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Education

Ph.D. in Marketing, expected July 2009
Guanghua School of Management, Peking University, China

M.S. in Computer Science, 2001
School of Information Science and Technology, Liaoning University, China

B.A. in Management Science, 1991
School of Management, Shandong University, China

Research Interests

Bayesian Method
Variable Selection
Survival Analysis
State Space model

Dissertation

Title: Joint Estimation of the Heterogeneous Recommendation and Repurchase Thresholds Using Hierarchical Bayesian Approach

Dissertation advisors: Ping Tu, Meng Su

Committee members: Yuxin Chen, Guoqun Fu, Hansheng Wang (Statistics)

Summary:

Satisfaction thresholds are important indicators to make inference about customers' attitudinal and behavioral loyalty. These implicit thresholds function as criteria in determining what level of satisfaction could lead to recommendation and repurchase intentions. If individual customer's satisfaction thresholds could be obtained, marketers may allocate resources more efficiently by implementing various loyalty plans for customers with different satisfaction thresholds. However, little research on satisfaction focuses on explicitly estimating the satisfaction thresholds. Due to their latent and noisy nature, these thresholds need to be estimated with robust and advanced data analysis techniques. The purposes of this research are to jointly estimate the latent recommendation and repurchase thresholds and examine how the demographic factors and experience factors affect the two thresholds.

A customer may show different recommendation and repurchase intentions in the same satisfaction survey.

However, a certain level of correlation between two types of intention may also exist. In addition, the latent thresholds for recommendation and repurchase are usually heterogeneous across customers. And the heterogeneity may be partially explained by individual characteristics and experiences. To capture these traits, this research develops a Bayesian hierarchical bivariate probit model to jointly calibrate the individual-level recommendation and repurchase thresholds. The Markov chain Monte Carlo (MCMC) simulation method is applied to estimate the model. A hybrid algorithm of Gibbs sampler and Metropolis-Hastings is used to implement the simulation. The proposed model is tested using both simulated data and empirical data. The model comparison results show the proposed joint estimation model performs better than the separate estimation models.

The proposed model is applied to a satisfaction survey data of automotive customers. The results show the heterogeneous distribution of the two thresholds and the effects of both demographic and product related factors on the thresholds. This research also finds that the segmentations of customers based on satisfaction thresholds differ significantly in responses to satisfaction changes. This indicates that the nature of satisfaction-intention linkage varies on the basis of satisfaction thresholds markedly and thereby customers with various levels of satisfaction thresholds should be treated as distinct segments.

Papers under Review

“Estimating Recommendation and Repurchase Thresholds with a Joint Heterogeneity Response Model”, with Meng Su, under 2nd round review at *International Journal of Research in Marketing*.

“An Investigation of Consumers’ Smoking Behavior and Initiation Age for Anti-tobacco Advertising and Policy”, with Meng Su and Ke Chen, under review at *Marketing Letters*.

Conference Presentations

“Consumer Knowledge, Stated Preference, and Revealed Choice”, with Yuxin Chen and Meng Su, to be presented at the *INFORMS Marketing Science Conference*, University of Michigan, Ann Arbor, June 2009.

“Will Products Always Seem More Attractive When Consumers are Happy: Incorporating the Effects of Evaluation Modes”, with Zixi Jiang and Minghua Jiang, to be presented at the 38th *EMAC Conference*, Audencia Nantes, France, May 2009.

“Estimation of the Heterogeneous Recommendation and Repurchase Thresholds Using Hierarchical Bayesian Method”, with Meng Su, presented at the *INFORMS Marketing Science Conference*, University of British Columbia, Vancouver, June 2008.

Research in Progress

“A Zero-Inflated Negative Binomial Model for Family Influence on Consumer’s Smoking Behavior”, with Meng Su and Ke Chen. Manuscript in preparation. To be submitted to *Journal of Marketing*.

“Consumer Knowledge, Stated Preference, and Revealed Choice”, with Yuxin Chen and Meng Su. Data analysis in progress. To be presented at the *INFORMS Marketing Science Conference*, University of Michigan, Ann Arbor, June 2009.

“A LSA Method to Identify Factors Causing the Inconsistency between Stated and Revealed Choice”, with Hansheng Wang and Meng Su. Data analysis in progress.

“Customer Base Analysis in the Non-contractual and Polygamous Relationship Context”. Data analysis in progress.

Honors and Awards

Excellent Paper Award, 2008 JMS Chinese Marketing Science Conference Doctoral Forum, Xi'an Jiaotong University, October 2008.

Mizuho Corporate Bank Scholarship, Peking University, 2007.

Marketing Scholar Forum Fellowship, The University of Hong Kong, 2006.

Sample of Coursework

Marketing Data Analysis Method	(Ping Tu)
Special Topics in Marketing	(Rungting Tu)
Marketing Models	(Meng Su)
Data Mining and Application	(Junni Zhang)
Marketing Research Methods	(Rungting Tu)
Seminar in Marketing Classics	(Ping Tu)
Discrete Choice Model Seminar	(Xinlei Chen)
Consumer Behavior Topic	(Guoqun Fu)
Advanced Microeconomics	(Qinghua Zhang)
Management Research Method	(Zhixue Zhang)
Applied Statistics (2)	(Liangjun Su, Hansheng Wang)

References

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APPENDIX

Abstracts

“Estimating Recommendation and Repurchase Thresholds with a Joint Heterogeneity Response Model,” with Meng Su. Under 2nd round review at *International Journal of Research in Marketing*.

Recommendation and repurchase intentions are the two most important dimensions of customer loyalty. Latent satisfaction thresholds at the individual level, if obtained, can function as an additional valid and effective criterion to satisfaction ratings in determining customer behavior. Hence, customer segmentation based on these thresholds can help firms optimize their resources to improve customer retention. This paper proposes a joint heterogeneity response model to simultaneously calibrate the individual-level recommendation and repurchase thresholds through a joint specification over the heterogeneity. We conduct a simulation study to examine the parameter recovery and model comparison between our proposed model and two competing models. We apply our proposed model to the satisfaction survey data of automotive customers. The results outperform the other three alternative models and show more insight into uplifting customer loyalty using a segmentation scheme based on estimated recommendation and repurchase thresholds. In addition to the heterogeneous distribution of thresholds, our results uncover the effects of customer characteristics on the thresholds.

“An Investigation of Consumers’ Smoking Behavior and Initiation Age for Anti-tobacco Advertising and Policy”, with Meng Su and Ke Chen. Under review at *Marketing Letters*.

With the huge number of smoking population in China, understanding drivers of people’s smoking behavior and the development of successful anti-smoking advertising campaign are important issues in the current Chinese social marketing fields. However, compared to research in Western countries, there are few studies of tobacco consumption and smoking behavior in China. The purpose of this research is to identify these factors related to smoking likelihood and initiation of Chinese consumption. The sample used for this study is composed of 25,261 survey respondents coming from a large scale national survey on tobacco consumption in China in 2005. We summarize the results from three subsets of effects: household factors, individual demographic variables, and family members’ variables. The results from the logistic regressions show that variables influencing overall respondents are different from those influencing female and male respondents. In addition, survival analysis is applied to investigate the age of smoking initiation and its relationship to other factors such as household status, and individual as well as family characteristics. This research provides implications for antitobacco campaign advertising and tobacco control policy designing.

“A Zero-Inflated Negative Binomial Model for Family Influence on Chinese Consumer’s Smoking Behavior”, with Meng Su and Ke Chen. Manuscript in preparation. To be submitted to *Journal of Marketing*.

Understanding individuals’ smoking behavior are important issues in the public health and social marketing fields today. It also helps government to determine anti-smoking policy and tobacco companies to set pricing and advertising strategies. In previous research, the influence from family members, with demographic and behavioral information for individual’s parents, spouse, and siblings, has not been thoroughly investigated with sufficiently large dataset. We apply a zero-inflated negative binomial model to simultaneously examine consumer’s smoking behavior and average cigarette consumption quantity. In addition, to examine when and why adolescents start to smoke, the survival analysis is applied to model

customers' age of smoking initiation. The data are composed of 36,254 residents across different regions of China. The primary results show that demographic and family members' features have distinct influences on male's and female's smoking behavior. For instance, age significantly influences male's smoking behavior in a nonlinear function, while female is not affected by age. Cigarette consumption quantity is also correlated with several demographic factors and family members' features. Male's cigarette consumption amount is sensitive to price while female is not. The results of survival analysis show that for male, 20-year-old is the age facing highest risks to begin smoking, while female presents an even and low tendency through all life time. Our research provides implications for several areas, such as public policy, pricing strategies, and the directions for anti-smoking advertising.

“Consumer Knowledge, Stated Preference, and Revealed Choice,” with Yuxin Chen and Meng Su. Data analysis in progress. To be presented at the *INFORMS Marketing Science Conference*, University of Michigan, Ann Arbor, June 2009.

In this paper we investigate consumers' knowledge with various attributes of passenger vehicles and its effects on the inconsistency between stated preference and revealed choice. Previous research finds that consumers' knowledge plays an important role in their decision making process. However, it is still unclear how consumers' knowledge affects the inconsistency between stated preference and revealed choice. We collect the data from a total of 2034 consumers in China who plan to purchase a new vehicle within the next six months. Their knowledge on vehicles and their stated vehicle model preferences are elicited through a combination of conjoint experiments and survey questionnaires. Six months later, a second round survey is conducted for each participant. About seven hundred consumers actually bought a new vehicle and reported their actual automobile choices. We apply a multivariate hierarchical Bayesian choice model to jointly calibrate consumer knowledge on those essential attributes of automobiles. Furthermore, a binary logit model is implemented to examine the impacts of consumers' knowledge on the inconsistency between stated and revealed choice. We propose that consumers' knowledge can function as a significant indicator of the inconsistency between stated and revealed choice. The findings of this paper provide some additional insights in explaining the discrepancies between consumers' stated preferences and revealed preferences. It may help automobile firms make better predictions with regular consumer surveys and improve market share by influencing consumers' knowledge.

“A LSA Method to Identify Factors Causing the Inconsistency between Stated and Revealed Choice”, with Hansheng Wang and Meng Su. Data analysis in progress.

It is often observed that consumer's revealed choice differs from the stated preference. We investigate which features, such as product attributes and customer demographic, have the most explanatory power for the inconsistency between stated and revealed choice. Our dataset comes from 732 individuals whose automobile purchase intention and real choice were investigated. Since the dataset includes dozens of features, detecting the most predictive variables of the given output is demanded. On the basis of an ordinary binary logistic model, we use a least squares approximation (LSA) for the least absolute shrinkage and selection operator (LASSO) estimation to select variables. With this approach, the logistic model estimation and variable selection can be executed simultaneously. We illustrate the advantage of this method by comparing with the ordinary approach.

“Customer Base Analysis in the Non-contractual and Polygamous Relationship Context”. Data

analysis in progress.

Customer base analysis is concerned with understanding customers' current and likely future purchase behavior by analyzing their observed past purchase patterns. The conventional customer base analysis approach, Pareto/NBD model, is not appropriate to analyze customer base in the non-contractual and polygamous contexts. In a non-contractual setting, transactions may occur at any point of time and customers may terminate their relationship with a company without informing it. Further, in polygamous settings, customers typically keep polygamous business relationship with several suppliers simultaneously. In these contexts, it is hard to determine whether a customer has left the relationship or not. We propose a two-stage model for customer base analysis in the non-contractual and polygamous relationship settings. In the first stage, we develop a state-space model to predict number and monetary volume of purchase. In the second stage, using the result of the first stage as input data, we model customer's partial defection transition and compute share of wallet by a Markov transition model. We apply our propose approach to an empirical retailing customer database analysis. Our dataset comes from 12,320 customers of fourteen supermarkets from a chained retailer in China. The data include the customers' transaction records during one year and a half. Individual-level partial defection and share of wallet in the non-contractual and polygamous contexts are estimated. A model comparison with the Pareto/NBD model is conducted in terms of both internal fitness and external validation.

“Will Products Always Seem More Attractive When Consumers are Happy: Incorporating the Effects of Evaluation Modes”, with Zixi jiang and Minghua jiang. To be presented at the 38th EMAC Conference, Audencia Nantes, France, May 2009.

Prior research suggests that positive affect would improve the preference toward a product when evaluated separately, but little is known about the validation of this conclusion when products are subjected to side-by-side comparison. Two experiments in our study reveal that positive mood exerts promoting effect on products when they are presented and evaluated separately (separate evaluations mode); such effect is only evident for “good” product, but is reversed for “bad” one when “good” and “bad” products are juxtaposed and evaluated together (joint evaluations mode). This study suggests that this phenomenon may be due to the fact that positive affect operates differently in separate and joint evaluation mode.