question, you should make sure you can have data relevant to that industry and question.

After the final exam, in the final two weeks of this semester, you must present your analysis result in the class. We will also discuss/question your result. After your presentation, you also have to submit your analysis report in a pdf file. Your presentation and analysis report should have three parts: first, an introduction to the industry and issue you pick; secondly, an explanation on how you get and clean data, and how you analyze data (empirical methods); thirdly, descriptive statistics for your data, analysis/regression results, and discussion.

The grading of your group project will depend on whether your presentation and report are clear, whether you adopt appropriate data to answer your question, whether you correctly use analysis tools, and whether you results/conclusions are reliable.

3. Midterm and the Final Exam

The final is cumulative, but the midterm is not. **No make-ups** are given on any exam. Absences will result in a zero for that particular exam. For exams, excused absences will result in a reweighting of your grade after I receive notification from the Office of Academic Affairs.

4. Academic dishonesty will result in serious consequences!!

Course Outline

Week	Topic	Required reading
2024/2/22	Course Introduction	
2024/2/29	*Basic Tool: Regression Analysis*	Ch.1.2.3&4 (SW)
2024/3/7	*Basic Tool: Regression Analysis*	Ch.1.2.3&4 (SW)
2024/3/14	*Basic Tool: Regression Analysis and Causal Inference*	Ch.6 (SW) and related papers
2024/3/21	*Basic Tool: Regression Analysis and Causal Inference*	Ch.6 (SW) and related papers
2024/3/28	*Basic Tool: Regression Analysis and Nonlinear Models*	Ch.5 (SW)
2024/4/4	Tomb Sweeping Day	
2024/4/11	**Midterm**	
2024/4/18	*Time-series Cross-sectional Data: Fixed Effects Model, DID Estimator, and statistical matching*	Ch.10 (SW) and Handout
2024/4/25	*Time-series Cross-sectional Data: Fixed Effects Model, DID Estimator, and statistical matching*	Ch.10 (SW) and Handout
2024/5/2	*Housing or Artwork Transaction Data: Hedonic Pricing Method*	Handout
2024/5/9	*Market Equilibrium Data: Instrumental Variable Regression*	Ch.9 (SW)
2024/5/16	*Market Equilibrium Data: Instrumental Variable Regression*	Ch.9 (SW) and industry analysis report
2024/5/23	*Business Registration Data: Survival Analysis*	Handout
2024/5/30	**Final Exam**	
2024/6/6	Group Presentation and Discussion	
2024/6/13	Group Presentation and Discussion	

Note: “SW” means “Stock and Watson 編寫，胥愛琦與呂瓊瑜譯之計量經濟學課本”。

Any changes to this schedule will be announced in class or on National Sun Yat-Sen Cyber University (http://cu.nsysu.edu.tw/).