26:630:675 Marketing Models  
Rutgers Business School – Newark and New Brunswick  
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Lecture: Tuesdays, 9:00-11:50AM  
Location: WP402

Goal: This course provides broad statistical knowledge and basic programming skills for conducting quantitative marketing research projects. Causality between sales/ market shares/customer purchases and marketing mix (e.g., price, advertising, and promotion activities) is an essential logic link in many marketing models. Statistical causality is often established with generalized linear models (e.g., linear/nonlinear, logit, multinomial and Poisson regressions). This course covers the basic theory of GLMs and empirical applications in market response models. The other part of this course includes: Bass diffusion models, empirical research on pass-through rates, and hazard rate models (if time permits). All data analysis is implemented with R.

Prerequisite: Elementary statistics and computer skills; Intermediate microeconomics.

Statistical packages: R (free download and tutorial at http://www.r-project.org/)

Related Courses: 26:799:685 Supply Chain-Marketing Interface

Class Participation: Class participation is mandatory. Students are required to discuss class materials in class.

Homework: Students are required to analyze the in-class datasets in depth and demonstrate their results in class.

Presentation: Two students form one presentation team. Each team is required to give two presentations based on journal papers (see details on Page 4).

Project: Two students form one project team. Each team is required to write a mini marketing research project and present the project results in class (see details on Pages 2-3).

Exam: Students are required to analyze datasets and build market response models using R in class.

Grade: class participation and homework demonstration (10%), presentation (20%), project (30%), and exam (40%).
**Mini-Project Guidelines**

There are some basic steps you need to consider in order to produce a successful marketing research project. A simple guideline of what you should include in a project is listed below.

I. You need a managerial question or problem. Statistics is a tool to help you answer the question. Make sure your topic is related to quantitative marketing and your applied methodology is related to GLMs.

II. Define your problem or question in clear, specific terms.

III. Develop your hypotheses. What do you expect to happen?

IV. Find out as much as you can about your question.
   - Has someone already done work on your question?
   - Is your question one for which there is an answer?
   - Collect research about your topic.

V. Design your study. Find or develop techniques and measurement instruments that will provide objective data pertinent to your hypotheses. Decide how you will analyze your data.

VI. Collect your data. Marketing datasets are widely available online.

VII. Analyze your data following the plan you developed.
   - Visualize/summarize data (charts, tables, histograms, and etc.)
   - Present your regression models and discuss alternatives

VIII. Interpret your results and draw conclusions relative to your hypotheses based upon your data and your analysis of the data. **What’s the practical implication of your conclusions for managers?**

IX. Write your results—write, rewrite, spell-check, rewrite and . . . PROOFREAD!

**Format and Structure for Mini-Projects**

1. Your project must be word-processed using a standard font (e.g., TimesNewRoman 12) and double-spaced. Length is recommended less than twenty pages (including appendices).

2. All charts, data sheets and graphs should be done on the computer. Graphs and charts should have a title and properly labeled axes. You need graphs in BOTH your written project and on your visual aid.
3. When using variables, be sure to state what each represents. Give sufficient explanation of statistical formula and procedures.

4. All pages must be numbered.

5. Order of pages:
   - COVER SHEET—The first page of your project must be a cover sheet that includes your name(s), date and the title of your project.
   - EXECUTIVE SUMMARY—Briefly describe your research topic, conclusions and practical implications for managers.
   - TABLE OF CONTENTS
   - INTRODUCTION, PROBLEM, PURPOSE—This section should include the statement of your question, a statement as to why your project is important or relevant, and your null and alternative hypotheses. Also discuss what you expected to find.
   - RESEARCH—A summary discussion of your background research and information on related studies goes here.
   - METHODS AND PROCEDURES—This should include data sources and statistical models you choose.
   - RESULTS (ANALYSIS OF DATA)—Your data tables and graphs go here, interspersed with your narrative. This is also where you include all statistical tests (including calculations). Graphs and charts should be inserted into the appropriate location of your paper or referenced by page number if not in the body of the paper.
   - CONCLUSION—This is where you interpret your findings (what can you conclude or not conclude from your research) and offer managerial insights.
   - DISCUSSION—This should include any difficulties that occurred when collecting or analyzing data, as well as what you would change in a follow-up to your project. Limitations of your inferences should be discussed. Suggestions for further work in the area of your topic, as well as recommendations, are mentioned here.
   - References
   - APPENDICES—attach anything technical or supplementary.

6. Final project presentation (30 minutes)

7. Hand in a hard copy of your project and send me the electronic version of your datasets, R codes, the project report and ppt presentation. Grading criteria: make your project interesting and worth learning!
Presentation

Each team will select two journal papers (see the list in Pages 5-8) and give a formal lecture based on the papers. In the lecture (30 minutes), you need to explain the research problem, the motivation, the model, and the solution to the problem. You also need to compare the paper to existing work and point out the contribution. Feel free to take you time to clearly explain the paper.

Besides the presenters, the rest of the class will serve as discussants. The main task of a discussant is to provide a critique of the paper presented: the significance of the problem, the suitability of the model, the limitations of modeling assumptions, the role that these assumptions play in obtaining results, and possible extensions. In addition, discussants should look for common themes or key issues that link related papers and enhance our understanding of the topic. Lastly, discussants are expected to raise challenging questions that would guide class discussion.

The presentation will be graded based on how well you motivate the research and how clearly you explain the model and results.
**Topics covered (tentative)**

There is no textbook required. The class materials are pooled among miscellaneous research books and journal papers.


**Overview of marketing and modeling principles (2 weeks)**

- Parts I, II and IV of BMM

**Historical, philosophical and technical reviews of probability, statistics and induction logic (3 weeks)**

- Part III of BMM
• Statistic concepts: Sufficiency, strong consistency, asymptotic normality and Cramer-Rao lower bound of the Maximum-Likelihood Estimate, asymptotic distribution of the likelihood ratio test statistic, exponential families, mixture models, EM algorithms, Bayes’ rule, resampling techniques, and empirical Bayesian estimators

**Review of Linear regression models and implementation with R (2 weeks)**

• Part III of BMM
• Chapters 1-3 of QMR
• G.J. Kerns. *Introduction to Probability and Statistics Using R*. Online PDF.

**Empirical research on promotions and pass-through rates (1 week)**


**Logit and multinomial models (2 weeks)**

• Chapters 4 and 5 of QMR
• J.S. Cramer. 2003. The origins and development of the logit model. Online PDF.

**Bass diffusion models (2 weeks)**

• Chapter 8 of QMR

**Hazard rate models (1 week if time permits)**

• Chapter 8 of QMR

**Project presentation (1 week)**

**Exam (1 week)**