

The University of Chicago Booth School of Business

Operations Management/Management Science Workshop

Tuesday, September 13, 2016

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Title: A Partial-Order-Based Model to Estimate Individual Preferences using Panel Data

Abstract:

In retail operations, customer choices may be affected by stockout and promotion events. Given panel data with the transaction history of customers, and product availability and promotion data, our goal is to predict future individual purchases.

We use a general nonparametric framework in which we represent customers by partial orders of preferences. In each store visit, each customer samples a full preference list of the products consistent with her partial order, forms a consideration set, and then chooses to purchase the most preferred product among the considered ones. Our approach involves: (a) defining behavioral models to build consideration sets as subsets of the products on offer, (b) proposing a clustering algorithm for determining customer segments, and (c) deriving marginal distributions for partial preferences under the multinomial logit (MNL) model. Numerical experiments on real-world panel data show that our approach allows more accurate, fine-grained predictions for individual purchase behavior compared to state-of-the-art alternative methods.

Joint with: Gustavo Vulcano, NYU Stern School of Business

Link to the paper: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2560994