
MARKETING MODELING

Period: a.y. 2025/2026

Class times: II

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: Modeling Marketing Data: Foundations

Focus: Why we model in marketing, see the historical lineage, and glimpse both cross-sectional and duration paradigms.

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, 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. (2015), "Market Structure Research" in in The History of Marketing Science. Eds. R.Winer and S.A.Neslin.
 5. Wedel, M., & Kannan, P. K. (2016). Marketing analytics for data-rich environments. Journal of Marketing, 80(6), 97-121. Chapter 6

Session 2: Modeling Choice in Marketing

Focus: *multinomial logit, nested & mixed logit, multi-item baskets, state dependence, price/promo effects, introduction to GMM & market-level demand*

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. (2015). 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: Identification, Parameter Recovery & Customer Heterogeneity

Focus: *random-coefficients, finite mixtures, HMM, Gaussian Processes, exogenous vs. endogenous variation, simulation, robustness diagnostics.*

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. Hwang, H., Malhotra, N. K., Kim, Y., Tomiuk, M. A., & Hong, S. (2010). A comparative study on parameter recovery of three approaches to structural equation modeling. *Journal of Marketing Research*, 47(4), 699–712.
5. Valentini, S., Montaguti, E., & Neslin, S. A. (2011). Decision process evolution in customer channel choice. *Journal of Marketing*, 75(6), 72–86.
6. 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.
7. 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* (2nd ed., Chap. 12: Simulation and identifiability, pp. 261–284). Cambridge University Press. ISBN 978-0-521-74707-4.

Session 4: Targeting & Marketing Responsiveness

Focus: Link modelling choices to actionable targeting policies and compare static vs. adaptive approaches.

*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. Bult, J. R., & Wansbeek, T. J. (1995). Optimal selection for direct mail. *Marketing Science*, 14(4), 378–394.
3. 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.
4. Narayanan, S., & Manchanda, P. (2009). Heterogeneous learning and the targeting of marketing communication for new products. *Marketing Science*, 28(3), 424–441.
5. Smith, A. N., Seiler, S., & Aggarwal, I. (2023). Optimal price targeting. *Marketing Science*, 42(3), 476–499..

Session 5: Model-Based Evaluation of Marketing Interventions: Multi-Method Approaches

Focus: field interventions, targeting response, observational data, multi-method causal inference, heterogeneous treatment effects, uplift modeling, quasi-experiments.



*References (**Pre-class readings):*

1. 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.
2. Lambrecht, A., & Tucker, C. (2013). When does retargeting work? Information specificity in online advertising. *Journal of Marketing Research*, 50(5), 561–576.
3. 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.
4. Rubin, D. B. (2005). Causal inference using potential outcomes: Design, modeling, decisions. *Journal of the American Statistical Association*, 100(469), 322–331.
5. Anderson, E., Chen, C., Israeli, A., & Simester, D. (2024). Canary categories. *Journal of Marketing Research*, 61(5), 872–890.
6. Tucker, C., & Zhang, J. J. (2011). How does popularity information affect choices? A field experiment. *Management Science*, 57(5), 828–842.

References (Optional – background reading):

- Athey, S., & Imbens, G. W. (2017). The state of applied econometrics: Causality and policy evaluation. *Journal of Economic Perspectives*, 31(2), 3–32.
- Holland, P. W. (1986). Statistics and causal inference. *Journal of the American Statistical Association*, 81(396), 945–960.

Session 6: Frontiers in Marketing Modeling

***Focus:** Recent advancements in personalization, privacy, fairness, and algorithmic decision-making in marketing. This session explores how emerging technologies and modeling approaches impact customer-level targeting and raise new challenges for transparency, equity, and scalability. Emphasis will be placed on the empirical foundations of these issues and their implications for model-based marketing decisions.*

References (Pre-class readings):

1. Anand, Piyush, and Clarence Lee (2023). “Using deep learning to overcome privacy and scalability issues in customer data transfer.” *Marketing Science*, 42(1), 189–207.
2. Ascarza, Eva, and Ayelet Israeli (2022). “Eliminating unintended bias in personalized policies using Bias Eliminating Adapted Trees (BEAT).” Working Paper.
3. Goldfarb, Avi, Catherine Tucker, and Hema Yoganarasimhan (2023). “Privacy and Personalization.” *Handbook of Marketing Analytics*. (Excerpt)
4. Li, Xingyi, Yiting Deng, Puneet Manchanda, and Bert De Reyck (2024).

"Can Lower(ed) Expert Opinions Lead to Better Consumer Ratings? The Case of Michelin Stars." *Management Science*.

5. Luca, Michael, Elena Pronkina, and Massimo Rossi (2024). "The Evolution of Discrimination in Online Markets: How the Rise in Anti-Asian Bias Affected Airbnb During the Pandemic." *Marketing Science*, February.
6. Rafieian, Omid, and Hema Yoganarasimhan (2021). "Targeting and privacy in mobile advertising." *Marketing Science*, 40(2), 193–218.

Optional (background readings):

- Fabris, A., Baranowska, N., Dennis, M. J., Hacker, P., Saldivar, J., Borgesius, F. Z., & Biega, A. J. (2023). "Fairness and Bias in Algorithmic Hiring." arXiv preprint arXiv:2309.13933.
- Proserpio, D., Hauser, J. R., Liu, X., Amano, T., Burnap, A., Guo, T., ... & Yoganarasimhan, H. (2020). "Soul and Machine (Learning)." *Marketing Letters*, 31, 393–404.
- Yoganarasimhan, Hema (2020). "Causal Machine Learning in Marketing." *Journal of Marketing Research*.

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

Assessment Methods

Effective class participation includes attendance to sessions and making an active and constructive contribution to the discussion having read in advance the suggested paper, making constructive comments. Participants might also be required to participate to assignments with the objective of applying the models discussed in class. Finally, participants will be asked to submit a proposal of a conceptual paper proposal.

Project: Concept Paper

For this assignment, you are tasked with creating a concept paper. This should be based on the themes and topics we've explored in our class. You can use provided datasets, simulated data, public data, or your own data. Your task is to articulate an original concept or idea. This should be detailed both in narrative form and through fundamental equations. The paper's length is capped at 8 pages, using Times New Roman, 12 pt. font, and 2 line spacing. There's no requirement for an extensive literature review, keeping it concise and focused on your idea.

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

Assignments	20%
Project	50%
Class Participation	30%

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.