Editorial

Endogenous Modeling of Late Entry Penalties for Packaged Goods.
By Gurumurthy Kalyanaram

This editorial is abstracted *verbatim* from the following research manuscript: "ENDOGENOUS MODELING OF LATE ENTRY PENALTIES FOR PACKAGED GOODS by Gurumurthy Kalyanaram and Glen L. Urban, MIT Working Paper (WP #3412-92MSA)." The working paper can be obtained from Dr. Gurumurthy Kalyanaram.

Introduction

Numerous previous papers have documented the empirical relationship of early entry with market share advantages generally using a single equation model. However, there are two major threats to the estimates from the single-equation models arising from possible endogenous entry phenomena. First, the marketing variables may themselves be a function of order of entry. For example, the level of advertising may be systematically lower for later entrants. If this is not modeled, "innate" order effect may in fact be the structure of spending of later entrants and not a true market penalty. Similar arguments apply to price, promotion and distribution.

The second threat is that entry itself may be endogenous. Vanhonacker and Day (1987) discussed this as an example of an area where reserve regression is relevant. Moore, Boulding, and Goodstein (1991) explicitly suggest that entry may be a function of the skills and resources of the firm. When this is true, they show that the underlying order effect will be biased and may even be of opposite sign. They do not build an endogenous model for order of entry effects, but they show the dangers of ignoring the effect in estimation. Similarly, while Rodrigueze-Pinto, Gutierrez-Cillan and Rodriguez-Escudero (2007) did not study the endogeneity issue, they found that the entry effect is moderated by marketing and R&D resources. These findings make a compelling case for this paper.

The issue of endogeneity, while it has not been addressed in substantial measure in the context of order of entry effect, endogeneity has been studied well in the context of advertising and it has been found that advertising should be modeled as an endogenous decision (Dave and Saffer 2009, Kalyanaram 2009, Chintagunta, Kadiyali and Vilcassim 2006, Cotterill, Putsis and Dhar 2000, Villas and Winer 1999, Erickson 1992, Pindyck and Rubinfeld 1991).

Accordingly, we develop in this paper an explicit simultaneous equation model that includes the endogenous effects of order of entry on the levels of marketing variables and the entry order itself. The purpose of this paper is to examine the endogenous effects that could change the estimated magnitude and significance of the order of entry penalties. We also incorporate the dynamics of growth which is relevant and important in the context of consumer package goods.

The structure of this paper is as follows. We briefly review the literature, and then propose a structural equation model that examines the endogenous effects of order of entry on marketing variables and the possibility that order itself is endogenous and a function of the skill and power of the firm. In the following sections, we present the empirical results of applying the new model to the original data, examine this existence and magnitude of the innate order of entry effects, analyze the sensitivity of the structure, and close with an identification of directions for future research.

Brief Overview of Relevant Literature

There is a large amount of literature documenting that the early entrants enjoy sustained (long term) market share (Bond and Lean 1977, Robinson 1988a, Robinson and Fornell 1985, Urban et. al.1986, Parry and Bass 1989, Kalyanaram and Urban 1992, Robinson, Kalyanaram and Urban 1994, Kalyanaram, Robinson and Urban 1995, Kerin, Kalyanaram and Howard 1996, Berndt et. al. 1995, King 2000, Vakratsas, Rao and Kalyanaram 2003, Shamsie, Phelps, and Kuperman 2004, Kalyanaram 2008 and 2009) across many product categories. Researchers have found this effect across many product categories, and using both time-series and cross-sectional data.

Kalyanaram and Urban (1992) reported that while the later entrants (in consumer packaged goods) suffered from a long term sustained market share disadvantage, the later entrants reached the lower market share at a faster rate. This is because of the

education of the market (consumers) by the early entrants about the product category.

Many economic (e.g. Schmalensee 1982) and behavioral (e.g. Kardes, Kalyanaram, Chandrasekar, and Dornoff 1993, Kardes and Kalyanaram 1992, Carpenter and Nakamoto 1989) explanations have been given for order of entry advantages.

Researchers (Dave and Saffer 2009, Kalyanaram 2009, Chintagunta, Kadiyali and Vilcassim 2006, Cotterill, Putsis and Dhar 2000, Villas-Boas and Winer 1999, Erickson 1992, Pindyck and Rubinfeld 1991) have recognized the issue of endogeneity in the choices by firms, and particularly in the domain of advertising decisions. Quite often firms tend to set the advertising budget for a brand as a percentage of sales and/or profits for that brand. That is, the choice of advertising budget is affected by the level of sales, and this makes the advertising decision endogenous. Incorporation of endogeneity is important for both substantial and methodological reasons.

In the context of entry effect, Rodrigueze-Pinto, Gutierrez-Cillan and Rodriguez-Escudero (2007) found that the entry effect is moderated by marketing and R&D resources, and scale and order.

Accordingly, we study the entry effect as endogenous to the system. And this paper extends and complements the base of empirical knowledge in the study of order of entry effect by modeling entry effect and other marketing variables as endogenous decisions.

Managerial Insights

Modeling the endogenous relationship between order of entry and the level of promotion, price, distribution and advertising, and relationship between order of entry and expected share and the firm's financial performance, leads to an increase in the magnitude of the estimated innate penalty for late entry. This finding supports theories that argue for structural underlying phenomena that account for why the customers grant early entrant advantages based on economics (e.g. Lane 1980, Schmalensee 1982, and Hauser and Wernerfelt 1990) and behavioral information processing (e.g. Sujan 1985 and Alba and Hutchinson 1987. Our statistical results support previous empirical statistical and experimental analysis that found pioneering rewards (e.g. Robinson and Fornell 1985, Urban, et.al. 1986, Robinson 1988, Carpenter and Nakamoto 1989, and Kardes and Kalyanaram 1992).

The strategic implications of our model are that a share reward can be obtained by early entry by this effect and can be overridden by aggressive marketing by later entrants. Conversely later entrants should expect to obtain a lower share even if they have a product that performs at a parity level and has the same marketing support levels as the pioneer. Our data indicates that such parity is not common because we observe later entrants have higher prices and lower promotion, distribution, and advertising levels. Despite this observation, the early entrant would be wise to preempt the potential product positioning advantages of later entrants and aggressively support their brand if they want to secure maximum share advantages. The firms that are most likely to enter early are those with demonstrated skill as measured by the growth in earnings per share and foresight in identifying high share potential market opportunities.

Although our recursive equations demonstrate statistical and managerial significance which are useful in understanding entry phenomena, if a manager were forecasting the potential of entering a new market, the original single equation model would be more appropriate than the recursive structural equation model. The order of entry and marketing variable levels would be known so the new equations would not be needed to predict entry values and marketing variable levels; the loss of estimation precision in equations 2 to 5 could be avoided.

Two directions of future research are evident. First our model could be extended to account for the time between entrants and include structures that assess how enduring the entry advantage is (Brown and Lattin 1994, Robinson and Huff 1991). The second direction of research is to find the fundamental causes of the innate order of entry effect. Because behavioral and economic phenomena might explain the effect, more behavioral experiments are needed to uncover the underlying causative relationship between market share and order of entry.

References

- Alba, Joseph W. and J. Wesley Hutchinson (1987), "Dimensions of Consumer Expertise", *Journal of Consumer Research*, 13 (March), 411 -54.

- Berndt, Ernst R., Linda T. Bui, David H. Reiley and Glen L. Urban (1995), "Information, Marketing and Pricing in the U.S. Anti-Ulcer Drug Market," *American Economic Review*, Vol. 85, No. 2 (May), 100-105.

- Bond, Ronald S. and David F. Lean, Sales, Promotion and Product Differentiation in Two Prescription Drug Markets, Washington DC: Staff Report of the Bureau of Economics of the Federal Trade Commission, February 1997.

- Brown, Christina and James M. Lattin (1994), "Investigating the Relationship Between Time-in-Market and Pioneering Advantage," *Management Science*, 40 (10), 1361-1369.

- Carpenter, Gregory S. and Kent Nakamoto (1989), "Consumer Preference Formation and Pioneering Advantages, "*Journal of Marketing Research*, 26(3) (August), 285 – 298.

- Chintagunta, Pradeep, Vrinda Kadiyali and Naufel Vilcassim (2006), "Endogeneity and Simultaneity in Competitive Pricing and Advertising: A Logit Demand Analysis," *Journal of Business*, Vol. 79 (6), 2761-2787.

- Cotterill, Ron, William Putsis, and Ravi Dhar (2000), "Assessing the competitive interaction between private labels and national brands," *Journal of Business*, Vol. 73 (1), 109-37.

- Dave, Dhaval and Henry Saffer (2009), "Direct-to-Consumer Advertising and Pharmaceutical Prices," presentation in Eastern Economic Association Conference, New York.

- Erickson, Gary (1992), "Empirical analysis of closed-loop duopoly advertising agencies," *Management Science*, Vol. 38(12), 1732-49.

- Guadagni, Peter M. and John D. C. Ltttle (1983), "A Logit Model of Brand Choice

- Calibrated on Scanner Data," *Marketing Science*, 2 (Summer), 203-238.

- Hauser, John R. and Birger Wernerfelt (1990), "An Evaluation Cost Model of Consideration Sets," *Journal of Consumer Research*, 16 (4) (March), 393-408.

- Kalyanaram, Gurumurthy (2009), "The endogenous modeling of the effect of direct-to-consumer advertising in prescription drugs," *International Journal of Pharmaceutical and Healthcare Marketing*, Volume 3 (2), 137-148.

- Kalyanaram, Gurumurthy (2008), "The order of entry effect in prescription (Rx) and over-the-counter (OTC) pharmaceutical drugs," *International Journal of Pharmaceutical and Healthcare Marketing*, Volume 2 (1), 35-46.

- Kalyanaram, G. and Glen L. Urban (1992), "Dynamic Effects of the order of Entry on Market Share, Trial Penetration, and Repeat Purchase for Frequently Purchased Consumer Goods, " *Marketing Science,* Vol. 11, No. 3, 235-250.

- Kalyanaram, Gurumurthy and Dick R, Wittink (1994), "Heterogeneity in Entry Effects Between Nondurable Consumer Produce Categories," *International Journal of Research in Marketing,* 11(3) 219-231.

- Kalyanaram, Gurumurthy, William T. Robinson, and Glen L. Urban (1995), "Order of Market Entry: Established Empirical Generalizations, Emerging Empirical Generalizations, and Future Research," *Marketing Science*, 14(3), Part 2 (of 2), G212-G221.

- Kardes, Frank R., Gurumurthy Kalyanaram, Murali Chandrashekaran, and R. Dornoff (1993), "Brand Retrieval, Consideration Set Composition, Consumer Choice, and the Pioneering Advantage," *Journal of Consumer Research*, Vol. 20, (June), 62-75.

- Kardes, Frank R. and Gurumurthy Kalyanaram (1992), "Order of Entry Effects on Consumer Memory and Judgment: An Information Integration Perspective," *Journal of Marketing Research*, Vol. 24, (August) 1992, 343-357.

- Kerin, Roger, Gurumurthy Kalyanaram, and Dan Howard (1996), "Product Hierarchy and Brand Strategy Influences on the Order-of-Entry Effect for Consumer Package Goods," *Journal of Product Innovation Management*, Vol. 13, 21-34.

- King, Charles III, "Marketing, Product Differentiation and Competition in the Market for Antiulcer Drugs," Boston MA: Harvard Business School Working Paper No. 01-014, 2000.

- Lane, W.J. (1980), "Product Differentiation in a Market With Endogenous Sequential Entry", *Bell Journal of Economics*,   11 (Spring), 237-60.

- Moore, Michael T., William Boulding and Ronald C. Goodstein (1991), "Pioneering and Market Share: Is Entry Time Endogenous and Does It Matter?" *Journal of Marketing Research*, 28, (1) (February), 97-104.

- Parry, Mark and Frank M. Bass, (1989), "When to Lead or Follow? It Depends," *Marketing Letters*, 1, (3), 187-98.

- Pindyck, Robert S. and Daniel L. Rubinfeld (1991), Econometric Models and Economic Forecasts, 3rd edition, New York:

McGraw-Hill.

- Prescott, Edward C. and Michadel Visscher (1977), "Sequential Location of Firms with Foresight, "*Bell Journal of Economics*, 8 (Autumn), 378-93.

- Robinson, William T., Gurumurthy Kalyanaram, and Glen L. Urban (1994), "First-Mover Advantages from Pioneering New Markets: A Survey of Empirical Evidence," *Review of Industrial Organization (Journal of the Industrial Organization Society),* Vol. 9, 1-23.

- Robinson, William T. (1988a), "Sources of Market Pioneer Advantages: The Case of Industrial Goods Industries," *Journal of Marketing Research,* 25 (February), 87-94.

- Robinson, William T. (1988b), "Marketing Mix Reactions to Entry," *Marketing Science*, 7 (4) (Fall), 368-385.

- Robinson, William T., and Claus Fornell (1985), "The Sources of Market Pioneer Advantages in Consumer Good Industries, "*Journal of Marketing Research,* 22 (2) (August), 297-304.

- Robinson, William T., and Leonard Huff (1991), "Two Dynamic Factors that Influence Pioneer Market Share Advantages, " Working Paper, (Ann Arbor, MI:School of Business, University of Michigan).

- Rodriguez-Pinto, Javier, Jesus Gutierrez-Cillan, and Ana-Rodriguez-Escudero (2007), "Order and Scale of Market Entry, Firm Resources, And Performance," *European Journal of Marketing*, Vol. 41, No. 5/6, 590-607.

- Schmalensee, Richard (1982), "Product Differentiation Advantages of Pioneering Brands," *American Economic Review*, 27, 349-65.

- Shamsie, Jamal, Corey Phelps, and Jerome Kuperman (2004), "Better Late Than Never: A Study of Late Entrants in House Hold Equipment," *Strategic Management Journal*, Vol. 25, 69-84.

- Sujan, Mita (1985), "Consumer Knowledge: Effects of Evaluation Strategies Mediating Consumer Judgment Expenditures, "*Journal of Consumer Research*, 12 (2) (June), 31-46.

- Urban, Glen L., Theresa Carter, Steve Gaskin, and Zofia Mucha (1986), "Market Share Rewards to Pioneering Brands: An Empirical Analysis and Strategic Implications," *Management Science*, 32 (June), 645-59.

- Vakratsas, Demetrios, Ram C. Rao and Gurumurthy Kalyanaram (2003), "An Empirical Analysis of Follower Entry Timing Decisions," *Marketing Letters*, 14:3, 203-216.

- Vanhonacker, Wilfried R., and Diana Day (1987), " Cross-Sectional Estimation in Marketing: Direct Versus Reverse Regression," *Marketing Science*, 6, (3) (Summer) 254-67.

- Villas-Boas, Miguel and Russell S. Winer (1999), "Endogeneity in brand choice models," *Management Science*, 45, 1324–1338.

Dr. Gurumurthy Kalyanaram is the Editor of two prestigious scholarly journals of NMIMS: Management Review and Economic and Public Policy Journal.

Dr. Kalyanaram is also currently advising MIT Global Startup Workshop, and its India and Asia initiatives. He holds professorial affiliations with City University of New York (Part-time) and Tata Institute of Social Sciences (Visiting Research Professor). He is also serving as the President of Global MIT South Asian Alumni Association.

Dr. Kalyanaram's Educational Services include leadership in a school education project in India and digital learning and counseling about colleges and universities.

Dr. Kalyanaram earned his Ph.D. in Management Science in 1989 from the Massachusetts Institute of Technology (MIT). He holds an MBA from the University of Texas at Arlington and a BE in Electronics and Communication Engineering from the University of Madras.

For more details, please see www.gkalyan.com