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EDUCATION

Ph. D. in Marketing (expected 2009)
Johnson Graduate School of Management, Cornell University, Ithaca, NY

M. A. in Marketing, May 2008
Johnson Graduate School of Management, Cornell University, Ithaca, NY

B. Sc. in Electrical and Computer Engineering, May 2003
College of Engineering, Cornell University, Ithaca, NY

HONORS, AWARDS AND SCHOLARSHIPS

AMA-Sheth Doctoral Consortium Fellow, 2007
INFORMS Doctoral Consortium Fellow, 2006
Doctoral fellowship, Johnson Graduate School of Management, Cornell University, 2004-2008

DISSERTATION

Title: “Essays on Competition in the U.S. Motion Picture Industry”

Area of Specialization: **Applied Competitive Game Theory**

Advisor: **Vrinda Kadiyali** (Marketing)

Committee: **Sachin Gupta** (Marketing), **Jeffrey Prince** (Applied Economics and Management), **Nicholas Kiefer** (Economics and Statistics)

Essay 1: “**Forecasting in Rapidly Changing Environments: An Application to the U.S. Motion Picture Industry**” (with Vrinda Kadiyali), revision invited at *Journal of Marketing Research*

Abstract:

Markets with rapidly changing environments provide forecasting challenges because of fewer similarities between past and future outcomes. In this paper, we provide a methodology that enables forecasting with relatively short histories. The application is to the U.S. motion picture industry where we forecast revenues in theatrical, sales (DVD and VHS), and rental channels. Using short market histories of similar products, we account for (1) observed and unobserved movie-specific characteristics, (2) seasonality of demand, (3) competition within and across multiple distribution channels (4) market expansion, substitution and complementarity between movies inside and across distribution channels. We extend the multiplicative competitive interaction model (Cooper and Nakanishi (1988)) to multiple distribution channels and build a novel two-step estimation method that allows for endogenous release schedules. We find our model outperforms existing models in most cases.

Essay 2: “**The Competitive Dynamics of DVD Release Timing and Pricing**” (with Vrinda Kadiyali), job market paper

Abstract:

In the U.S. motion picture industry, DVDs are increasingly a major source of revenue for movie studios. Two important strategic decisions for DVDs are the release date and price. Industry evidence suggests studios consider various release options as evidenced by their announcements. When deciding DVD release dates and prices, studios must consider the following. First, weeks of peak demand increase sales. Second, intense competition in weeks of peak demand might reduce market share and lower margins. Third, peak weeks have higher costs of release. Fourth, deferring a DVD release (e.g. to a non-peak demand week) after the movie’s theatrical run reduces the potential sales of the title. So how does the competitive equilibrium of release dates and prices evolve?

Such competitive dynamics are typically studied using Markov Perfect Nash Equilibrium methods. Our industry has features that make these methods unsuitable. First, studios’ announcements (which are both action in a period and state vectors in future periods) are not observed by the researcher, and cannot be imputed from the data. Second, the seasonality of demand and competition and other time trends in the data lead to time-varying payoffs and hence time-varying strategy selection rules for firms. That is, states of the world follow a first-order non-stationary Markov process. Third, given the variety of possible competitive dynamics at play (e.g. strategies might be strategic substitutes or complements, depending on the set of players being analyzed), multiple equilibria might result. There are no existing methods available to analyze dynamic competitive games with multiple equilibria. To overcome these modeling challenges, analogous to methods in the oblivious equilibrium literature, we use state distributions for unobserved state variables. We identify a sufficient statistic that captures industry competitive structure and use a novel two-step estimation procedure. We show reasonable predictive validity of agent behavior in our dataset.

While the application of our model is to the U.S. DVD market, the model is applicable to competitive industries with frequent entry of new products. Examples include technology products, other entertainment products like music, and fashion products. More broadly, the model is a generalization of dynamic multi-firm models to industries where firms’ strategy selection rules vary over time.

Essay 3: “**Managing the Format Transition from VHS to DVD**” (with Vrinda Kadiyali)

Abstract:

We model the release and pricing of new movies on Digital Video Disc (DVD) and Video Home Systems (VHS), at the end of the VHS technology lifecycle. In the U.S. home-viewing motion picture, DVDs were a newer format that displaced VHS tapes. Two key driving forces for consumer adoption of DVDs were the release dates and prices of new titles on VHS and DVD. The release of fewer movies or higher mean prices on VHS will push consumers towards opting for DVDs rather than VHS tapes. Conversely, higher mean prices for and fewer titles on DVD will decrease adoption of the new format.

In our model studios are forward looking and strategically use release timing and pricing strategies to influence adoption. Firms manufacturing DVD players profited from high per period equilibrium prices of players. Studios benefited from DVD adoption, post purchase of the player, as DVDs were priced higher than VHS tapes. Thus technology firms had incentives to maintain high prices on DVD players, while studios had an incentive to choose release and pricing strategies that increased adoption at the cost of current profits.

Studios also need to keep in mind that rival studios are making similar choices. It might be profitable to wait for other studios to popularize the new format and save oneself the cost of subsidizing it. Alternatively, this waiting might delay the adoption of the new format, and hence studios might need to

move together. Additionally, studio estimates of future DVD profits are complicated by cross format cannibalization across DVD and VHS, substitution of titles within format and changes in price elasticity with continued adoption. These factors are likely to vary by studio.

To model these issues in format adoption, we develop estimation methods for a dynamic Markov Perfect Nash Equilibrium (MPNE) with multiple equilibria. As firms could coordinate strategies to drive adoption or free ride, strategies in our model could be strategic substitutes or strategic complements, leading to the potential existence of multiple equilibria. Extant dynamic models are econometrically incomplete when faced with multiple equilibria. Instead, in the literature it is commonly assumed that despite the potential presence of multiple equilibria in the data, a single unique equilibrium is played in sample. In our paper, we define a new framework with beliefs over future equilibria, and extend prior methods for estimating static MPNE with multiple equilibria, to the dynamic setting.

OTHER RESEARCH

“Losing and Winning Auctions: Bidding Behavior in Repeated Auctions” (with Vrinda Kadiyali)

Brief Abstract:

In Nov 2006, two next generation consoles, the PS3 and Wii were launched to great fanfare. Both products sold out in stores within minutes of their launch, with fans spending hours in line to obtain these products. Post launch, neither of the products was available in conventional retail channels. A substantial number of these products had been bought by speculators and were sold in secondary channels over the course of the next few weeks. Ebay was the primary of such channels for secondary sales of new consoles.

We track sales of PS3 and Wii over the 2 months post launch of the consoles. In our data we are able to identify the unique bidder and seller identity, tracking them over the course of the auctions as they bid and won or lost in auctions. We notice a decline in prices, and sellers whose auctions ended without a sale, at an artificially high starting price. Our primary interest is in the repeat behavior of such participants. When returning to Ebay, do they price higher or lower than the average selling price. Does the initial exuberance and over estimation of market closing prices lead to gloom and understatement of future prices. Do losing bidders update their bid over the average market price, or do they continue to under bid in the market? By studying repeated auctions in this setting, we thus seek to understand the drivers of bidding behavior on Ebay.

“Signaling Quality on Ebay Motors” (with Vrinda Kadiyali)

Brief Abstract:

Ebay Motors is one of the largest clearing houses of used cars and motorcycles. How does quality uncertainty translate into sales at Ebay Motors? Who sells vehicles that have higher defect ratings are reputation mechanisms available to buyers that allow for a separation between trustworthy and less trustworthy dealers? What is the market structure for used vehicles and how does it differ from the market structure of new vehicles?

We empirically investigate related questions with data on three months of transactions on Ebay Motors. Our dataset contains 448,000 auctions, including all cars and motorcycles auctions on Ebay. A description of auction characteristics, vehicle characteristics, bidder descriptions, and seller descriptions, across this period of time for each auction, allows a complete reconstruction of the auctioning environment faced by the bidder. Separate quality measures identify private information held by the seller, but not available to the bidder.

PRESENTATIONS

“The Competitive Dynamics of DVD Release Timing and Pricing,” *Marketing Science Conference*, Vancouver, BC, Canada (Scheduled June 2008)

SELECTED PHD COURSEWORK

Course	Instructor
Economics & Marketing	
Microeconomic Theory	David Easley
Intermediate Economics Math	Tapan Mitra
Industrial Organization & Regulation	Talia Bar
Economics of Information	Ani Guerdjikova
Industrial Organization & Regulation	Robert Masson
Doctoral Seminar in Quantitative Marketing Models	Sachin Gupta
Doctoral Seminar in Quantitative Marketing Models	Vithala Rao
Doctoral Proseminar in Marketing	Various faculty
Econometrics and Probability	
Econometrics I	Yongmiao Hong
Econometrics II	Nicholas Kiefer
Probability	Gennady Samorodnitsky
Bayesian Econometrics	Nicholas Kiefer
Applied Econometrics I	George Jakubson
Applied Econometrics II	George Jakubson

TEACHING

Instructor, Marketing Management, NCC 553, Fall 2006

Equivalent of the Marketing Management core MBA class, offered to non-Johnson School students

Instructor Rating: 3.79/5, Overall course Rating: 3.96/5

CONFERENCES ATTENDED

North East Marketing Consortium, Cornell, Sept 2004

BCRST, SUNY - Binghamton, May 2005

North East Marketing Consortium, HBS, Sept 2005

INFORMS Marketing Science, June 2006

BBCRST, SUNY-Buffalo, May 2008

INFORMS Marketing Science, June 2008

REFERENCES

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