



Instructor:	Professor Stefan Stremersch
E.mail:	SStremersch@iese.edu
Phone:	+34.932.534.200
Office:	B-304
Assistant:	Alicia Segui
E.mail:	ASegui@iese.edu
Phone:	+34.932.534.200 (ext. 6407)
Office	B-305

QUANTITATIVE METHODS FOR MANAGEMENT RESEARCH 13/02/2016

Introduction

This course provides an introduction to quantitative methods for management research. It provides an understanding of the strengths and weaknesses of different data and modeling traditions. It also covers prime challenges in model specification such as heterogeneity, multicollinearity, heteroskedasticity, endogeneity and aggregation. In our discussions, we will also devote attention to how to design research for academic and practice impact and to philosophy of science in general.

Course Objectives and Content

The course aims to prepare students to better understand the principles behind academic research aimed for publication in top journals. After this course, students will be more able to design research studies, to assess research studies by others, and to apply quantitative techniques in their own work. The course is focused on students with an interest in quantitative research in management (i.e., research grounded in economics, econometrics, statistics, and to a minor extent, mathematics). It is open to students with more of a theory orientation that want to improve their methodological knowledge.

The course consists of 24 sessions of 1 hour and 15 minutes each. In each of the first 22 sessions, we will discuss a set of papers (both classical papers and book chapters and more recent, state-of-the-art applications) related to each of the covered topics. Students will lead the discussions themselves and the professor will act as a moderator, befitting IESE's teaching philosophy. The discussion format will be the following. All of the "discussion readings" should be read carefully by everyone in the class and everyone should write down questions and comments they have regarding the discussion articles they read (these do not need to be handed in, they are meant to be notes you make while reading on the articles themselves).

Each session and reading will be assigned to one student for in-depth discussion. This student should prepare a presentation in which s/he summarizes the methods issues the

paper enlightens. This part of the presentation should be educational for the students in the class and entails a very personal, in your own words summary of the methods issues under discussion. The second part of the student's presentation should include a critical reflection, such as methodological criticisms or a discussion of how future research in management (for example, in the respective student's own field of research) may use the methods introduced. While students should avoid providing a mere summary of the article, which is uninteresting as all students have read all articles beforehand and come to class well-prepared, they should carefully introduce the technical aspects of the methods studied. That also means they need to cover the general introduction to the topic of the session and will have to read more widely than merely the papers suggested to get a detailed and thorough understanding (e.g. Wikipedia, other professors' materials online, introductory texts, etc.). This way the student-discussant is also taught how to master the search for detailed and sometimes subtle method issues one faces in research.

As an example consider session 10. This session addresses endogeneity as a topic. The student-discussion leader for this session should introduce the general notion of endogeneity and the different forms. The student should use the Hamilton and Nickerson discussion reading to introduce corrections for endogeneity. The student should also introduce further discussion either from his own field of research or the supplementary readings. As endogeneity is one of the topics we will devote two sessions to (the same happens in sessions 1&2, 3&4, 10&11, and 20&21), it would be good if the discussant-leaders of the two sessions (which should not be the same person) align amongst themselves, who covers what, to not have repetition.

The role of the other students is to prepare so they can actively contribute to the discussion. Note that "introduction readings" and "supplementary readings" are not required material, while I obviously warmly recommend them. It is up to the student to decide whether s/he needs a solid introduction to the topic (introduction reading) or wants to go beyond the discussion readings (supplementary readings).

The objective of the course is to train students on quantitative techniques that are often used in management research. Therefore, the course will be followed by a closed book, in class, exam in the last two sessions of the course. In this exam, the knowledge gained is tested.

Prerequisites

As this is a core class for first year students and an elective for more advanced students, the course has no prerequisites. Obviously, some familiarity with elementary statistics or mathematics is welcome.

Course Methodology

Session Preparation and Readings. For each session, students need to read and study all of the required readings (typically 1 or 2 papers, per session) and the required introductory readings, if they are not familiar with the matter we will cover in this session. In each

session, there are also a series of supplementary readings which are directly related to the topic we discuss in that particular session and which provide more advanced materials on the respective topic. These are optional reading materials which the student can read but is not required to read. All articles were carefully chosen to cover different areas of quantitative research in management sciences.

Discussion Leader. Even though everyone should read all readings per session, I will appoint a discussion leader per article who will need to prepare issues and angles to be debated in class in greater detail. The discussion leader should also submit the PowerPoint used in class summarizing the main learning points of the assigned article (at least 5 hours before the first session of the respective day of class starts). The focus should be on the key learning points in terms of the usage of quantitative methods for research in management. The discussion leader should also be prepared to open and steer the discussion of the assigned article.

Course Grading

Your grade is determined as follows:

Assignment	Grade Points
Participation in class, in general	25 %
Participation as discussion leader	25 %
Exam	50 %*

I will grade each of these three dimensions on a scale of 1 (very poor) to 10 (excellent) and then transform your total score to IESE's grading system for your final grade. For this final grade, I will adhere to IESE guidelines for Ph.D. courses.

*To pass the course, students will have to pass the exam (meaning obtain a score of at least 5/10), regardless of their score on the class participation.

Student Profile

I consider this course as a requirement for any student with a strong interest in research in management. Even if you do not plan to use quantitative models in your research, it is pivotal for you to be able to understand and critically examine published quantitative research. For doctoral students in IESE's quantitative track, this course is even more important as it will offer you the backbone for your further courses and research with the goal of reaching a first-class dissertation.

Faculty

Stefan Stremersch

Professor of Marketing, IESE.

Chair of Marketing, Erasmus University Rotterdam.

For more details see: <http://wwwapp.iese.edu/faculty/facultyDetail.asp?lang=en&prof=sst>

Summary of Course Calendar

Session #	Date/Time	Topic
<i>Session 1</i>	TBA	Philosophy of Science and Publishing Strategy part 1
<i>Session 2</i>	TBA	Philosophy of Science and Publishing Strategy part 2
<i>Session 3</i>	TBA	Causality and the Experimental Ideal part 1
<i>Session 4</i>	TBA	Causality and the Experimental Ideal part 2
<i>Session 5</i>	TBA	Survey Methodology
<i>Session 6</i>	TBA	The Linear Regression Model (Continuous DV)
<i>Session 7</i>	TBA	Heterogeneity
<i>Session 8</i>	TBA	Multicollinearity
<i>Session 9</i>	TBA	Heteroskedasticity
<i>Session 10</i>	TBA	Endogeneity 1: Intro and Self Selection Bias
<i>Session 11</i>	TBA	Endogeneity 2: IV, 2sls, Simultaneous Equations
<i>Session 12</i>	TBA	Aggregation
<i>Session 13</i>	TBA	Binomial Dependent Variables: Logit and Probit
<i>Session 14</i>	TBA	Multinomial Dependent Variables: Multinomial Logit/Probit
<i>Session 15</i>	TBA	Identification of Causal Effects: Differences-in-Differences
<i>Session 16</i>	TBA	Duration & Diffusion; Censoring & Truncation
<i>Session 17</i>	TBA	Count Models
<i>Session 18</i>	TBA	Univariate Time Series
<i>Session 19</i>	TBA	Multivariate Time Series
<i>Session 20</i>	TBA	Theory in Models part 1
<i>Session 21</i>	TBA	Theory in Models part 2
<i>Session 22</i>	TBA	Impact: Research & Practice
<i>Session 23</i>	TBA	Exam
<i>Session 24</i>	TBA	Exam

Session 1 & 2: Philosophy of Science and Publishing Strategy

SESSION 1:

Required Discussion Reading:

- 1) Stremersch, Stefan, Isabel Verniers and Peter Verhoef (2007), "The Quest for Citations: Drivers of Article Impact," *Journal of Marketing*, 7, 171-193.

SESSION 2:

Required Discussion Reading:

- 2) Stremersch, Stefan, Nuno Camacho, Sofie Vanneste and Isabel Verniers (Available online 12 October 2014), "Unraveling Scientific Impact: Citation Types in Marketing Journals," *International Journal of Research in Marketing*, ISSN 0167-8116, <http://dx.doi.org/10.1016/j.ijresmar.2014.09.004>

Supplementary Readings (Part 1 and 2):

- 1) Scandura, Terri A. and Ethlyn A. Williams (2000), "Research Methodology in Management: Current Practices, Trends, and Implications for Future Research," *Academy of Management Journal*, 43(6), 1248-1264.
- 2) Bergh, Donald D., John Perry and Ralph Hanke (2006), "Some Predictors of SMJ Article Impact," *Strategic Management Journal*, 27(1), 81-100.

Session 3 & 4: Causality and the Experimental Ideal

SESSION 3:

Required Discussion Readings:

- 1) Sobel, Michael E. (2009), "Causal Inference in Randomized and Non-Randomized Studies: The Definition, Identification, and Estimation of Causal Parameters" in *The SAGE book of Quant Methods in Psych*, Millsap and Maydeu-Olivares, Eds, Ch. 1.

SESSION 4:

Required Discussion Readings:

- 2) Kirk, Roger E. (2009), "Experimental Design," in *The SAGE book of Quant Methods in Psych*, Millsap and Maydeu-Olivares, Eds Chapter 2.
- 3) Lynch, John G. (1982), "On the External Validity of Experiments in Consumer Research" *Journal of Consumer Research*, 9, 225-239.

Supplementary Readings (sessions 3 and 4):

- 4) Jha, N.K. (2008), *Research Methodology*, Chapter 2: Experiments in Research. Chandigarh, IND: Book Global Media.
- 5) Hotz, V. Joseph, Charles H. Mullin and Seth G. Sanders (1997), "Bounding Causal Effects Using Data From a Contaminated Natural Experiment: Analysis the Effects of Teenage Childbearing," *Review of Economic Studies*, 64(4), 575-603.

Session 5: Survey Methodology

Required Discussion Readings:

- 1) De Jong, Martijn G., Rik Pieters, and Stefan Stremersch (2012), "Cross-Cultural Analysis of Sensitive Questions: An Application of Multigroup Item Randomized Theory to Sexual Attitudes and Behavior," *Journal of Personality and Social Psychology*, 103 (3), 543-564.

Supplementary Readings:

- 2) Hinkin, Timothy (1998), "A Brief Tutorial on The Development of Measures for Use in Survey Questionnaires," *Organizational Research Methods*, 1, 104.
- 3) Miller, C. Chet, Laura B. Cardinal and William H. Glick (1997), "Retrospective Reports in Organizational Research: A Reexamination of Recent Evidence," *Academy of Management Journal*, 40(1), 189-204.
- 4) Hunt, Shelby D., Richard D. Sparkman, Jr. and James B. Wilcox (1982), "The Pretest in Survey Research: Issues and Preliminary Findings," *Journal of Marketing Research*, 19(2), 269-273.

Session 6: The Linear Regression Model (Continuous DV)

Introduction reading:

- 1) Verbeek, Marno (2012), "An Introduction to Linear Regression," *A Guide to Modern Econometrics (6th Ed.)*, Ch. 2.

Required Discussion Readings:

- 2) Verbeek, Marno (2012), "Interpreting and Comparing Regression Models," *A Guide to Modern Econometrics (6th Ed.)*, Ch. 3

Supplementary Readings:

- 1) Christie, Andrew A. (1987), "On Cross-Sectional Analysis in Accounting Research," *Journal of Accounting and Economics*, 9(3), 231-258.
- 2) Tufano, Peter (1989), "Financial Innovation and First-Mover Advantages," *Journal of Financial Economics*, 25(2), 213-240.
- 3) Kane, Thomas J. and Cecilia E. Rouse (1995), "Labor-Market Returns to Two - and Four-Year College," *American Economic Review*, 85(3), 600-614.

Session 7: Heterogeneity

Required Discussion Readings:

- 1) Rothaermel, Frank T. and Andrew M. Hess (2007), "Building Dynamic Capabilities: Innovation Driven by Individual-, Firm-, and Network-Level Effects," *Organization Science*, 18 (6), 898-921.

Supplementary Readings:

- 2) Denrell, Jerker, Christina Fang, and Zhanyun Zhao (2013), "Inferring Superior Capabilities from Sustained Superior Performance: A Bayesian Analysis," *Strategic Management Journal*, 34, 182-196.

- 3) Beckman, Christine M. and Pamela R. Haunschild (2002), "Network Learning: The Effects of Partners' Heterogeneity of Experience on Corporate Acquisitions," *Administrative Science Quarterly*, 47(1), 92-124.
- 4) Balakrishnan, Srinivasan and Isaac Fox (1993) "Asset Specificity, Firm Heterogeneity and Capital Structure," *Strategic Management Journal*, 14, 3-16.

Session 8: Multicollinearity

Introductory Readings:

- 1) Freund, Rudolf Jakob and William J. Wilson (2006), "Multicollinearity," *Regression Analysis: Statistical Modeling of a Response Variable (2nd Edition)*, Part III, Ch. 5. Burlington, MA: Academic Press.
- 2) Intriligator, Michael D., Ronald G. Bodkin and Cheng Hsiao (1996), "Multicollinearity," *Econometric Models, Techniques, and Applications*, section 5.2., 126-132.

Required Discussion Readings:

- 3) Grewal, Rajdeep, Joseph A. Cote and Hans Baumgartner (2004), "Multicollinearity and Measurement Error in Structural Equation Models: Implications for Theory Testing," *Marketing Science*, 23(4), 519-529.

Supplementary Readings:

- 1) Gelper, Sarah and Stefan Stremersch (2014), "Variable Selection in International Diffusion Models," *International Journal of Research in Marketing*, 31(4), 356-367.
- 2) Eisenbeis, Robert A. (1977), "Pitfalls in the Application of Discriminant Analysis in Business, Finance, and Economics," *Journal of Finance*, 32(3), 875-900.

Session 9. Heteroskedasticity

Required Discussion Readings:

- 1) Baltagi, Badi H. (2008), "Heteroskedasticity," *A Companion to Theoretical Econometrics*, Ch. 4. Wiley: Chichester, England
- 2) Bowen, Harry P. and Margarethe F. Wiersema, "Matching Method to Paradigm in Strategy Research: Limitations of Cross-Sectional Analysis and Some Methodological Alternatives," *Strategic Management Journal*, 20, 625-636.

Supplementary Readings:

- 1) Forbes, Kristin J. and Roberto Rigobon (2002), "No Contagion, Only Interdependence: Measuring Stock Market Comovements," *Journal of Finance*, 57(5), 2223-2261.
- 2) Taylor, James W. (2005), "Generating Volatility Forecasts from Value at Risk Estimates," *Management Science*, 51(5), 712-725.

Session 10. Endogeneity 1: Intro and Self Selection Bias

Required Discussion Readings:

- 1) Hamilton, Barton and Jackson Nickerson (2003), "Correcting for Endogeneity in Strategic Management Research," *Strategic Organization*, 1(1), 51-78.

Supplementary Readings:

- 2) Landsman, Vardit and Stefan Stremersch (2011), "Multihoming in Two-Sided Markets: An Empirical Inquiry in the Video Game Console Industry," *Journal of Marketing*, 75, 39–54.
- 3) Antonakis, John, Samuel Bendahan, Philippe Jacquart, and Rafael Lalive (2010), "On Making Causal Claims: A Review and Recommendations," *The Leadership Quarterly*, 21, 1086–1120.

Session 11. Endogeneity 2: IV, 2sls, Simultaneous Equations

Required Discussion Readings:

- 1) Bascle, Guilhem (2008), Controlling for Endogeneity with Instrumental Variables in Strategic Management Research," *Strategic Organization*, 6(8), 285-327.

Supplementary Readings:

- 2) Palia, Darius (2001), "The Endogeneity of Managerial Compensation in Firm Valuation: A Solution," *Review of Financial Studies*, 14(3), 735-764.
- 3) Murray, Michael (2006), "Avoiding Invalid Instruments and Coping with Weak Instruments," *Journal of Economic Perspectives*, 20(4), 111–132.
- 4) Larcker, David F., and Tjomme O. Rusticus (2010), "On the Use of Instrumental Variables in Accounting Research," *Journal of Accounting and Economics*, 49, 186–205.

Session 12. Aggregation

Required Discussion Readings:

- 1) Christen, Markus, Sachin Gupta, John C. Porter, Richard Staelin, and Dick R. Wittink (1997), "Using Market-Level Data to Understand Promotion Effects in a Nonlinear Model," *Journal of Marketing Research*, 34(3), 322-334.
- 2) Tellis, Gerard J., and Philip Hans Franses (2006), "Optimal Data Interval for Estimating Advertising Response," *Marketing Science*, 25(3), 217-229.

Supplementary Readings:

- 1) Feenstra, Robert F. and Gordon H. Hanson (2000), "Aggregation Bias in the Factor Content of Trade: Evidence from U.S. Manufacturing," *American Economic Review*, 90(2), 155-160.

Session 13. Binomial Dependent Variables: Logit and Probit

Introduction Reading:

- 1) Cameron, A. Colin, and Pravin K. Trivedi (2005), *Microeconometrics: Methods and Applications*, pp 463-478 (Sections 14.1 to 14.4). New York: Cambridge University Press.

Required Discussion Readings:

- 2) Hoetker, Glenn (2007), "The Use of Logit and Probit Models in Strategic Management Research: Critical Issues," *Strategic Management Journal*, 28, 331-343.
- 3) Wiersema, Margarethe F., and Harry P. Bowen (2009), "The Use of Limited Dependent Variable Techniques in Strategy Research: Issues and Methods," *Strategic Management Journal*, 30, 679-692.

Session 14. Multinomial Dependent Variables: Multinomial Logit/Probit**Introductory Readings:**

- 1) Cameron, A. Colin, and Pravin K. Trivedi (2005), *Microeconometrics: Methods and Applications*, pp 490-506 (Sections 15.1 to 15.5.3). New York: Cambridge University Press.

Required Discussion Readings:

- 2) Guadagni, Peter M. and John D.C. Little (1983), "A Logit Model of Brand Choice Calibrated on Scanner Data," *Marketing Science*, 2(3), 203-238.
- 3) Jones, S. and D.A. Hensher (2004), "Predicting Firm Financial Distress: A Mixed Logit Model," *The Accounting Review*, 79 (4), 1011-1038.

Supplementary Readings:

- 4) Green, Paul E. and V. Srinivasan (1978), "Conjoint Analysis in Consumer Research: Issues and Outlook," *Journal of Consumer Research*, 5(2), 103-123.

Session 15. Identification of Causal Effects: Differences-in-Differences**Introductory Reading:**

- 1) Gertler, Paul, Sebastian Martinez, Patrick Premand, Laura B. Rawlings, and Christel M.J. Vermeersch (2011), "Chapter 6: Difference in Differences," in *Impact Evaluation in Practice*. The International Bank for Reconstruction and Development /The World Bank.

Required Discussion Readings:

- 2) Chhaochharia, Vidhi and Yaniv Grinstein (2009), "CEO Compensation and Board Structure," *Journal of Finance*, 64(1), 231-261.

Supplementary Readings:

- 3) Chevalier, Judith A. and Dina Mayzlin (2006), "The Effect of Word of Mouth on Sales: Online Book Reviews," *Journal of Marketing Research*, 43(Aug), 345-354.
- 4) Chaterji, Aaron K. and Michael W. Toffel (2010), "How Firms Respond to Being Rated," *Strategic Management Journal*, 31, 917-945.

Session 16. Duration & Diffusion; Censoring & Truncation

Introductory Readings:

- 1) Allison, Paul D. (1982), "Discrete-Time Methods for the Analysis of Event Histories," *Sociological Methodology*, 13, 61-98.
- 2) Greene, William (1997), "Chapter 19: Censoring and Truncation," in *Econometric Analysis*, pp 695-734. Prentice Hall.

Required Discussion Readings:

- 3) Everdingen, Yvonne, Dennis Fok, and Stefan Stremersch (2009), "Modeling Global Spill-Over in New Product Takeoff," *Journal of Marketing Research*, 46(5), 637-652.

Supplementary Readings:

- 4) Van den Bulte, Christophe and Stefan Stremersch (2004), "Social Contagion and Income Heterogeneity in New Product Diffusion: A Meta-Analytic Test," *Marketing Science*, 23(4), 530-544.
- 5) Sheridan, John E. (1992), "Organizational Culture and Employee Retention," *Academy of Management Journal*, 35(5), 1036-1056.

Session 17. Count Models

Required Discussion Readings:

- 1) Cameron, A. Colin, and Pravin K. Trivedi (1998), "Chapter 1: Introduction," in *Regression Analysis of Count Data*. New York: Cambridge University Press.
- 2) Venkataraman, Sriram, and Stefan Stremersch (2007), "The Debate on Influencing Doctors' Decisions: Are Drug Characteristics the Missing Link?," *Management Science*, 53(11), 1688-1701.

Supplementary Readings:

- 1) Fader, Peter S., Bruce G.S. Hardie, and Ka Lok Lee (2005), "Counting Your Customers," the Easy Way: An Alternative to the Pareto/NBD Model," *Marketing Science*, 24(2), 275-284.
- 2) Stremersch, Landsman and Venkataraman (2013), "The Relationship between DTCA, Drug Requests and Prescriptions: Uncovering Variation in Specialty and Space," *Marketing Science*, 32(2), 127-140.

Session 18. Univariate Time Series

Required Discussion Readings:

- 1) Franses, Philip Hans, and Dick van Dijk (2000), "Chapter 2: Some concepts in Time Series Analysis," *Non-Linear Time Series Models in Empirical Finance*, Cambridge University Press.
- 2) Granger, Clive W. J. (1993), "What are We Learning About the Long-Run?," *The Economic Journal*, 103 (417), 307-317.

Session 19. Multivariate Time Series

Introductory Reading:

- 1) Qin, Duo (2011), "Rise of VAR Modeling Approach," *Journal of Economic Surveys*, 25(1), 156-174.

Required Discussion Readings:

- 2) Villanueva, Julian, Shijin Yoo and Dominique M. Hanssens (2008), "The Impact of Marketing-Induced Versus Word-of-Mouth Customer Acquisition on Customer Equity Growth," *Journal of Marketing Research*, 45(1), 48-59.

Supplementary Readings:

- 3) Stremersch, Stefan and Aurélie Lemmens (2009), "Sales Growth of New Pharmaceuticals Across the Globe: The Role of Regulatory Regimes," *Marketing Science*, 28(4), 690-708.
- 4) Chordia, Tarun, Asani Sarkar and Avanidhar Subrahmanyam (2005), "An Empirical Analysis of Stock and Bond Market Liquidity," *Review of Financial Studies*, 18(1), 85-129.

Session 20-21. Theory in Models

SESSION 20

Required Discussion Reading:

- 1) Franses, Philip Hans (2005), "On the Use of Econometric Models for Policy Simulation in Marketing," *Journal of Marketing Research*, 42(1), 4-14.

SESSION 21

Required Discussion Reading:

- 2) Thaler, Richard (1985), "Mental Accounting and Consumer Choice," *Marketing Science*, 27(1), 15-25.

Supplementary Readings:

- 1) Daniel, Kent D., David Hirshleifer, and Avanidhar Subrahmanyam (2001), "Overconfidence, Arbitrage, and Equilibrium Asset Pricing," *Journal of Finance*, 56(3), 921-965.
- 2) DellaVigna, Stefano (2009), "Psychology and Economics: Evidence from the Field," *Journal of Economic Literature*, 47(2), 315-372.

Session 22. Impact: Research & Practice

Required Discussion Readings:

- 1) Vermeulen, Freek (2005), "On Rigor and Relevance: Fostering Dialectic Progress in Management Research," *Academy of Management Journal*, 48(6), 978-982.
- 2) Lehmann, Donald R., Leigh McAlister, and Richard Staelin (2011), "Sophistication in Research in Marketing," *Journal of Marketing*, 75 (July), 155-165.

Sessions 23-24. Exam

Students take a written exam in class, closed book, about the subjects covered in class. Students need to pass the exam to pass the course. Required knowledge for the exam are all introductory and discussion readings as well as anything discussed in class. Supplementary readings are not part of the exam content.