Bocconi

Ph.D. Course 40176

MARKETING MODELING

From Research Questions to Empirical Models

Period: a.y. 2026/2027

Class times: II quarter

Instructor:

Prof. **Sara Valentini**
Dept. of Marketing. - Room 4-C1-15
s.valentini@unibocconi.it

Course description

This PhD course provides a rigorous and critical exploration of the models and methodologies most commonly used in quantitative marketing research. The focus is on developing, estimating, and interpreting formal models of consumer and firm behavior using both individual-level and aggregate data. By the end of the course, students will be able to: 1) formulate and estimate discrete choice models, including extensions to multi-item, state-dependent, and heterogeneous preferences, 2) diagnose identification issues, evaluate parameter recovery, and assess model robustness in empirical applications, 3) compare modeling approaches used in the literature, highlighting trade-offs between interpretability, generalizability, and realism, 4) apply these models to address problems in customer targeting, responsiveness, and personalization, with attention to emerging concerns such as fairness and bias.

The course is designed for doctoral students with a focus on marketing analytics and quantitative research. A background in microeconomics, statistics, and econometrics is expected. Familiarity with Python or R is useful for participating in hands-on sessions using real and simulated data.

Course Material

Session 1: Foundations: From Marketing Problems to Models

Focus: Translating marketing phenomena into research questions and formal models. Identifying underlying behavioral mechanisms, articulating modeling assumptions, and evaluating how alternative model specifications shape the insights we can obtain.

References (*Pre-class readings):

1. Winer, R. S., & Neslin, S. A. (Eds.). (2014). The History of Marketing Science. Now Publishers Inc. Chapter 1
2. John R. Hauser; Steven M. Shugan “Defensive Marketing Strategies” Marketing Science, Vol. 2,

PHD SCHOOL

No. 4. (Autumn, 1983), pp. 319-360.

3. Steve Shugan (2002), " Editorial Marketing Science, Models, Monopoly Models, and Why We Need Them" Marketing Science, 21, 3 , 223-228.
4. Shugan S. (2014), “Market Structure Research” in in The History of Marketing Science. Eds. R.Winer and S.A.Neslin. Chapter 6
5. Wedel, M., & Kannan, P. K. (2016). Marketing analytics for data-rich environments. Journal of Marketing, 80(6), 97-121.
6. Dew, R., Padilla, N., Luo, L. E., Oblander, S., Ansari, A., Boughanmi, K., ... & Yin, M. (2026). Probabilistic machine learning: New frontiers for modeling consumers and their choices. International Journal of Research in Marketing, 43(2), 462-484.

Session 2: Modeling Choice in Marketing

Focus: *Model consumer choice using random utility and discrete-choice frameworks; understand the role of consumer heterogeneity and state dependence; compare alternative model specifications and discuss identification challenges.*

References (*Pre-class readings):

1. Guadagni, P. M., & Little, J. D. C. (1983). A logit model of brand choice calibrated on scanner data. Marketing Science, 2(3), 203–238.
2. Harlam, B. A., & Lodish, L. M. (1995). Modeling consumers’ choices of multiple items. Journal of Marketing Research, 32(4), 444–457.
3. Levine, J., & Seiler, S. (2023). Identifying state dependence in brand choice: Evidence from hurricanes. Marketing Science, 42(5), 934–957.
4. Russell, G. J. (2014). Brand choice models. In R. S. Winer & S. A. Neslin (Eds.), The History of Marketing Science (pp. 59–84). Now Publishers.
5. Seetharaman, P. B., Chib, S., Ainslie, A., et al. (2005). Models of multi-category choice behavior. Marketing Letters, 16(3–4), 239–254.
6. Berry, S., Levinsohn, J., & Pakes, A. (1995). Automobile prices in market equilibrium. Econometrica, 63(4), 841–890.
7. Nevo, A. (2000). A practitioner’s guide to estimation of random-coefficients logit models of demand. Journal of Economics & Management Strategy, 9(4), 513–548.

References (Optional - background reading):

- Richards, T. J. (2007). A nested logit model of strategic promotion. Quantitative Marketing & Economics, 5(1), 63–91.

- Chintagunta, P. K., & Nair, H. S. (2011). Discrete-choice models of consumer demand in marketing. *Marketing Science, 30*(6), 977–996.
- Blattberg, R. C., Kim, B. D., & Neslin, S. A. (2008). Database Marketing: Analyzing and Managing Customers (Chapter 10: The predictive modeling process)

Session 3: Modeling Customer Heterogeneity and Dynamics

Focus: Observed and unobserved heterogeneity, state dependence, latent states, parameter recovery, simulation, identification and misspecification.

References (*Pre-class readings):

1. Ansari, A., Mela, C. F., & Neslin, S. A. (2008). Customer channel migration. Journal of Marketing Research, 45(1), 60–76.
2. Dew, R., Ansari, A., & Li, Y. (2020). Modeling dynamic heterogeneity using Gaussian processes. Journal of Marketing Research, 57(1), 55–77.
3. Fader, P. S., & Hardie, B. G. S. (2010). Customer-base valuation in a contractual setting: The perils of ignoring heterogeneity. Marketing Science, 29(1), 85–93.
4. Valentini, S., Montaguti, E., & Neslin, S. A. (2011). Decision process evolution in customer channel choice. Journal of Marketing, 75(6), 72–86.
5. Rossi, P. E., & Allenby, G. M. (2003). Bayesian statistics and marketing. Marketing Science, 22(3), 304–328.

References (Optional - background reading):

- Train, K. E. (2009). Discrete Choice Methods with Simulation https://eml.berkeley.edu/books/choice2.html
- Netzer, O., Padilla, N., & Montoya, R. (2019). Heterogeneity in hidden Markov models: Allowing for heterogeneity in the number of states. Working Paper, Columbia Business School.

Session 4: Marketing Responsiveness & Multi-Method Approaches

Focus: Distinguish prediction from marketing responsiveness, estimate heterogeneous treatment effects, and integrate modeling and field experiments to evaluate marketing interventions and inform managerial decisions.

References (*Pre-class readings):

1. Ascarza, E. (2018). Retention futility: Targeting high-risk customers might be ineffective. Journal of Marketing Research, 55(1), 80–98.
2. Ascarza, E., Iyengar, R., & Schleicher, M. (2016). Proactive churn prevention using plan recommendations: Evidence from a field experiment. Journal of Marketing Research, 53(5), 796–815.
3. D'Assergio, C., Manchanda, P., Montaguti, E., & Valentini, S. (2025). The race for data: Utilizing informative or persuasive cues to gain opt-in? Journal of Marketing, 89(3), 36–59.
4. Huang, T.-W., & Ascarza, E. (2024). Doing more with less: Overcoming ineffective long-term targeting using short-term signals. Marketing Science, 43(1), 111–131.
5. Lambrecht, A., & Tucker, C. (2013). When does retargeting work? Information specificity in online advertising. Journal of Marketing Research, 50(5), 561–576.
6. Smith, A. N., Seiler, S., & Aggarwal, I. (2023). Optimal price targeting. Marketing Science, 42(3), 476–499.

Suggested additional readings:

- Bult, J. R., & Wansbeek, T. J. (1995). Optimal selection for direct mail. Marketing Science, 14(4), 378–394.
- Narayanan, S., & Manchanda, P. (2009). Heterogeneous learning and the targeting of marketing communication for new products. Marketing Science, 28(3), 424–441.
- Montaguti, E., Neslin, S. A., & Valentini, S. (2016). Can marketing campaigns induce multichannel buying and more profitable customers? A field experiment. Marketing Science, 35(2), 201–217.

References (Optional – methodological background):

- Rubin, D. B. (2005). Causal inference using potential outcomes: Design, modeling, decisions. Journal of the American Statistical Association, 100(469), 322–331.
- Athey, S., & Imbens, G. W. (2017). The state of applied econometrics: Causality and policy evaluation. Journal of Economic Perspectives, 31(2), 3–32.

Session 5: Frontiers in Marketing Modeling

Focus: Explore emerging approaches to marketing modeling in environments characterized by privacy constraints, algorithmic decision-making, and fairness concerns. The session examines how advances in machine learning and personalization create new opportunities and methodological challenges for customer-level modeling, identification, and policy design. Particular attention is devoted to the trade-offs between predictive performance, privacy, fairness, and managerial effectiveness.

References (*Pre-class readings):

Topic 1 — Privacy, Personalization, and Scalable Customer Modeling

1. Anand, P., & Lee, C. (2023). Using deep learning to overcome privacy and scalability issues in customer data transfer. *Marketing Science, 42*(1), 189–207.
2. Rafieian, O., & Yoganarasimhan, H. (2021). Targeting and privacy in mobile advertising. *Marketing Science, 40*(2), 193–218.

Topic 2 — Fairness, Bias, and Discrimination

3. Ascarza, E., & Israeli, A. (2022). Eliminating unintended bias in personalized policies using bias-eliminating adapted trees (BEAT). Proceedings of the National Academy of Sciences, 119(11), e2115293119.
4. Luca, M., Pronkina, E., & Rossi, M. (2024). The evolution of discrimination in online markets: How the rise in anti-Asian bias affected Airbnb during the pandemic. *Marketing Science*.

Topic 3 — AI-Driven Causal Prediction and Marketing Policy Optimization

5. Ellickson, P. B., Kar, W., Reeder, J. C., & Zeng, G. EXPRESS: Evaluating Novel Unstructured Treatments with Generative AI: A Causal Prediction Framework. Journal of Marketing Research, 00222437261476639.
6. Lu, Haihao, Duncan Simester, and Yuting Zhu (2025). "Optimizing Scalable Targeted Marketing Policies with Constraints." Marketing Science, 44(5), 1082–1103.

References (Optional – Background Reading)

- Proserpio, D., Hauser, J. R., Liu, X., Amano, T., Burnap, A., Guo, T., et al. (2020). Soul and machine (learning). *Marketing Letters, 31*, 393–404.
- Yoganarasimhan, H. (2020). "Search Personalization Using Machine Learning." Management Science, 66(3), 1045–1070.
- Li, X., Deng, Y., Manchanda, P., & De Reyck, B. (2025). Can lower(ed) expert opinions lead to better consumer ratings? The case of Michelin stars. *Management Science*.

Session 6: From Marketing Models to Research Design

<u>Focus:</u> Integrating the methodological approaches covered throughout the course into the design of rigorous and impactful marketing research. This session examines how to translate a substantive

marketing question into a formal modeling framework, justify modeling choices, address identification challenges, and develop appropriate estimation and validation strategies. Particular attention will be devoted to evaluating the trade-offs between model complexity, empirical credibility, and managerial relevance.

Research Proposal Workshop: Students will briefly present their preliminary research proposals, outlining their research question, proposed modeling approach, data requirements, and main methodological challenges.

Proposed Assignment Schedule

Session	Assignment / Activity	Format	Due date
1 – Foundations	Research question and modeling framework	In-class exercise	Session 1
2 – Modeling Choice	Discrete choice modeling assignment	Take-home assignment	Session 3
3 – Heterogeneity & Dynamics	Heterogeneity, simulation, and parameter recovery	Take-home assignment	Session 4
4 – Marketing Responsiveness	Customer targeting and treatment responsiveness	Take-home assignment	Session 5
5 – Frontiers	No assignment	-	-
6 – Research Design	Preliminary research proposal presentation	In-class presentation and feedback	Session 6
Final Project	Individual research proposal	Written submission	Dec, 18th

Students are expected to develop their final research proposal progressively throughout the course, drawing on the methodological approaches discussed in each session. In Session 6, students will present their preliminary proposals and receive feedback before submitting the final written version by December 18.

Recommended book:

Winer, R. S., & Neslin, S. A. (Eds.). (2014). The History of Marketing Science. Now Publishers Inc.

Please read the assigned papers in advance and be prepared to discuss them in class

Bocconi

Assessment Methods

Students are expected to attend all sessions, complete the assigned readings, and actively contribute to class discussions and research paper presentations. Assessment will be based on technical assignments, class participation, and an individual final modeling research proposal. During Session 6, students will present their preliminary research ideas and receive feedback before submitting their final written proposal.

Final Project: Modeling Research Proposal.

Students are required to develop an original research proposal addressing a substantive marketing question using one or more modeling approaches discussed in the course. The proposal should articulate the research idea, its expected contribution, and the proposed modeling framework, supported by relevant mathematical equations. Students may draw on existing, simulated, publicly available, or proprietary data. Completed empirical analyses are not required.

The proposal should not exceed 8 pages (Times New Roman, 12-point font, double-spaced, excluding references). An extensive literature review is not required. Students will receive feedback on their preliminary ideas during Session 6 and submit their final proposal after the course..

The various components of the course grade are weighted as follows:

Assignments	40%
Project	50%
Class Participation	10%

Faculty Bio.

Sara Valentini's area of expertise lies in measuring and analyzing marketing effectiveness and customer profitability, especially in the fields of channel choice and customer relationship management. Her research interests also include product-returns dynamics, privacy, and customer data acquisition. The common thread running through her work is the evaluation of the impact of marketing actions along different stages of the customer journey. Most recent research interest focuses on tracing sustainable choices using GPS Data. Her research has appeared in Journal of Marketing, Marketing Science, Journal of the Academy of Marketing Science, Journal of Retailing, Journal of Interactive Marketing, Marketing Letters, and in other outlets such as MIT press. She currently serves as the Curriculum Coordinator for the Ph.D. program in Marketing. She is also the founder and chair of the "Customer Journeys in a Digital World"

conference. In addition, she has served as Track Chair for "Methods, Modelling & Marketing Analytics" at the EMAC Conference and is a member of the Editorial Review Board for Marketing Science, Journal of Interactive Marketing, and Journal of Retailing.