
Statistical methods and data analysis

Graduate, Dept. of International Business

2-5pm, Thursday / Classroom C121

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Office hours: 12-2pm, Wed. @C429

Course description

This course is designed to equip students with the abilities of analyzing data using statistical apps to satisfy the potential needs in thesis writing and managerial tasks. The course content is composed of six modules. The first module instructs how to collect primary and secondary data using questionnaires and databases, as well as the data preparation in statistical software. The second module introduces methods frequently used to describe the profiles of the data. The third module provides lectures on the fundamental concepts of inferential statistics with regard to statistical estimation and hypothesis testing, as well as the methods testing population means. The fourth module practices how to test causality using regression models. Module 5 introduces advanced multivariate methods dealing with data reduction and prediction. The sixth module introduces some analytical approaches to the modern needs in analyzing big data and qualitative data. In addition to the class lectures, students are required to practice the methods through assignments and turn in a term project.

Course objectives

Students are expected to possess the following capabilities after taking this course :

1. knowing how to collect, transform, and integrate data;
2. familiar with the use of statistical software to describe and present data;
3. understanding the fundamental concepts underlying statistical inferences;
4. being able to independently practice the entire process from data collection to managerial implication.

Evaluation

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|-----------------------|-----|
| 1. Paper presentation | 20% |
| 2. Homework | 50% |
| 3. Term project | 30% |

Textbook

None

References

1. Weiss, N. A. (2017), *Introductory Statistics*, 10th ed., Boston, Addison Wesley, MA.
2. 吳明隆、涂金堂 (2019) · *SPSS 與統計應用分析* · 二版 · 台北：五南圖書。
3. 蕭文龍 (2023) · *統計分析入門與應用：SPSS 中文版 + SmartPLS 4 (PLS-SEM)* · 第四版 · 台北：碁峰。
4. 邱皓政 (2017) · *多層次模式與縱貫資料分析：Mplus 8 解析應用* · 台北：五南圖書。

Schedule

Week	Date	Topic	Software	Credits
1	2/22	Course introduction: An overview of the applications of Statistics		
2	2/29	Data Preparation: Archival data, Questionnaire, & Software	Excel	
3	3/7	Descriptive statistics: Statistics, correlation, reliability & validity		10%
4	3/14	Population characteristics: Two-means & association ~ t & χ^2 tests	SPSS	10%
5	3/21	Population characteristics: Mean difference ~ ANOVA ¹	SPSS	10%
6	3/28	Causality: Multiple Regression ²	SPSS	10%
7	4/4	~ Spring break ~		
8	4/11	Causality: Variant forms of Regression ~ Logistics ³ & Nonlinear ⁴	SPSS	15% each
9	4/18	Causality: Moderation & Mediation ⁵	SPSS/Process	10% each
10	4/25	Causality: Panel data analysis ⁶	Stata	20%
11	5/2	Multivariate techniques: MANOVA ⁷	SPSS	10%
12	5/9	Multivariate techniques: Factor analysis ⁸	SPSS	15%
13	5/16	Multivariate techniques: Cluster ⁹ & Discriminant analysis ¹⁰	SPSS	10% each
14	5/23	Systematic Relationship: Structural Equation Modeling (SEM) ¹¹	AMOS	30%
15	5/30	Hierarchical Relationship: Multi-level Analysis (MLM) ¹²	Mplus	35%
16	6/6	Social network analysis ¹³	UCINET	30%
17	6/13	Text analysis ¹⁴		
18	6/20	~ Buffering week ~		

Papers

1. **ANOVA**: Li, Lam, & Qian (*JIBS* 2001)
2. **Multiple regression**: Elango & Pattnail (*JIBS* 2007)
3. **Binary logistic regression**: Qian & Delios (*JIBS* 2008)
4. **Nonlinear regression**: Kim, Kim, & Lee (*OS* 2008)
5. **Moderation and mediation regression**: Wei & Lau (*JIBS* 2008)
6. **Panel regression**: Yang, Chiao, & Kuo (*IEEE* 2010)
7. **MANOVA**: Ralston, Holt, Terpstra, & Yu (*JIBS* 2007)
8. **Factor analysis**: Steensma, Barden, Dhanaraj, Lyles, & Tihanyi (*JIBS* 2008)
9. **Cluster analysis**: Bayir (*BERJ* 2023)
10. **Discriminant analysis**: Surtpto (*APMR* 2023)
11. **SEM**: Steensma & Lyles (*SMJ* 2000)
12. **MLM**: Ma, Petrou, Bakker, & Born (*JBE* 2023)
13. **Network**: Brullebaut, Allemand, Prinz, & Thepot (*RMS* 2022)
14. **Text analysis**: Chou, Liu, & Yang (*LRP* 2023)

* The presenter of each paper is responsible for preparing a handout in Chinese, three pages at most, and uploading it to the class platform no later than 24 hours before the class. The handout should describe the method and result sections in more details than other sections. Please also sketch the data structure that you conceive in the handout. Each presenter has twenty minutes for the oral presentation using PPT.

Term Project

1. Propose a managerial study that contains the typical five sections. You can concisely draft on introduction, literature/hypotheses & conclusion, but you need to comprehensively and clearly describe the method & result sections.
2. Apply the methods discussed in the class to describe your data, test your hypotheses, and report the results according to the rigid academic format.
3. Each method that we discussed in the class is assigned a corresponding weight as displayed in the last column of the *Schedule* table. You are totally free to employ any listed method in your term project but the maximum credits each method earns are subject to its weight and the total credits earned from all the methods you employ are subject to 100%. This “methods” part accounts for 30% out of the 40% of the entire project credits. Contents excluding the “methods” part account for 10% out of the 40%.
4. Be including a self-appraisal page addressing the methods used in the front of your term report.