

# 個別課程英文授課大綱

表單編號：QP-T02-07-11

保存年限：10年

課程名稱 Course Title	(中文) 統計與計量方法於資管與作業研究 (英文) Statistical and Econometric Methods for Information and Operations Management Research		
授課教師 Instructor	莊皓鈞老師	開課單位 Departments	資管系
學分數 Credit(s)	3	修課對象 Target Students	碩士班、博士班
課程目標 Course Objectives	<p>This course is designed to familiarize graduate students with statistical and econometric methods for information and operations management research. As the use of secondary data has become predominant in empirical research at business school, adopting rigorous methods to analyze the data is of paramount importance. This course will provide a comprehensive survey of modeling techniques that have been adopted by researchers in our field. There will be a significant amount of reading from week to week. Reading materials include book chapters and research papers in each of the topics. You are expected to read the assigned materials before class and prepare for class discussions. In the discussion process, we will carefully assess the research design and most importantly, the methodology employed to address research questions. My goal is to expose you to best-in-class research and bring your research skills into the next level.</p>		
課程大綱 Course Description	<p>Empirical research Regression analysis I &amp; II Multivariate analysis System of regression equations Panel data analysis Non-linear regression I, II, &amp; III Efficiency analysis I &amp; II Simulation I &amp; II Emerging methods</p>		
上課進度 Weekly Course Schedule	<p><b>Session 1: Empirical research</b> Topics: Empiricism, association vs. causality, moderation/interaction, full/partial mediation, etc.</p> <ol style="list-style-type: none"> <li>1. Barwise, 1995. Good empirical generalizations. <i>Marketing Science</i>.</li> <li>2. Flynn et al. 1990. Empirical research methods in operations management. <i>JOM</i>.</li> <li>3. Benbast and Zmud, 1999. Empirical research in information</li> </ol>		

systems: The practice of relevance. *MISQ*.

4. Roth, 2007. Applications of empirical science manufacturing and service operations. *M&SOM*.

5. Fisher, 2007. Strengthening the empirical base of operations management. *M&SOM*.

**Session 2: Regression analysis I**

Due assignment: Essay I.

Topics: OLS, multicollinearity, heteroskedasticity, ANOVA, etc.

1. Randall and Ulrich, 2001. Product variety, supply chain structure, and firm performance. *MS*.

2. Lin et al. 2013. Too big to fail: Large samples and the *p*-value problem. *ISR*.

3. Heim and Field, 2007. Process drivers of e-service quality: Analysis of data from an online rating site. *JOM*.

4. Ton and Raman, 2010. The effect of product variety and inventory levels on sales: A longitudinal study. *POM*.

**Session 3: Regression analysis II**

Topics: Endogeneity, instrumental variable, 2SLS, selection bias, etc.

1. Mani et al. 2010. An empirical analysis of the impact of information capabilities design on business process outsourcing performance. *MISQ*.

2. Siebert and Zubanov, 2010. Management economics in a large retail company. *MS*.

3. Fisher et al. 2006. Retail store execution: An empirical study. *Working Paper*.

4. Nagar & Rajan, 2005. Measuring customer relationships: The case of retail banking industry. *MS*.

**Session 4: Multivariate analysis**

Due assignment: Essay II

Topics: MANOVA, principal component, factor, cluster, and discriminant analysis.

1. Olson et al. 2005. Operational, economic and mission elements in not-for-profit organizations: The case of the Chicago Symphony Orchestra. *JOM*.

2. Frohlich and Westbrook, 2001. Arcs of integration: An international study of supply chain strategies. *JOM*.

3. Bhalla et al. 2008. Is more IT offshoring better?: An exploratory study of western companies offshoring IT-enabled services to South East Asia. *JOM*.

**Session 5: System of regression equations**

Topics: Seemingly unrelated regressions, simultaneous equations model, etc.

1. Brynjolfsson and Hitt, 1996. Paradox lost? Firm-level evidence on the returns to information systems spending. *MS*.
2. Campbell and Frei, 2011. Market heterogeneity and local capacity decisions in services. *M&SOM*.
3. Kesavan et al. 2010. Do inventory and gross margin data improve sales forecasts for US public retailers? *MS*.
4. Duan et al. 2008. Do online reviews matter? – An empirical investigation of panel data. *Decision Support Systems*.

**Session 6: Panel data analysis**

Due assignment: Essay III

Topics: Fixed effects, random effects, dynamic panel, serial correlation, attrition bias, etc.

1. Gaur et al. 2005. An econometric analysis of inventory turnover performance in retail services. *MS*.
2. Roberts et al. 2006. Understanding the motivations, participation and performance of open source software developers: A longitudinal study of the Apache projects. *MS*.
3. Chuang et al. 2013. Impact of value-added service features in e-retailing processes: An econometric analysis of website functions. *Working Paper*.
4. Yao and Zhu, 2012. Do electronic linkages reduce the bullwhip effect? An empirical analysis of the U.S. manufacturing supply chains. *ISR*.

**Session 7: Non-linear regression I**

Topics: Logit model, probit model, etc.

1. Heim and Ketzenberg, 2011. Learning and relearning effects with innovative service designs: An empirical analysis of top golf courses. *JOM*.
2. Brynjolfsson et al. 2009. Battle of the retail channels: How product selection and geography drive cross-channel competition. *MS*.
3. Ren et al. 2011. Managing product variety and collocation in a competitive environment: An empirical investigation of consumer electronics retailing. *MS*.
4. De et al. 2011. Technology usage and online sales: An empirical study. *MS*.

**Session 8: Non-linear regression II**

Due assignment: Empirical research proposal.

Topics: Event study, duration analysis, hazard rate, etc.

1. Randall et al. 2006. An empirical examination of the decision to invest in fulfillment capabilities: A study of internet retailers. *MS*.
2. Singh KC and Terwiesch, 2012. An econometric analysis of patient flows in the cardiac intensive care unit. *M&SOM*.
3. Bhattacharjee et al. 2007. The effect of digital sharing technologies on music markets. *MS*.
4. Kauffman and Wang, 2008. Turning into the digital channel: Evaluating business model characteristics for internet firm survival. *IT & Management*.

**Session 9: Non-linear regression III**

Topics: Event study, count data models, mixed Poisson regression, etc.

1. Kauffman et al. 2012. Event history, spatial analysis and count data methods for empirical research in information systems. *IT & Management*.
2. Miller and Tucker, 2009. Privacy protection and technology diffusion: The case of electronic medical records. *MS*.
3. Shafer and Moeller, 2012. The effects of six sigma on corporate performance: An empirical investigation. *JOM*.
4. Chuang and Oliva, 2013. Estimating retail demand distribution with Poisson mixtures and out-of-sample likelihood. *Applied Stochastic Models in Business and Industry*.

**Session 10: Efficiency analysis I**

Due assignment: Essay IV

Topics: Production economics, efficiency frontier, data envelopment analysis (DEA)

This session will be taught by a guest professor – Dr. Chia-Yen Lee (李家岩) at National Cheng-Kung University. Dr. Lee will assign other readings (if necessary) at least one week before class (see his information at <http://140.116.86.229/>)

1. Chen and Zhu, 2004. Measuring information technology's indirect impact on firm performance. *Information Technology & Management*.
2. Chen and Delmas, 2011. Measuring corporate social performance: An efficiency perspective. *POM*.
3. Iyer et al. 2013. Effect of quality management systems and total

quality management on productivity before and after: Empirical evidence from the Indian auto component industry. *POM*.

**Session 11: Efficiency analysis II**

Topics: Stochastic frontier analysis (SFA), SFA vs. DEA.

1. Coelli, 2005. Chapter 9.
2. Li et al. 2010. Why do software firms fail? Capabilities, competitive actions, and firm survival in the software industry from 1995 to 2007. *ISR*.
3. Chuang et al. An empirical investigation of the inventory leanness-efficiency link in U.S. food retailing. *Working Paper*.
- Pang et al. 2011. Information technology and administrative efficiency in U.S. state governments - A stochastic frontier approach. *Working Paper*.

[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1612820](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1612820)

**Session 12: Simulation I**

Due assignment: Essay V

Topics: Distribution fitting, fitness assessment, experimental design, Monte-Carlo, etc.

1. Chatfield et al. 2004. The bullwhip effect—impact of stochastic lead time, information quality, and information sharing: A simulation study. *POM*.
2. Fleisch and Tellkamp, 2005. Inventory inaccuracy and supply chain performance: A simulation study of a retail supply chain. *International Journal of Production Economics*.
3. Reiner et al. 2013. Analyzing the efficient execution of in-store logistics processes in grocery retailing—the case of dairy products. *POM*.
4. Chuang and Oliva, 2013. Empirical modeling of inventory record audit policies. *Working Paper*.

**Session 13: Simulation II**

Topics: System dynamics

1. Sterman, 2002. System dynamics: Tools for learning in a complex world. *California Management Review*.
2. Oliva and Sterman, 2001. Cutting corners and working overtime: Quality erosion in the service industry. *MS*.
3. Georgantzas and Katsamakos, 2008. Information systems research with system dynamics. *System Dynamics Review*.
4. Chuang and Oliva, 2013. Inventory record inaccuracy: Causes and labor effects. *Working Paper*.

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	<p><b>Session 14: Emerging methods</b>                  Due assignment: Essay VI                  Topics: Bayesian analysis, structural models, hierarchical/multilevel modeling, etc.</p> <ol style="list-style-type: none"> <li>1. Musalem et al. 2010. Structural estimation of the effect of out-of-stocks. <i>MS</i>.</li> <li>2. DeHoratius and Raman, 2008. Inventory record inaccuracy: An empirical analysis. <i>MS</i>.</li> <li>3. Mani et al. 2012. Estimating the impact of understaffing on sales and profitability in retail stores. <i>Working Paper</i>.</li> <li>4. Han et al. 2011. Research note – Returns to information technology outsourcing. <i>ISR</i>.</li> </ol> <p><b>Session 15: Term paper presentation</b>                  Each individual/group will have to present the term paper. The presentation should last no longer than 22 minutes and 5 extra minutes will be left for Q&amp;A. Everyone in the class is encouraged to ask question and provide constructive critiques/suggestions.</p>
<p>教學方式                  Instructional Method</p>	<p>Except session 1 in which we will go over five papers, for the rest of semester you will have to read three to four papers each week. In the first hour of each session I will give a succinct lecture about the essence of modeling methods and methodological issues related to assigned readings. In the last two hours of each session we will jointly assess required readings through discussion. In addition to those journal articles listed below, I plan to distribute some book chapters before each session to enhance your background knowledge. I purposefully select articles from top-notch journals in information and operations management. Most articles adopt cutting-edge methods and thus may not be easy-to-read. While I DO NOT expect you to fully understand the details of all the articles, you MUST try your best to make a critical assessment of assigned readings before class.</p>
<p>課程要求                  Course Requirements</p>	<p>A good understanding of basic principles of statistics and probability is expected. You must be able to write and discuss in English. If you have any questions/concerns, talk to me.</p>
<p>評量方式                  Evaluation</p>	<p>Class participation: 30%                  Written assignments: 30%                  Empirical research project: 40%</p> <p><i>Class participation:</i> The course will require discussion and</p>

presentation (in English) of assigned readings. While I will lead some discussions, each of you should try to stimulate class discussion by asking questions, commenting on the readings, etc. If you are asked to present a paper, your presentation will have to cover the article's motivation, question, data, methodology, assumption, result, and contribution. You should conclude the talk by assessing strength and weakness of the paper. The presentation should be designed to be 20-25 minutes in length.

*Written assignments:* To complete your degree, you must write a thesis. An important goal of this course is to develop your writing skills. To help you achieve the goal, you are required to write a 500 – 800 words essay (**1.5 space lines spacing & NO more than two pages**) every two weeks. My purpose is to force you to exercise building and justifying an argument in written form. Grammar, choice of words, logical flow of the argument, and overall structure are important components of a well-written document.

During this term, I expect you to meet with the research active faculties in your department, find out about their research agenda, familiarize yourself with their work, and explore how it relates to your research interests. To help you accelerate that process, I require that two out of the six essays be dedicated to this topic. For the remaining essays, you can write on any topics related to (but not limited to) your research interests, business/economic/social phenomena, etc.

*Empirical research project (40% total):* You can either form a group (NO more than two people) or do it all by yourself to write the course paper. During the semester you should meet with me occasionally to discuss the research project. My job is to help you position the paper and identify fatal issues in the early stage. The term research project has two components:

1. *Proposal (10%):* You or your group will have to hand in a short proposal (**1.5 space lines spacing & NO more than two pages; references are not counted**) in the beginning of session 8. At a minimum the proposal should 1) motivate the research question with 5+ references, 2) explain why the question is important and what has been done to tackle the issue, and 3) clearly state what the objective of the paper will be.

2. *Final paper (30%):* The final term paper should at least 1)

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	<p>motivate the research question, 2) position the paper after reviewing the relevant literature, 3) derive research hypotheses (if any), 4) describe the data and methodology you will use to answer the question, and 5) describe contributions and future research directions created by this work.</p>
<p style="text-align: center;">教材及參考書目 Textbooks &amp; Suggested Materials</p>	<p><b>Textbook</b></p> <p>There is NO required textbook for this course. Nonetheless, to provide you with the necessary background knowledge, I will assign and lecture some materials from (but not limited to) the following books:</p> <ul style="list-style-type: none"> <li>➤ Coelli, T. J. 2005. An Introduction to Efficiency and Productivity Analysis.</li> <li>➤ Hoffmann, J. P. 2003. Generalized Linear Models.</li> <li>➤ Johnson, D. E. 1998. Applied Multivariate Methods for Data Analysis.</li> <li>➤ Kennedy, P. 2008. A Guide to Econometrics.</li> <li>➤ Washington, S. P., Karlaftis, M. G. and Mannering, F. L. 2010. Statistical and Econometric Methods for Transportation Data Analysis.</li> </ul> <p><b>Readings (mostly from journals listed-below)</b></p> <p><i>MS</i>: Management Science; <i>M&amp;SOM</i>: Manufacturing &amp; Service Operations Management; <i>ISR</i>: Information Systems Research; <i>MISQ</i>: Management Information Systems Quarterly; <i>POM</i>: Production and Operations Management; <i>JOM</i>: Journal of Operations Management.</p>
<p style="text-align: center;">課程相關 連結網址 Course Website</p>	
<p style="text-align: center;">備註 Remarks</p>	