Capturing Competitive, Cannibalistic, and Variety-Seeking Influences on Market Share: An Asymmetric Modeling Approach

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Abstract

This paper attempts to focus on the asymmetric source-of-share issue by building and calibrating a probabilistic choice model which estimates market share at the consumer level while also capturing the asymmetric influences of inter-brand competition, intra-brand cannibalism, and cross-form variety-seeking. The results suggest that the inclusion of asymmetric influences improves the fit to the data. Asymmetric variety-seeking is demonstrated to be a function of the dissimilarity between offerings. Managers who ignore asymmetric variety-seeking may be ignoring some of their closest competitors. The importance of asymmetric competition and asymmetric cannibalism must also be taken into account. Both are demonstrated to be functions of the similarity between offerings. Managers who ignore asymmetric cannibalism may introduce offering extensions that leave the firm no better off financially. These extensions conceivably could have a negative impact on the financial viability of the firm given the extra cost of expanding their offering mix. In addition, asymmetric competition provides new insights as to the competitors most likely to be affected by a given firm's actions.

Introduction

Marketing mix efforts by consumer products companies often involve huge investments, much of which is aimed specifically at increasing the market share of an individual product or brand. In theory, every such effort should be based on forecasts of the product's resulting share, the overall brand or company share, and competitor shares, all under various scenarios concerning competitive response and potential repositioning. But with the

typical marketplace packed with competing offerings in many forms, sizes, and brands, just predicting share has been complex enough without attempting to add to the complexity by trying to understand the specific sources of that share. Although the obvious hope among brand managers is that most purchases will be diverted from other firms' brands or other potential consumer uses of their money, managers realize that one possibility

is that some of that share will be cannibalized from other products of their own firm.

The mathematical marketing models, which have played a large role in trying to relate a particular promotional campaign or product change with the likely share response have, for the most part, avoided explicit consideration of share sources. Models designed in this way typically assume that a product draws share proportionally, or symmetrically, from all competitors in a market segment or consumer choice set in response to increased marketing efforts. In other words, such models ignore all differences and similarities among competing products. In most markets, however, increases in the share of one product cannot be assumed to come proportionally from the shares of all others, and a number of recent models have attempted to incorporate the asymmetry issue (e.g., Vanden Abeele et al. 1990). Most, however, tend to be non-parsimonious and/or difficult to estimate (Givon 1984).

Purpose

This paper attempts to focus on the asymmetric source-of-share issue by building and calibrating a probabilistic choice model which estimates market share at the consumer level while also capturing the disproportional influences of inter-brand competition, intra-brand cannibalism, and cross-form variety-seeking. As such, the research has managerial implications to such brand management areas as new product development, brand repositioning, and promotion analysis as well as in response estimation in competitive multi-brand environments. The estimated model is then demonstrated in a simulated marketing environment and the results compared to those of a standard choice-based model typically used to predict share.

Choice-Based Competitive Share Models

One popular choice-based model has been the Logit model (McFadden 1972, 1986) which assumes that an individual consumer's probability of purchasing a particular offering on a given pur-

chase occasion is based on his or her overall utility for the offering relative to the other offerings under consideration at the time. Consumers are assumed to be utility maximizers, choosing the offering with the highest level of utility. The Logit model can be expressed as:

$$P_{in} = \frac{\exp(S_{k=1}^K B_k X_{kin})}{\sum_{j=1}^J \exp(S_{k=1}^K B_k X_{kjin})}$$

P_{in} = probability that consumer n chooses offering i ,

X_{kin} = value of attribute k for offering i assigned by consumer n ,

B_k = importance parameter of attribute k ,

k = 1,2,...,K attributes,

i,j = 1,2,...,J offerings.

The Logit model offers numerous advantages over other linear and non-linear models: (1.) Computational tractability for choice sets containing many offerings; (2.) Parsimony in terms of the number of parameter estimates since only one parameter per attribute is estimated; (3.) Derivation from behavioral theory; (4.) Consistency of market share estimates since choice probabilities are bounded in a zero-one interval.

The problems with the Logit model, for the most part, revolve around the assumption of the random components of utility (i.e., error terms). The assumption of the independence of the random components of utility of the Logit model results in the Independence From Irrelevant Alternatives (IIA) property or Constant Ratio Rule which states that the ratio of choice probabilities between any two offerings is constant regardless of the presence or absence of any other offerings. The IIA property has important implications for estimating the source of share for an offering, since it implies that any offering will capture share proportionally from all existing offerings regardless of the similarity or differences among them. Intuitive counter-examples (e.g., Debreu 1960) and empirical evidence e.g., (Bass et al. 1972) support the idea that the influences between offerings are asymmetric, and that an offering should take disproportionately

more share from some offerings (e.g., more similar or more dissimilar) than from other offerings.

Sources Of Asymmetric Influence On Share

One potential source of asymmetric draw for an offering, and typically the most desirable from a managerial perspective, is from direct intra-form competitors (i.e., asymmetric competition). Asymmetric competition involves the share the offering pulls from directly competing offerings over and above the proportional share captured by a basic Logit model with the IIA property. An example is the disproportional share a barbecue-flavored potato chip offering introduced by Pringles would draw from direct competitors such as Ripples and Lay's barbecue-flavored potato chips. If such offerings compete more with these products than other products in the category, a disproportional amount of share is hypothesized to be drawn from them.

Another possible source of asymmetric draw for an offering is from intra-firm cannibalism (i.e., asymmetric cannibalism). Typically the least desirable source of share, asymmetric cannibalism involves the extra draw from other offerings in the same product category of the same firm. A disproportional amount of share can be expected to be drawn from within the firm when an offering competes more with the other products of the firm than with other offerings in the choice set. The obvious example in the above scenario would be the disproportional share the barbecue-flavored Pringles chip pulls from other Pringles potato chip offerings. Although important, this cannibalism versus competition issue has not received the attention it deserves in the literature (for exceptions see: Bultez et al. 1989).

While similarities among the various offerings in the marketplace drive the choice process which results in asymmetric competition and cannibalism, another body of literature suggests that competitive interrelationships can also be based upon the dissimilarity among offerings. As such, the third potential source of disproportional draw for an offering is based on cross-firm/cross-form

variety-seeking among consumers of the product category (i.e., asymmetric variety-seeking). Variety-seeking is the subject of a significant amount of literature in its own right, with several approaches and definitions. McAlister (1982), McAlister and Pessemier (1982), Lattin and McAlister (1985), and others have developed models of variety-seeking and its asymmetric influence on share. Variety-seeking focuses on a consumer's desire to achieve a particular level of satisfaction from a product class, even if several different offerings have to be purchased to achieve that satisfaction. It involves such terms as "balanced choice", "complementary products", "attribute satiation", and "structural variety", all used to describe consumer switching behavior among apparently dissimilar offerings. In the study of choice, then, competing offerings can be candidates for potential disproportional draw even if they are not direct competitors, as consumers seek balance or an overall level of satisfaction not available from a single firm and offering form. Asymmetric variety-seeking within a product category is defined for this study as involving the disproportional share an offering draws from products of a different form and a different firm. An example would be the disproportional share the Pringles barbecue-flavored potato chip offering might draw from Lay's and Ripple's regular, sour cream and onion, and nacho cheese-flavored potato chips. In cases where such semi-competitive offerings of other brands are perceived by consumers as overly competitive with the product, a disproportional amount of share could be drawn from them.

Variety-Seeking and Brand Loyalty

The adverse impact of asymmetric cannibalism (e.g., Bultez et al. 1989) and asymmetric competition (e.g., Cooper 1988) have been the subjects of recent empirical studies. These studies suggest that competitive interrelationships are based upon the similarity between offerings in the market. In other words, the market can be partitioned into submarkets of similar offerings such that offerings of the same submarket compete to a greater degree than the market as a whole.

While there exists theoretical and empirical support for asymmetric competition and cannibalism, another body of literature suggests that competitive interrelationships are based upon the dissimilarity between offerings. This literature can be broadly subsumed under the rubric of variety-seeking. Proponents of variety-seeking contend that a consumer, having just chosen a given offering, has a reduced probability of selecting the same or similar offering on a subsequent choice occasion. Instead, offerings that are highly dissimilar become more attractive (Faison 1977). As such, the market might be partitioned into submarkets of dissimilar offerings such that dissimilar offerings compete to a greater degree (i.e., asymmetric variety-seeking).

Not all consumers exhibit moderate or high levels of variety-seeking behavior. Many consumers exhibit brand loyalty behavior. Proponents of brand loyalty contend that a consumer, having just chosen a given offering, has an increased probability of selecting the same or similar offering on a subsequent choice occasion.

Many choice models assume that an individual consumer's probability of purchasing a particular offering on a given purchase occasion is based on his or her overall utility for the offering relative to the other offerings under consideration at the time. Consumers are assumed to be utility maximizers, choosing the offering with the highest level of utility. The concept of utility can be used to reconcile the concepts of variety-seeking and brand loyalty. Similarity (brand loyalty) and dissimilarity (variety-seeking) appear to possess utility for consumers. Consumers can be segmented on the basis of the utility assigned to the choice of similar and dissimilar offerings. In other words, different segments of consumers "value" similarity and dissimilarity to varying degrees. As such, different segments of consumers choose offerings to satisfy this need for similar or dissimilar offerings. This segmentation approach to the modeling of brand loyalty and variety-seeking in a single model has been utilized by Bucklin and Gupta (1992).

A Cluster-Type Model

An approach taken by Bultez et al. (1989), Gijbrechts and Vanden Abeele (1987), and Vanden Abeele et al. (1990) attempts to address the source of influence issue by developing a model which is a hybrid between several models. Their model is based on the well researched notion that "clusters" of offerings exist within a market, and that offerings of the same cluster influence each other more than offerings from different clusters. Asymmetric influences are specified as some functions of the attributes of clusters of similar offerings. As such, this model is able to incorporate asymmetric competition and cannibalism.

This is a valid approach when viewing the market from a managerial perspective. Managers want to know who the competitors are and how competitive actions impact their own product's performance. In addition, managers are concerned with the impact of their own new product introductions on both competition and their own products. However, recent anecdotal evidence suggests that this view may be somewhat limited by the perceptions of the market from the management's viewpoint. For example, the major cola producers completely missed the impact of the carbonated bottled water market and the flavored tea market of recent years. Even a major tea producer, Lipton, failed to recognize the consumer needs for tea flavored products and was subsequently second into the tea market behind a small start up firm Snapple. Therefore, the questions that arise from these examples are (1) What consumer factors might be important for the manager to consider so that gaps in the marketplace can be found and exploited? (2) How can we model the market to incorporate the impact due to alternative choices not directly included in the choice set?

Carpenter et al. (1988), suggest that one direction for research is to incorporate other types of information, specifically, consumer-level measurements of attitudes or perceptions). We propose that an alternative of the asymmetric competition and cannibalism model which incorporates brand and form, can be formulated to include a new component based on variety-seeking theory. The model seeks to explain market share and structure

by adding consumer variety seeking to the asymmetric modeling perspective.

The SOS Model

Our study is designed to build on the work of Vanden Abeele and colleagues. As such, our study contributes to the cluster-type model studies in several ways. First, this study demonstrates that asymmetric influences can be functions of perceptual attributes rather than marketing instruments. Second, these asymmetric influences can be studied using individual data rather than market level data. While the cluster-type models were able to capture the asymmetric influences of competition and cannibalism, the asymmetric influence of variety-seeking was ignored. Third, our model is able to incorporate this additional asymmetric influence. Finally, the specification of our model overcomes some of the computational difficulties encountered in earlier cluster-type model studies.

The model employed in this study is referred to as the SOS (Source-Of-Share) model since it accounts for asymmetric competition, asymmetric cannibalism, and asymmetric variety-seeking. In our model, the asymmetric sources of influence hypothesized to help explain consumer choice (and subsequently market share) when IIA assumptions do not hold are estimated in a Logit model by a set of additional parameters θ_M which estimates the asymmetric influence from the M^{th} cluster of offerings. Specifically, θ_{comp} represents the asymmetric influence on share of a given offering from the competition (intra-form) cluster, θ_{cann} represents the asymmetric influence on share of a given offering from the cannibalism (intra-firm) cluster, and θ_{variety} represents the asymmetric influence on share of a given offering from the variety-seeking (cross firm/cross form) cluster. Clusters, and thus similarity and dissimilarity, are based upon offering firm and offering form.

Mathematically, the SOS model becomes:

$$P_{in} = \frac{\exp[(\sum_{k=1}^K B_k X_{kin}) + (\theta_{\text{comp}} A_{\text{comp}i}) + (\theta_{\text{cann}} A_{\text{cann}i}) + (\theta_{\text{variety}} A_{\text{variety}i})]}{\sum_{j=1}^J \exp[(\sum_{k=1}^K B_k X_{kjin}) + (\theta_{\text{comp}} A_{\text{comp}j}) + (\theta_{\text{cann}} A_{\text{cann}j}) + (\theta_{\text{variety}} A_{\text{variety}j})]}$$

where

$A_{\text{comp}i}$ = sum of the attributes of the offerings of different firms/same form as offering i ,

$A_{\text{cann}i}$ = sum of the attributes of the offerings of the same firm/different forms as offering i ,

$A_{\text{variety}i}$ = sum of the attributes of the offerings of different firms/different forms as offering i .

This approach implies that the utility of offering i is not only a function of its own attributes, but also the attributes of the clusters of other offerings within which it exists and competes. In other words, the specification utilized for the A_M is a sum of the attributes of the other offerings in the cluster all measured on five point response scales. This specification allows for easy estimation of the model's parameters using maximum likelihood methods.

This specification overcomes some of the computational difficulties encountered by Vanden Abeele and colleagues. Their specification resulted in an intrinsically nonlinear model not fit for nonlinear estimation procedures since each A_M is a variable function of the attributes and the associated parameters. An iterative estimation procedure designed to deal with this problem produced mixed results (Bultez et al. 1989) and the convergence of the iterative procedure under fairly general conditions has not been investigated (Vanden Abeele et al. 1990).

Methodology

Data Collection

An application of the SOS model demonstrates the processes involved in measurement, parameter estimation, and analysis as well as implications related to product development and marketing mix management. It also highlights the differences in market share estimates between an IIA approach (i.e., the Logit model) and this asymmetric approach (i.e., the SOS model).

The research was performed in the context of a fast food firm in a South-

eastern MSA specializing in delivered pizza. At the time of the study, the market consisted of three major competing firms (B, D, and H), each producing two distinct forms of pizza ("R"-regular crust and "P"-deep dish or pan). As such, each offering is identified by a two letter code with the first corresponding to the firm and the second to the offering form (e.g., BP=firm B, form P).

Consumer choice data from the home-delivery pizza market were used to calibrate the model. These data were gathered by use of a questionnaire completed by a set of 270 participating respondents as part of a ten-week diary panel exercise administered by an undergraduate marketing research class. The diary panel which participated in the research was selected for convenience and accessibility rather than through a randomizing procedure, so the choice behavior and resulting shares are not generalizable to a larger population. However, the key aspects of the analysis center on information within the sample so lack of generalizability is not a major limitation. The questionnaire was administered at the beginning of the diary panel exercise so as to avoid the sensitizing effects of the process on respondent purchasing behavior.

The questionnaire obtained estimates of pizza purchasing (both firm and form) by each respondent as well as attribute ratings for each offering the respondent was familiar with (not just those being purchased). Perceptual ratings (Agarwal and Ratchford 1980) on each attribute were assessed using five point scales (Strongly Agree=5 to Strongly Disagree=1). After screening, 248 questionnaires were deemed usable for the analysis. The 248 questionnaires represents a 37 percent response rate.

Variables

The basic attributes hypothesized to influence choice and market share in this study were derived from previous research into the particular product market (Kochak 1987) and from general research into services quality (Parasuraman et al. 1988). After an examination of intercorrelations,

six variables were used in the modeling of share. The six attributes were overall taste (TASTE), acceptability of the crust (CRUST), dependability (DEPEND), convenient hours (HOURS), delivered condition of the pizza (CONDITION), and speed of delivery (QUICK). Each are hypothesized to exert a positive influence on choice.

Additional variables hypothesized to capture the disproportional influences of competition, cannibalization, and variety-seeking on share were then generated for each respondent following the ATCA (Arithmetic Total Cluster Asymmetry) computation utilized by Vanden Abeele et al. (1990). The ATCA method estimates the asymmetric influence above and beyond the basic intrinsic attractiveness of an offering as the sum of the attraction of the items of other offerings within the particular competitive cluster. At the individual level, this translates as the sum of each respondent's ratings across the other offerings of each cluster (all measured on five point response scales). The ATCA approach was used in this study because it performed better than other methods suggested by Van Abeele et al. (1990). Each of these asymmetric variables are hypothesized to exert a negative influence on choice. The asymmetric variables are hypothesized to be negative since each is a sum of the attributes of the other offerings in the cluster. It appears reasonable that if other offerings improve their attributes in the consumer's mind (and thus, increase the sum of the attributes or A_M) that there may be an adverse impact on the offering of interest.

Each respondent was then represented in the data by his or her stated proportions of purchases with respect to each of the offerings (i.e., dependent variable), ratings of each of the known offerings on the basic attributes, and three additional structural variables for each consumer and product hypothesized to capture the disproportional or asymmetric influences likely to affect choice behavior. This specification of the dependent variable as proportions of each offering purchased (i.e., "How many out of the last 10 home delivery pizza purchases were from: firm, form) allows the use of the discrete choice-multinomial

Logit program within the LIMDEP package (Greene 1990).

Results

The model typically used to estimate the impact of marketing mix changes on preference and share is the basic Logit model with the IIA property. As such, this model provides a good starting point and benchmark against which to explore the capabilities of the SOS model. Using the discrete choice-multinomial Logit program within the LIMDEP package (Greene 1990), a model of market share was estimated using the variables hypothesized to capture the basics of choice.

As shown in Table 1, the Logit model is driven largely by a limited number of variables, including consumer perceptions of TASTE, CRUST, DEPEND, and CONDITION. The Logit model

achieved a significant overall level of goodness-of-fit as measured by the Likelihood Ratio Test. As such, this model was successful in capturing the basics of consumer choice, with a change in Log-Likelihood from -444.36 to -262.83 and a Likelihood Ratio Test of 363.06 ($p < 0.00$).

The SOS model was then estimated in a similar fashion, except that the additional asymmetric influences were included to address the extra impact of each offering's competitive clusters. Parameter estimates indicate that the SOS model is likewise driven by consumer perceptions of the different offerings' TASTE, CRUST, DEPEND, HOURS, CONDITION, and QUICK. In this model, however, each of the three potential sources of disproportional influence exhibits an additional impact on choice and market share (and each with the hypothesized sign).

Table 1
Estimation Results Of The SOS And Logit Models

Variable Name (Hypothesized Sign)	Parameter Estimate (p-value for one-tail test)	
	SOS Model	Logit Model
TASTE (+)	0.3938 (0.0001) ^a	0.3241 (0.0009) ^a
CRUST (+)	0.2481 (0.0042) ^a	0.1519 (0.0416) ^a
DEPEND (+)	0.3279 (0.0021) ^a	0.2483 (0.0099) ^a
HOURS (+)	0.2139 (0.0316) ^a	0.1261 (0.1266)
CONDITION (+)	0.3634 (0.0034) ^a	0.2705 (0.0154) ^a
QUICK (+)	0.1450 (0.0665) ^b	0.1299 (0.0839)
COMP (-)	-0.0423 (0.0001) ^a	-----
CANN (-)	-0.0180 (0.0692)	-----
VARIETY (-)	-0.0332 (0.0001) ^a	-----
Summary Statistics:		
Log-Likelihood	-254.9700	-262.8300
Restricted Log-Likelihood	-444.3600	-444.3600
Likelihood Ratio Test	378.7800	363.0600
Adjusted Rho Squared	0.4060	0.3950
Cross Validity	0.7518	0.6934

^a=significant at the 0.01 level.
^b=significant at the 0.05 level.

Inclusion of the asymmetric influence variables designed to account for disproportional draw among offerings due to their competitive clusters changed the Log-Likelihood to -254.97 and increased the Likelihood Ratio Test to 378.78 ($p < 0.00$). A significance test designed to test for differences between competing models fit (Kamakura and Srivastava 1984) generated a value of 15.72 with three degrees of freedom which was significant at the 0.005 level. As such, the SOS model provides a superior fit to the data.

More impor-

Table 2
Model Comparison

Offering	BR	BP	DR	DP	HR	HP
<u>Actual Share</u>	0.1101	0.0269	0.3137	0.0744	0.2058	0.2692
<u>Estimated Share:</u>						
SOS Model	0.1285	0.0254	0.3063	0.0805	0.2165	0.2427
Logit Model	0.1584	0.0234	0.2713	0.0715	0.2296	0.2459
<u>Error:</u>						
SOS Model	0.0184	0.0014	0.0074	0.0061	0.0107	0.0264
Logit Model	0.0484	0.0035	0.0424	0.0028	0.0237	0.0233
<u>Overall Error:</u>						
SOS Model	0.0707					
Logit Model	0.1442					

tantly, however, it appears that the inclusion of the hypothetical disproportional influences significantly enhances the ability of the model to reflect actual market shares in an asymmetric environment. Comparisons between the two models are shown in Table 2 along with the shares reported by respondents. The SOS model clearly provides better estimates of actual shares than the Logit model, with approximately half the absolute error.

Validation

A true test of a model's diagnostic usefulness is evidenced by its predictive accuracy. The parameters of each model derived from the above analysis were used to predict choice probability in a holdout data set of 57 respondents from a separate pizza study. Predicted choice probability is correlated with actual choice probability in the holdout data set to obtain a measure called a cross

validity correlation coefficient. The higher coefficient reported in Table 1 for the SOS model indicates a superior fit using fresh data.

An Illustration

The obvious implication from the difference between the two models is that each of the sources of disproportional influence within the set of competing brands does exert a separate influence on share in addition to the individual attributes. It seems clear that failure to take these "influences" into account can make a significant difference on estimated shares resulting from marketing activities. These differences can be demonstrated by a simple illustration borrowing the basic characteristics (i.e., the estimated parameters) of the two models.

Assume a market with the basic parame-

Table 3
An Illustration

Panel A: Logit Model

Attribute	BR	BP	Offering DR	DP	HR	HP
TASTE	3	3	3	3	3	3
CRUST	3	3	3	3	3	3
DEPEND	3	3	3	3	3	3
HOURS	3	3	3	3	3	3
CONDITION	3	3	3	3	3	3
QUICK	3	3	3	3	3	3
Share	0.166	0.166	0.166	0.166	0.166	0.166

Panel A: SOS Model

Offering Attribute	BR	BP	DR	DP	HR	HP
TASTE	3	3	3	3	3	3
CRUST	3	3	3	3	3	3
DEPEND	3	3	3	3	3	3
HOURS	3	3	3	3	3	3
CONDITION	3	3	3	3	3	3
QUICK	3	3	3	3	3	3
COMP	54	54	54	54	54	54
CANN	36	36	36	36	36	36
VARIETY	54	54	54	54	54	54
Share	0.166	0.166	0.166	0.166	0.166	0.166

Panel B: Logit Model

Offering Attribute	BR	BP	DR	DP	HR	HP
TASTE	3	4	3	3	3	3
CRUST	3	3	3	3	3	3
DEPEND	3	3	3	3	3	3
HOURS	3	3	3	3	3	3
CONDITION	3	3	3	3	3	3
QUICK	3	3	3	3	3	3
Share	0.156	0.216	0.156	0.156	0.156	0.156

Panel B: SOS Model

Offering Attribute	BR	BP	DR	DP	HR	HP
TASTE	3	4	3	3	3	3
CRUST	3	3	3	3	3	3
DEPEND	3	3	3	3	3	3
HOURS	3	3	3	3	3	3
CONDITION	3	3	3	3	3	3
QUICK	3	3	3	3	3	3
COMP	54	55	55	54	55	54
CANN	37	37	36	36	36	36
VARIETY	54	55	55	54	55	54
Share	0.156	0.216	0.156	0.156	0.156	0.156

ters of the current study, but with six perfectly homogeneous competitors. This situation appears in Table 3, Panel A. Both models predict perfectly equal shares at the outset.

If firm B then improves the taste of its offering form P (designated offering BP) by "one perceived unit", its share should increase. This situation is depicted in Table 3, Panel B. The Logit model would predict the share the new improved offering should garner as 21.66 percent. The resulting impact on all other shares is exactly the same, and each would be expected to fall to 15.66 percent of the market.

However, the model which accounts for asymmetric competitive effects yields a different set of results with respect to the market share outcomes from the same competitive move. The predicted

share outcome for BP, although similar to that computed above, takes into account the differential effects of all three disproportional influences as they filter through the entire product set, and thus, avoids the IIA property. For example, the utility associated with BR, the other offering form of firm B, is lowered by the amount of cannibalism estimated by the cannibalism parameter. However, because the (negative) cannibalism parameter is smaller than both the competition and variety-seeking parameters, the overall utility of BR remains relatively high and the share drawn from it is less than from the other competing offerings. The resulting share falls, but less than the amount predicted by the Logit model. On the other hand, offerings DP and HP compete with BP in the direct competition (intra-form) cluster, which has the highest negative draw parameter. The predicted shares of these two offerings can be expected to fall more than predicted by the Logit model in response to a marketing mix change by BP. As indicated in Table 3, Panel B, the resulting shares of DP and HP do fall by a greater amount than predicted by the Logit model. Predicted share for the two offerings for whom the choice is for variety-seeking purposes (i.e., DR and HR) fall in the middle, with nearly the share predicted by the Logit model.

Implications

The results of this study are important for both marketing theory and marketing management. The results suggest that asymmetric influences should be included in modeling efforts. Asymmetric variety-seeking is demonstrated to be a function of the dissimilarity between offerings. Managers who ignore asymmetric variety-seeking may be ignoring some of their closest competitors. Diagnostically the results suggest that consumers who seek variety not only switch the form of the offering, but also the firm. In other words, a consumer may choose regular crust pizza from firm D, for example. However, when that consumer seeks variety by choosing a pan pizza, the consumer is more likely to choose the pan pizza from firm H. The implications for marketing managers is that rather than introduce "me-too" products, the firm

should introduce dissimilar offerings to cater to the variety-seeking behavior of consumers.

The impacts of asymmetric competition and asymmetric cannibalism must also be taken into account. Both are demonstrated to be functions of the similarity between offerings. Managers who ignore asymmetric cannibalism may introduce offering extensions that leave the firm no better off financially. These extensions conceivably could have a negative impact on the financial viability of the firm given the extra cost of expanding their offering mix. In addition, asymmetric competition provides new insights as to the competitors most likely to be affected by a given firm's actions.

The impacts of these asymmetric influences should be modeled separately. Models such as the adjusted Logit model rely on some overall measure of asymmetric influence. Thus, one cannot distinguish between the influence of asymmetric competition, asymmetric cannibalism, and asymmetric variety-seeking. There is presently software available to model the asymmetric influences separately. Two of the more popular software packages, SAS and LIMDEP, allow for the incorporation of these asymmetric influences.

Suggestions For Future Research

There are several areas for future research. First, the SOS model can be calibrated for different segments of the market. It is possible that the asymmetric influences may differ by segment. Second, the SOS model can be utilized in other product settings. The SOS model has only been utilized in the pizza market. It would be interesting to investigate any differences in the effects of the asymmetric influences for other product markets. Third, the SOS model can be applied to intangible services. Again, it would be interesting to investigate the asymmetric influences in an intangible service setting rather than a tangible product setting. Finally, the SOS model can be applied to a given product/service offering over time. The researcher or manager can then investigate how those asymmetric influences might change over

time as the product/service matures.

The SOS model has been developed to overcome the shortcomings of existing models while preserving the advantages of the Logit model. Specifically, the SOS model accounts for asymmetric competition, cannibalism, and variety-seeking using an approach that is parsimonious, computationally tractable, modest in terms of data requirements, and has superior predictive ability as compared to the Logit model. In addition, the flexibility and superior specification of the SOS model provides the manager with a valuable diagnostic tool. It is hoped that future research will attempt to incorporate the effects of asymmetric influences in modeling efforts.

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