MARK 8335: Marketing Models   Professor James Hess
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"All models are wrong, but some are useful."   George Box

Course Objective: **To learn how to create theoretical marketing models and to use deductive logic and mathematical analysis to uncover surprising linkages between their variables.**

Business and the scientists that study business depend upon a rational, ordered pattern in human behavior that can be analyzed in a coherent, systematic way. This course will help you develop theoretical marketing models that begin with interesting empirical observations and deduce surprising conclusions to be tested empirically. It may seem peculiar to seek surprises using deductive logic and mathematics, but these intellectual "instruments" may allow us to see things that are invisible to intuitive methods. To accomplish this objective, in-depth study is required; we will study a limited number of research papers intensely and let the textbooks provide an encyclopedic overview. Given diverse doctoral student backgrounds, some math will be taught to make the course self-contained.

Marketing Science and Theoretical Models
"Science is a process in which data and theory interact leading to generalized explanations of disparate types of phenomena."   From the introduction to the special 1995 issue of *Marketing Science* on empirical generalizations in marketing

Marketing science typically consists of a staged, iterative process:
  a. Informal *observations* of phenomena highlight a pattern of behavior by marketing actors;
  b. A *theory* is constructed to explain the pattern, often involving deductive reasoning; the theory also makes explicit predictions that other, previously unobserved, patterns should logically exist;
  c. Formal *measurements* and *experiments* are designed to show that the predicted patterns exist empirically.

Corresponding to the marketing science process are three types of marketing models.
  1. **Behavioral Models**: verbal and graphical descriptions of concepts and relationships between them. The selection of concepts and relationships is based upon judgment or prior empirical work.
  2. **Theoretical Models**: translation of marketing behavior into symbols that describe the relationships between marketing variables; these are used to provide logical, internal valid, cause-and-effect explanations of measurable behavior using deductive, mathematical methods.
  3. **Measurement Models**: numbers are assigned to concepts (measurement) and the mathematical relationships between them are empirically calibrated from data from surveys, field observations or laboratory experiments.
Because other doctoral courses at University of Houston concentrate on behavioral and measurement models, MARK 8335 focuses on theoretical models.

In a Nutshell: A theoretical marketing model says that a set of marketing variables Y is determined by a relationship f (Y,X) = 0, where X is a set of marketing parameters. Implicitly, this relationship determines a predictive dependency between the X parameters and the resulting Y variables, Y=g(X). Mathematical analysis is used to uncover the details of this dependency.

"The most beautiful thing we can experience is the mysterious."   Albert Einstein

Remark: Marketing <u>engineering</u> differs from marketing <u>science</u> in that its objective is not to understand and predict, but rather to create representations of marketing reality that are easier to deal with and to explore than reality itself for a specific practical marketing purpose. Corresponding to marketing engineering are marketing decision support models.

4. ***Decision Support Models***: descriptive measurement models that answer the question, "what will happen if we do X?" and normative methods aimed at making recommendations for management on questions like, "What is our best course of action in situation Y?"

While this is not the objective of MARK 8335 (it would be the objective of an MBA course), we will investigate a one decision support model since marketing scholars are responsible for the development of many models, and you may want to teach undergraduate and MBA students about such models.

<u>How To Master Theoretical Modeling In Marketing.</u>

I hear - I forget. I see - I forget. I do - I remember!	Chinese proverb
Just do it!	Nike advertisement

<u>Readings</u>. Every class session there will be new papers to read (in addition to the text). These readings were <u>not</u> selected to provide encyclopedic coverage of the substantive findings in marketing models (if you would like to have a book that covers marketing models from A to Z, but skin deep, buy Kotler, Lilien and Moorthy's <u>Marketing Models</u>). Instead, they were selected because they illustrate one or more relevant theoretical research method. Put yourself in the author's place and ask the question, "Why did the author create this theoretical marketing model and how did he/she use deductive logic and mathematical analysis to uncover surprising linkages between its variables?" Concentrate on the main story line, but sweat the details. Learn how to "Just do it!"

<u>Research Paper</u>. This doctoral seminar is designed to help you learn how to publish in top scholarly journals, so you will have the opportunity to write a research paper applying modeling methods to a marketing problem. The topic of the paper could be similar to one of the papers read for this or other classes or found in the textbook. Alternatively, it could be a new topic that you have experience and interest. A paper proposal of one typed page is due on February 17. I would like to meet with you that week and then for a status in the period March 8-9 report (my role is to keep you from going down a blind alley). Naturally, I'd be happy to talk about your research at any time. In the last two class sessions, you will get to make a presentation of your paper as though at the INFORMS Marketing Science Conference. The finished paper is due May 5, in lieu of a final exam. It will be evaluated as though it was under review for publication in *Marketing Science*.

<u>Homework Exercises</u>. To hone your skills in formulating and investigating theoretical marketing models, you will be provided regular problem sets. Some of the questions are straightforward applications of lecture and readings, while others will be more thought provoking. To prevent you from getting frustrated, follow the rule former students and I developed, "After you have worked on a problem for three hours, you **must** telephone me - at my office or home - day or night - weekday or weekend - to get a hint." Do not be shy! It will be good for both of us.

<u>Grading</u>. Your grade will be based 75% on the research paper and 25% on the homework.

<u>Course Materials</u>

<u>Preliminary Draft of Textbook</u>: I am in the process of writing a textbook "Theoretical Models in Marketing" for this course and will provide you a draft copy on Blackboard along with updated chapters throughout the semester (referred to as TMIM below).

<u>Recommended mathematics textbook</u>: <u>Mathematics for Economists</u> by Carl Simon and Lawrence Blume, 1994, Norton (referred to as MathEcon). This is expensive (but used ones cost about $70), so you can inspect my copy and decide for yourself if it is valuable enough to buy from a Web-bookstores like Amazon.com.

Meeting 1, Wed January 20:
Introduction to Theoretical Models in Marketing
Readings: TMIM=Theoretical Models in Marketing Chapter 1
Background: Moorthy, Sridhar (1993), "Theoretical Modeling in Marketing," Journal of
    Marketing, 57: April, 92-106.
Marketing Model Formulation and Rationale
Readings: Nash, John F., Jr. (1950), "The Bargaining Problem," Econometrica, 18(2), 155-162.
Background: MathEcon Appendix A1
Meeting 2, Wed January 27
Relationships Between Marketing Variables: Graphs and Functions
Readings: TMIM 2
Background: MathEcon Chapters 2, 3.1-3.4, 5, 10, 13
Theory of Brand Positioning and Attitudes
Readings: Hauser, John and Patricia Simmie (1981), "Profit Maximizing Perceptual
    Positions," Management Science, 27, January, 33-56.
Background: Schmalensee, Richard and J.-F. Thisse (1988), "Perceptual Maps and the Optimal
    Location of New Products" Internat J of Res in Mkting, 5, 225-249
Meeting 3, Wed Feb 3
Linear Algebra and Systems of Equations in Marketing
Readings: TMIM 3.1-3.3
Akerlof, George (1970), "The Market for 'Lemons': Qualitative Uncertainty and the Market
    Mechanism," Quarterly Journal of Economics, 84, 488-500.
Background: MathEcon 6, 7.1-7.4, 8.1-8.4, 9.1-9.2
Matrix Algebra: Brand Switching and Model Identification
Readings: TMIM 3.4-3.5
Background: MathEcon 11, 23.1-23.2, 23.6
Johnston, J. (1984), Econometric Methods, Third Ed., Ch. 11, New York: McGraw-Hill.
Meeting 4, Wed Feb 10
Market Dynamics and Differential Equations
Readings: TMIM 4.1-4.3
Background: MathEcon 24.1-24.2, Appendix A4
Product Diffusion Models and Fluctuations
Readings: TMIM 4.4-4.6
Background: MathEcon 23.5, 24.3, 25.2-25.3,Appendix A2, A3
Meeting 5, Wed Feb 17
Calculus of Unconstrained Optimization
Readings: TMIM 5.1-5.3, 5.6
Chu, Wujin, Eitan Gerstner, and James Hess (1998), "Dissatisfaction Management with
    Opportunistic Consumers," Journal of Service Research, 1, November, 140-155.
Background: MathEcon 3.5, 17.1-17.3, 14.1-14.6
Comparative Static Response Analysis
Readings: TMIM 5.4
Gerstner, Eitan, James Hess, and Duncan Holthausen (1994), "Price Discrimination Through a
    Distribution Channel: Theory and Evidence," American Economic Review, 84,
    December, 1437-1445.

Meeting 6, Wed Feb 24

Defender Positioning Model: Reaction to an Market Entrant

Readings: TMIM 5.5

Hauser, John and Steven Shugan (1983), "Defensive Market Strategies," <u>Marketing Science</u>, 2: Fall, 327-351.

Constrained Optimization

Readings: TMIM 6.1-6.3,

Hess, James and Marilyn Lucas, ""Doing the Right Thing or Doing the Thing Right: Allocating Resources Between Marketing Research and Manufacturing," forthcoming in <u>Management Science</u>, Spring 2004.

Background: MathEcon 18.1-18.3, 19.1-19.2

Meeting 7, Wed Mch 3

Principal-Agent Models

Readings: TMIM 6.4-6.8

Gerstner, Eitan and James Hess (1987), "Why Do Hot Dogs Come in Packs of 10 and Buns in 8s or 12s? A Demand-Side Investigation," <u>Journal of Business</u>, 60, March, 491-518.

Background: AmiyaBasu; Rajiv Lal; V. Srinivasan; Richard Staelin (1985), "Salesforce Compensation Plans: An Agency Theoretic Perspective," <u>Marketing Science</u>, 4(4) (Autumn), 267-291.

Dynamic Optimization

Readings: TMIM 7.1-7.5,

Horsky, Dan and Leonard S. Simon (1983), "Advertising and the Diffusion of New Products," <u>Marketing Science</u>, 2(1) (Winter), 1-17.

Meeting 8: to be arranged

Introduction to Game Theory

Readings: TMIM 8.1-8.4

Gibbons, Robert (1997), "An Introduction to Applicable Game Theory," <u>Journal of Economic Perspectives</u>, 11, Winter, 127-149.

Retail Location Games

Readings: TMIM 8.5

Balasubramanian, Sridhar (1998), "Mail versus Mall: A Strategic Analysis of Competition between Direct Marketers and Conventional Retailers," <u>Marketing Science</u>, 17, 181-195.

Background: Tirole, Jean (1989), <u>The Theory of Industrial Organization</u>, Cambridge, MA: MIT Press, Chapter 7.

March 14: Spring Vacation - no classes

Meeting 9, Wed March 24

Sales Promotions and Mixed Strategies

Readings: TMIM 9.1-9.3

Lazear, Edward (1986), "Retail Pricing and Clearance Sales," <u>American Economic Review</u>, 76: March, 14-32.

Varian, Hal (1980), "A Model of Sales," <u>American Economic Review</u>, 70, Sept., 651-9.

Periodic Sales

Readings: TMIM 9.4

Conlisk, John, Eitan Gerstner, and Joel Sobel (1984), "Cyclic Pricing by a Durable Goods Monopolist," <u>Quarterly Journal of Economics</u>, 99, August, 489-505.

Background: Banks, Jeffrey and Sridhar Moorthy (1999), "A Model of Price Promotions with Consumer Search," <u>International J. Industrial Organization</u>, 17, 371-398.

Meeting 10, Wed Mch 31

Signaling Models

Readings: TMIM 9.6

A. Michael Spence, "Signaling In Retrospect and the Informational Structure of Markets" Nobel Prize Lecture, December 8, 2001

Push and Pull Promotions

Readings: TMIM 9.8

Gerstner, Eitan and Hess, James (1995), "Pull Promotions and Channel Coordination," Marketing Science, 14, Winter, 43-60.

Meeting 11, Wed April 7

Brand Competition in a Channel

Readings: TMIM 9.9-9.10

McGuire, Timothy and Richard Staelin (1983), "An Industry Equilibrium Analysis of Downstream Vertical Integration," Marketing Science 2, 161-191.

Channel Control

Readings: Chiang, W. Kevin, D. Chhajed, and J. Hess (2003), "Direct Marketing, Indirect Profits: A Strategic Analysis of Dual-Channel Supply Chain Design,", *Management Science*, 49(1) (January), 1-20.

Meeting 12, Wed April 14

Hard Sell Without Apology

Readings: Chu, Wujin, Eitan Gerstner and James (1995), "The Cost and Benefits of Hard Sell," Journal of Marketing Research, 32, February, 97-102.

Bait and Switch Advertising

Readings: Gerstner, Eitan and James Hess (1990), "Can Bait and Switch Benefit Consumers?" Marketing Science, 9, Spring, 114-124.

Wilkie, William L., Carl F. Mela, and Gregory T. Gundlach (1998), "Does 'Bait and Switch' Really Benefit Consumers?" Marketing Science, 17, 275-283.

Hess, James and Eitan Gerstner (1998) "Yes, 'Bait and Switch' Really Benefits Consumers," Marketing Science, 17, 283-289.

Meeting 13, Wed April 21

Social Psychology in Marketing Models

Readings: Amaldoss, Wilfred and Sanjay Jain (2005), "Pricing of Conspicuous Goods: A Competitive Analysis of Social Effects," JMR, Vol. XLII (February), 30–42

Decision Support Models: Coupons

Readings: Neslin, Scott and Robert Shoemaker (1983), "A Model for Evaluating the Profitability of Coupon Promotions," Marketing Science, 2: Fall, 361-388.
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Meeting 14, Wed April 28: *Paper Presentations*

MARK 8335: Marketing Models
Required Papers
(pdf files are found on Blackboard)

1. Nash, John F., Jr. (1950), "The Bargaining Problem,"Econometrica, 18(2), 155-162.
2. Lazear, Edward (1986), "Retail Pricing and Clearance Sales," American Economic Review, 76: March 14-32.
3. Hauser, John and Patricia Simmie (1981), "Profit Maximizing Perceptual Positions," Management Science, 27, January, 33-56.
4. Akerlof, George (1970), "The Market for 'Lemons': Qualitative Uncertainty and the Market Mechanism," Quarterly Journal of Economics, 84, 488-500.
5. Chu, Wujin, Eitan Gerstner, and James Hess (1998), "Dissatisfaction Management with Opportunistic Consumers," Journal of Service Research, 1, Nov., 140-155.
6. Gerstner, Eitan, James Hess, and Duncan Holthausen (1994), "Price Discrimination Through a Distribution Channel: Theory and Evidence," American Economic Review, 84, December, 1437-1445.
7. Hauser, John and Steven Shugan (1983), "Defensive Market Strategies," Marketing Science, 2: Fall, 327-351.
8. Hess, James and Marilyn Lucas, "Doing the Right Thing or Doing the Thing Right: Allocating Resources Between Marketing Research and Manufacturing," forthcoming in Management Science, Spring 2004.
9. Gerstner, Eitan and James Hess (1987), "Why Do Hot Dogs Come in Packs of 10 and Buns in 8s or 12s? A Demand-Side Investigation," Journal of Business, 60, March, 491-518.
10. Horsky, Dan and Leonard S. Simon (1983), "Advertising and the Diffusion of New Products," Marketing Science, 2(1) (Winter), 1-17.
11. Gibbons, Robert (1997), "An Introduction to Applicable Game Theory," Journal of Economic Perspectives, 11, Winter, 127-149.
12. Balasubramanian, Sridhar (1998), "Mail versus Mall: A Strategic Analysis of Competition between Direct Marketers and Conventional Retailers," Marketing Science, 17, 181-195.
13. Varian, Hal (1980), "A Model of Sales," American Economic Review, 70, Sept 651-659.
14. Conlisk, John, Eitan Gerstner, and Joel Sobel (1984), "Cyclic Pricing by a Durable Goods Monopolist," Quarterly Journal of Economics, 99, August, 489-505.
15. Gerstner, Eitan and Hess, James (1995), "Pull Promotions and Channel Coordination," Marketing Science, 14, Winter, 43-60.
16. McGuire, Timothy and Richard Staelin (1983), "An Industry Equilibrium Analysis of Downstream Vertical Integration," Marketing Science 2, 161-191.
17. Chiang, W. Kevin, D. Chhajed, and J. Hess (2003), "Direct Marketing, Indirect Profits: A Strategic Analysis of Dual-Channel Supply Chain Design," Management Science, 49(1) (January), 1-20.
18. Chu, Wujin, Eitan Gerstner and James Hess (1995), "The Cost and Benefits of Hard Sell," Journal of Marketing Research, 32, February, 97-102.
19. A. Michael Spence, "Signaling In Retrospect and the Informational Structure of Markets" Nobel Prize Lecture, December 8, 2001
20. Gerstner, Eitan and James Hess (1990), "Can Bait and Switch Benefit Consumers?" Marketing Science, 9, Spring, 114-124.
21. Wilkie, William L., Carl F. Mela, and Gregory T. Gundlach (1998), "Does 'Bait and Switch' Really Benefit Consumers?" Marketing Science, 17, 275-283.
22. Hess, James and Eitan Gerstner (1998), "Yes, 'Bait and Switch' Really Benefits Consumers," Marketing Science, 17, 283-289.
23. Amaldoss, Wilfred and Sanjay Jain (2005), "Pricing of Conspicuous Goods: A Competitive Analysis of Social Effects," JMR, Vol. XLII (February), 30–42
24. Neslin, Scott and Robert Shoemaker (1983), "A Model for Evaluating the Profitability of Coupon Promotions," Marketing Science, 2: Fall, 361-388

Summary of Topics and Reading for MARK 8335

Class	Date	Topic	Readings: TMIM=Theoretical Models in Marketing
1	Wed Jan 20	Introduction to Theoretical Models in Marketing Marketing Model Formulation And Rationale	TMIM Ch 1 Nash
2	Wed Jan 27	Relationships Between Marketing Variables Theory of Brand Positioning and Attitudes	TMIM 2 Hauser and Simmie
3	Wed Feb 3	Linear Algebra and Systems of Equations in Marketing Matrix Algebra: Brand Switching and Model Identification	TMIM 3.1-3.3, Akerlof TMIM 3.4-3.5
4	Wed Feb 10	Market Dynamics and Differential Equations Product Diffusion Models and Fluctuations	TMIM 4.1-4.3 TMIM 4.4-4.6
5	Wed Feb 17	Calculus of Unconstrained Optimization Comparative Static Response Analysis	TMIM 5.1-5.3, 5.6, Chu et al. **Paper proposal due** TMIM 5.4, Gerstner et al.
6	Wed Feb 24	Defender Positioning Model Constrained Optimization	TMIM 5.5, Hauser and Shugan TMIM 6.1-6.3, Hess and Lucas
7	Wed Mch 3	Principal-Agent Models Dynamic Optimization	TMIM 6.4-6.8, Gerstner & Hess TMIM 7.1-7.5, Horsky and Simon
8	To be scheduled	Game Theory Retail Location Games	TMIM 8.1-8.4, Gibbons TMIM 8.5, Balasubramanian **Meet on paper**
	Th Mch 17	*Spring Break*	*no classes*
9	Wed Mch 24	Sales Promotions and Mixed Strategies Periodic Sales	TMIM 9.1-9.3, Lazear,Varian TMIM 9.4, Conlisk et al.
10	Wed Mch 31	Signaling Models Push and Pull Promotions	TMIM 9.6, Spence TMIM 9.8, Gerstner and Hess (1995)
11	Wed Apr 7	Brand Competition in a Channel Channel Control	TMIM 9.9-9.10, McGuire and Staelin Chiang, Chhajed and Hess
12	Wed Apr 14	Hard Sell Without Apology Bait and Switch Advertising	Chu, Gerstner, and Hess et al. Hess and Gerstner (1990 & 1998), Wilkie et al.
13	Wed Apr 21	Social Psychology in Marketing Models Blending Marketing Theory and Experiments	Amaldoss and Jain Syam, Krishnamurthy and Hess
14	Wed Apr 28	Paper Presentations	
	Wed May 5	**Written paper is due Wednesday May 5, 2010**	