

MKTG 6320

New Technology Forecasting

Instructor: Professor Frank M. Bass (972-883-2744) email: mzjb@utdallas.edu

Market analysis and demand forecasting of new technologies. Diffusion theory including Bass Model and extensions: Multiple Generations of Technologies, Effects of Decision Variables, and Learning. Applications to new and developing high technology products and services. Use of software and computer programs.

The course is designed for those interested in the diffusion of new products and technologies. The course is designed around the well-known “Bass Model” of the adoption and diffusion of new products and technologies (Bass, Frank M., “A New Product Growth Model for Consumer Durables,” *Management Science*, 15 (January), 215-227). This paper has been cited hundreds of times and is one of the most cited papers in marketing. The model developed in the seminal paper has been extended and modified in numerous ways and has been widely applied in business for evaluating and forecasting new products and technologies. The course deals with the underlying theories of diffusion models and with applications of these models in forecasting the adoption and diffusion of new products and technologies.

The materials for the course consist of: reading materials of packets of papers dealing with the weekly topics, software and computer programs for use with the weekly exercises, and a basic textbook on Marketing Models that will be useful primarily for methodological purposes. The website [http://: www.basseconomics.com](http://www.basseconomics.com) contains useful materials for the course as does <http://www.utdallas.edu/~mzjb/> The course will be taught in seminar format with class discussion of exercises and projects. Student teams will be assigned to develop forecasts of new products and technologies. Software for the course includes Bass Basics, Bass Model Solver, and SAS programs for the basic Bass model, the Generalized Bass Model, the Norton Bass generations model, and the Bass-Bass generations model.

Grades will be based on the quality of the weekly assignments, topic presentations, and a term paper, with equal weight given to each of these.

WEEKLY ASSIGNMENTS

Week 1

Topic: Introduction and Overview

PowerPoint “Bass Model Historical Overview”

Week 2

Topic: Bass Model Theoretical Development and Philosophy of Modeling

Reading Assignment: Papers Week 2

Bass, Frank M. 1969. A New-Product-Growth Model for Consumer Durables. *Management Science*. 15 (January) 215-227.

Bass, Frank M. 1994. The Evolution of a General Theory of the Diffusion of Technological Innovations, Polykarp Kusch Lecture Series, The University of Texas at Dallas. 1-22.

Bass, Frank M. 1993. The Future of Research in Marketing: *Marketing Science*. *Journal of Marketing Research*, 30, 1-6.

Exercise Assignment Week 2

Week 3

Topic: Parameter Estimation and Applications of Basic Bass Model For Forecasting (Market Potential, Peak Time, Takeoff Time, “Guessing by Analogy”)

Reading Assignment: Papers Week 3

Mahajan, Vijay, Eitan Muller, and Frank M. Bass. 1995. Diffusion of New Products: Empirical Generalizations and Managerial Uses. *Marketing Science* 14 (3 Part 2 of 2) G79-G88.

Bass, Frank M., Kent Gordon, Teresa L. Ferguson and Mary Lou Githens. 2001. DIRECTV: Forecasting Diffusion of a New Technology Prior to Product Launch. *Interfaces*. 31 (3) 82-93.

Jamieson, Linda F. and Frank M. Bass. 1989. Adjusting Stated Intention Measures to Predict Trial Purchase of New Products: A Comparison of Models and Methods. *Journal of Marketing Research*. 26 (August) 336-345.

Yu, Jun and Frank M. Bass. Factors Affecting Diffusion Patterns For New Products: A Hierarchical Bayesian Mixture Model. 2002. 1-47

Exercise Assignment Week 3

Week 4

Topic: Multiple Generations of Technology

Reading Assignment: Papers Week 4

Norton, John A. and Frank M. Bass. 1987. A Diffusion Theory Model of Adoption and Substitution of Successive Generations of High-Technology Products. *Management Science*. 33 September. 1069-1086.

Norton, John A. and Frank M. Bass. 1992. Evolution of Technological Generations: The Law of Capture. *Sloan Management Review*. 33 Winter. 66-77.

Exercise Assignment Week 4

Week 5

Topic: Applications of Norton-Bass and Bass-Bass Model For Forecasting

Reading Assignment: Papers Week 5

Bass, Portia Isaacson and Frank M. Bass, 2001. Diffusion of Technology Generations: A Model of Adoption and Repeat Sales. Working paper.

Fisher, J.C. and R.H. Pry 1971. A Simple Substitution Model for Technological Change. *Technological Forecasting and Social Change* 3 March. 75-88.

Exercise Assignment Week 5

Week 6

Topic: The Generalized Bass Model and Decision Variables

Reading Assignment: Papers Week 6

Bass, Frank M., Trichy V.Krishnan, and Dipak C. Jain. 1994. Why the Bass Model Fits Without Decision Variables. *Marketing Science* 13, Summer. 203-223.

Kumar, V. and Trichy V. Krishnan. 2002. "Multinational Diffusion Models: An Alternative Framework. *Marketing Science*, Vol. 21, (Summer), 318-330.

Exercise Assignment Week 6

Week 7

Topic: Applications of GBM for Forecasting

Reading Assignment: Papers Week 7

Bass, Frank M., Trichy V.Krishnan, and Dipak C. Jain. 1994. Why the Bass Model Fits Without Decision Variables. *Marketing Science* 13, Summer. 203-223.

Kumar, V. and Trichy V. Krishnan. 2002. "Multinational Diffusion Models: An Alternative Framework. *Marketing Science*, Vol. 21, (Summer), 318-330.

Exercise Assignment Week 7

Week 8

Topic: Estimation Issues for Diffusion Models

Reading Assignment: Papers Week 8

Srinivasan, V. Seenu and Charlotte H. Mason. 1986. Nonlinear Least Squares Estimation of New-Product Diffusion Models. *Marketing Science*. 5 (Spring) 169-178.

Van den Bulte, Christophe and Gary L. Lilien. 1997. Bias and Systematic Change in the Parameter Estimates of Macro-Level Diffusion Models. *Marketing Science*, 16 (4). 338-353.

Dewan, Tarun and Frank M. Bass. 2000. Investigating Bias and Systematic Change in the Parameter Estimates of the Bass Model: A Simulation Approach. Working paper.

Exercise Assignment Week 8

Week 9

Topic: The Experience Curve and Pricing

Reading Assignment: Papers Week 9

Bass, Frank, M. 1980. The Relationship Between Diffusion Rates, Experience Curves, and Demand Elasticities for Consumer Durable Technological Innovations., *Journal of Business*, 53 July, 551-67.

Bass, Frank M. and Alain V. Bultez. 1980. A Note on Optimal Strategic Pricing of Technological Innovations. *Marketing Science*. 1. Fall.

Henderson, Bruce, 1984, *The Logic of Business Strategy*, Ballinger Publishing Company, Cambridge, Mass.

Exercise Assignment Week 9

Week 10

Topic: Normative Models and Optimal Policies For New Technologies

Reading Assignment: Papers Week 10

Krishnan, Trichy V., Frank M. Bass and Dipak C. Jain. 1999. Optimal Pricing Strategy for New Products. *Management Science*. 45 (December) 1650-1663

Kalish, Shlomo. 1983. Monopolist Pricing with Dynamic Demand and Production Cost. *Marketing Science*. 2 Summer. 135-159.

Padmanabhan, V. and Frank M. Bass. 1993. Optimal Pricing of Successive Generations of Product Advances. *International Journal of Research in Marketing*. 10. 185-207.

Wilson, Lynn O., and John A. Norton. 1989. Optimal Entry Time for a Product Line Extension. *Marketing Science*. 8 Winter 1-17.

Exercise Assignment Week 10

Week 11

Topic: Moore's Law, Hedonic Analysis, and The Design Frontier

Reading Assignment: Papers Week 11

Bass, Portia I. 2000. [Cost Function.ppt]

Adelman, Irma and Zvi Griliches. 1961. On an Index of Quality Change. *Journal of the American Statistical Association*. 56. September. 535-548.

Bartik, Timothy J. 1987. The Estimation of Demand Parameters in Hedonic Price Models. *Journal of Political Economy*. 95. January. 81-88.

Chow, Gregory C. 1967. Technological Change and the Demand for Computers. *American Economic Review*. 57. December. 1117-1130.

Epple, Dennis. 1987. Hedonic Prices and Implicit Markets: Estimating demand and Supply Functions for Differentiated Products. *Journal of Political Economy*. 95. January. 59-80.

Fisher, Franklin M., Zvi Griliches, and Carl Kaysen. 1962. The Costs of Automobile Model Changes since 1949. *Journal of Political Economy*. 70. October. 433-451.

Rosen, Sherwin M. 1974. Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. *Journal of Political Economy*. 82. January/February. 34-55.

Grimm, Bruce T. 1998. Price Indexes for Selected Semiconductors, 1974-96. *Survey of Current Business*. February.

Exercise Assignment Week 11

Week 12

Topics: Micro Level Diffusion Models and Cellular Automata and Multi-product Linkages in Diffusion

Reading Assignment: Papers Week 12

Niu, Shun-Chen 2001. A Stochastic Formulation of the Bass Model of New-Product Diffusion. Working Paper.

Goldenberg, Jacob, Barak Libai, and Eitan Muller. 2001. Using Complex Systems Analysis to Advance Marketing Theory Development: Modeling Heterogeneity Effects on New Product Growth through Stochastic Cellular Automata. *Journal of the Academy of Marketing Science*. 1-27.

Goldenberg, Jacob, Barak Libai, and Eitan Muller. 2001. Modeling New Product Growth through Cellular Automata: Is Consumers' Heterogeneity a Barrier to Aggregate Analysis? 1-45.

Goldenberg, Jacob, Barak Libai, and Eitan Muller. April 2002. Is the Bandwagon Rolling? The Chilling Effect of Network Externalities on New Product Growth. 1-45.

Goldenberg, Jacob, Barak Libai, and Eitan Muller. 2002. "Riding the Saddle: How Cross-Market Communications Can Create a Major Slump in Sales," *Journal of Marketing*, Vol. 66. 1-16.

Exercise Assignment Papers Week 12

Week 13

Topic: Multi-product Linkages in Diffusion

Reading Assignment: Papers Week 13

Peterson, Robert A. and Vijay Mahajan. 1978. Multi-Product Growth Models. In *Research in Marketing-Volume 1* JAI Press. 201-231.

Gupta, Sachin, Dipak C. Jain, and Mohanbir S. Sawhney. 1999. Modeling the Evolution of Markets with Indirect Network Externalities: An Application to Digital Television. *Marketing Science* 18 Fall. 396-416.

Exercise Assignment Papers Week 13

Week 14

Topic: Review and Term Project Presentations

Week 15

Topic: Review and Term Project Presentations