Quantitative Marketing and Economics
2006 Conference Schedule

October 27-28, 2006

Sponsored by
James M. Kilts Center for Marketing, GSB, University of Chicago
INFORMS Society for Marketing Science (ISMS)

Friday, October 27

Friday's sessions will be held in the Bishop Auditorium, South Building, 518 Memorial Way.
Lunch will be held on the 2nd floor Patio/Terrace.

12:00 pm – 12:45 pm Lunch

12:45 pm – 1:00 pm Welcome

1:00 pm – 2:00 pm Session 1

A Dynamic Model of Consumer Replacement Cycles in the PC Processor Industry
Brett Gordon (CMU)

Product replacement plays a critical role in many high-tech durable goods markets. Since these markets frequently undergo both rapid improvements in quality and falling prices, the consumer's replacement decision is most often due to product obsolescence, as opposed to wear and tear. Despite its importance, this issue has received insufficient attention in the literature, especially from an empirical perspective. Managers in these industries know that consumers follow replacement cycles, but little is known about how and why these replacement cycles change over time. And recognizing that consumers do follow such cycles, how should managers alter their own strategies to take advantage of this?

To address these issues, I develop and estimate a dynamic consumer demand model that explicitly accounts for the replacement decision when consumers are uncertain about both future product price and quality. Using a unique data set from the PC processor industry, I show how to combine aggregate data on sales and product ownership to infer replacement behavior. The results reveal substantial variation in replacement behavior over time. I find that a myopic model of replacement underestimates price elasticities by approximately 30 to 40 percent and overestimates the frequency of replacement by 50 percent. I demonstrate that this heterogeneity in consumer replacement behavior provides an opportunity for managers to tailor their product introduction and pricing strategies to target the particular segment of consumers that is most likely to replace in the near future.

Discussant: Dan Ackerberg (UCLA)

2:00 pm – 3:00 pm Session 2

Product Bundles under Three-Part Tariffs
Ping Xiao (Washington), Tat Chan (Washington) and Chakravarthi Narasimhan (Washington)

Product bundling and non-linear pricing are popular marketing strategies in industries such as wireless and internet. While each has been extensively studied separately in the economics and marketing literature there are few empirical studies that consider both simultaneously. The purpose of this paper is to study consumers' preferences for product bundles under three-part tariffs commonly used by providers of wireless services. We develop a structural model to study consumers' service plan choice and product bundle usage decisions, and estimate the model using a dataset from a wireless service provider. We also model the impacts of switching costs and consumer learning on the consumer service plan choice, and find these variables play an important role in explaining the switching patterns observed in the data. Based on the estimation results, we conduct policy experiments to examine the firm's optimal pricing decisions. We find both bundling and three-part tariff strategies help to increase firms profit but may also increase consumer surplus hence create a win-win situation. Our results show that when consumer preferences for multiple products and services are positively correlated, the optimal pricing scheme is a combination of two-part and three-part tariff service plans. Light users will be attracted to the three-part tariff service plan, and heavy users will choose the two-part tariff plan. A counter-factual pricing experiment shows that, when consumer preferences are negatively correlated, the optimal pricing scheme will be a combination of two three-part tariff service plans.

Discussant: Matt Gentzkow (Chicago)

3:00 pm – 3:30 pm Break

3:30 pm – 4:30 pm Session 3

Bayesian Estimation of Dynamic Discrete Choice Models
Susumu Imai (Queen’s University), Neelam Jain (NIU) and Andrew Ching (Toronto)

We propose a new estimator for dynamic programming discrete choice models. Our estimation method combines the Dynamic Programming algorithm with a Bayesian Markov Chain Monte Carlo algorithm into one single Markov Chain algorithm that solves the dynamic programming problem and estimates the parameters at the same time.

Our key innovation is that during each solution-estimation iteration both the parameters and the expected value function are updated only once. This is in contrast to the conventional estimation methods where at each estimation iteration the dynamic programming problem needs to be fully solved. A single dynamic programming solution requires repeated updates of the expected value functions. As a result, in our algorithm the computational burden of estimating a dynamic model is of similar order of magnitude as that of a static model.

Another feature of our algorithm is that even though per estimation iteration, we keep the number of grid points on the state variable small, we can make the number of effective grid points as large as we want by simply increasing the number of estimation iterations. This is how our algorithm overcomes the “Curse of Dimensionality.”

We prove that under mild conditions, similar to those imposed in standard Bayesian literature, the parameters in our algorithm converge in probability to the true posterior distribution regardless of the starting values. We show how our method can be applied to models with standard random effects where observed and unobserved heterogeneities are continuous. This is in contrast to most dynamic structural estimation models where only a small number of discrete types are allowed as heterogeneities.

Discussant: Wes Hartmann (Stanford)

4:30 pm – 5:30 pm Session 4

Incomplex Alternatives to Mixed Bundling
Chenghuan Sean Chu (Stanford), Phillip Leslie (Stanford) and Alan Sorensen (Stanford)

Discussant: Sanjog Misra (Rochester)

6:00 pm Reception/Dinner East Vidalakis Dining Room
Schwab Residential Center
680 Serra Street

Saturday, October 28

Saturday's sessions will be held in the James H. Clark Center Auditorium (Bio-X Basement), 318 Campus Dr.

8:00 am – 9:00 am Breakfast

9:00 am – 10:00 am Session 1

Estimating Dynamic Models of Imperfect Competition
Patrick Bajari (Michigan), C. Lanier Benkard (Stanford) and Jonathan Levin (Stanford)

We describe a two-step algorithm for estimating dynamic games under the assumption that behavior is consistent with Markov perfect equilibrium. In the first step, the policy functions and the law of motion for the state variables are estimated. In the second step, the remaining structural parameters are estimated using the optimality conditions for equilibrium. The second step estimator is a simple simulated minimum distance estimator. The algorithm applies to a broad class of models, including industry competition models with both discrete and continuous controls such as the Ericson and Pakes (1995) model. We test the algorithm on a class of dynamic discrete choice models with normally distributed errors, and a class of dynamic oligopoly models similar to that of Pakes and McGuire (1994).

Discussant: Günter Hitsch (Chicago)

10:00 am – 11:00 am Session 2

Vaporware, Suddenware, and Trueware: New Product Pre-Announcements Under Market
Ozge Turut (Washington) and Elie Ofek (Harvard)

In markets characterized by intense innovative activity, firms typically pre-announce their new product plans. Given that such communications can reduce rivals' incentives to pursue the same opportunities, a firm may find it beneficial to pre-announce untruthfully. Specifically, an incumbent firm may want to engage in vaporware— in which case it creates the impression that it plans to pursue a certain new product opportunity when it really has no intentions of doing so. Alternatively, it may want to engage in suddenware — in which case it creates the impression that it plans to abstain from a new product opportunity when it really has concrete intentions of pursuing it. We examine an incumbent's incentives to follow each of these strategies when there is ex-ante uncertainty about the commercial rewards to an innovation. The incumbent and entrant each receive a private signal regarding the market potential for a radical innovation, and have to decide how aggressively to pursue this opportunity. We find that the incumbent will engage in vaporware (suddenware) when the entrant's signal quality is high (low). Furthermore, we show that the incumbent's desire to engage in vaporware increases as the entrant's disadvantage in duopoly profits or the fixed entry cost increase. Therefore, when taking into account market uncertainty, higher barriers to entry actually make vaporware more prevalent. We also show that when there is a benefit to pre-hyping the market by communicating to consumers and partners about a possible future launch, the incumbent may prefer to pre-announce truthfully (trueware) rather than to engage in vaporware. This occurs even if there is no negative ex-post cost to vaporware.

Discussant: Ganesh Iyer (Berkeley)

11:00 am – 11:30 am Break

11:30 am – 12:30 pm Session 3

Heterogeneity and the Dynamics of Technology Adoption
Stephen Ryan (MIT) and Catherine Tucker (MIT)

The diffusion of a network technology may be inefficient if there is coordination failure. This paper analyzes the role of heterogeneity in understanding the dynamics of how network technologies diffuse. Using a detailed dataset on the adoption of a new video-conferencing technology within a firm, we estimate a structural model of technology adoption and communications choice. This model allows for heterogeneity in network benefits and adoption costs across agents. A new "simulated sequence estimator" measures the extent to which agents seek diversity in their calling behavior. Characterizing technology adoption in the presence of network effects as an optimal stopping problem, we evaluate the relative efficiencies of two common policies used to jump-start technological diffusion.

Discussant: Andrew Sweeting (Northwestern)

12:30 pm – 1:30 pm **Lunch**

1:30 pm – 2:30 pm **Session 4**

Leveraging Uncertainty Through Make-To-Order
Hai Che (Berkeley), Chakravarthi Narasimhan (Washington) and V. Padmanabhan (INSEAD)

Make-to-order (MTO) sales model is a phenomenal success since the late 1990s. In this, the seller promises to deliver to the buyer at some future date a configuration the buyer desires. Although this model has been actively analyzed in the operation research literature, so far research on MTO has focused on its effects on logistic and inventory control issues. In this paper, we investigate the role of MTO in providing firms an option to deal with demand uncertainty and its impact on optimal product line decisions. Specifically, we examine the role of demand uncertainty on the emergence of the MTO model in equilibrium and investigate the effects of MTO sales on the monopolist's optimal quality choices and profitability.

Our key results are as follows: We find that MTO sales model could help firms deal with both demand uncertainty and product cannibalization issues. First, MTO allows firms to produce a lower quantity while retaining the option to fulfill the demand if the demand happens to be high leading to reduction in inventory costs. Second, since MTO gives consumers an option to obtain the product that meets their preference, it helps firms to deal with product cannibalization problem more effectively. Interestingly, we find that with the MTO option, firms are more likely to lower the quality of the high-quality product, while the low-quality product is produced at a higher quality level than when there is no MTO option available.

Discussant: Preyas Desai (Duke)

2:30 pm – 3:00 pm **Break**

3:00 pm – 4:00 pm **Session 5**

Do Manufacturers Subsidize Leases? A Price Discrimination Model of Leasing Behavior
Srabana Dasgupta (British Columbia) and S. Siddarth (USC)

According to the Coase conjecture, which underlies most of the established theory for why leases exist in the marketplace, leasing is a means by which durable good producers can credibly commit to higher prices. We develop a model of demand and supply of leased and sold automobiles that provides an alternative explanation for why a firm may wish to lease some of its units. In particular, we find that concurrently leasing and selling its products enables an auto manufacturer to price discriminate among consumers, depending on how much they drive. Model parameters estimated using transaction data from the near-luxury segment of the U.S. auto market find that 65% of the difference in prices between leased and purchased products is due to this type of price discrimination.

Discussant: Florian Zettelmeyer (Berkeley)

4:30 pm – 4:30 pm **Closing Remarks**

Peter C. Reiss (Stanford)