Market Structure Analysis by Competitive Advertising Response

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Abstract

Competitive Market Structure Analysis is the partitioning of a set of brands into submarkets such that a brand within a particular submarket competes more closely with brands in the same submarket than with those belonging to a different submarket. The analysis helps managers make decisions for new product positioning and strategic marketing planning. In the area of marketing, many alternative market structuring approaches have been suggested. Most of them use consumer-based measures of substitutability. These measures are often unreliable or unavailable

This paper proposes and illustrates a firm-based market structure analysis, using competitive advertising data. The advertising competition data reflects firms' perception of competitive marketing efforts and is relatively easy to collect. The analysis identifies the market structure, assuming that firms know competitors and their moves so that respond properly through their competitive strategies. We also compare our approach with one of consumer-based approaches which uses a cross-elasticity measure of advertising. The comparison suggests that the two approaches derive similar market structures when the market is more structured and stable. In such markets, it maybe more difficult for firms to change the consumer perception through marketing repositioning strategies.

The firm-based approach analyzes the competitive behavior in a market more directly, and maybe is closer to the original purpose of the market structuring. Our study provides an important methodology for firms which plan competitive marketing strategies especially in changing markets.

Introduction

Market Structure Analysis(MSA) is the partitioning of a set of brands into submarkets such that a brand within a particular submarket competes more closely with brands in the same submarket than with those belonging to a different submarket. When managers make decisions of marketing strategies or position new products, they try to understand the competitive market structure through MSA. So MSA is of great interest in marketing area and has a vast literature. There are three basic approaches of MSA: an approach using actual purchase, that using consumer judgment data, and that using price cross-elasticity. However, each of the measures used has shortcomings as that of substitution.

The analysis of consumers' purchase behavior typically uses brand-switching or purchase-interval data. Frequent switching among a set of brands is interpreted as an indication that the brands in the set are close substitutes for consumer. However, a serious weakness of the brand switching is that it may reflect complementarity rather than substitutability due to variety seeking.

Cross-elasticity shows the effects of changes in a competitive marketing mix variable. When products are substitutes, and compete against each other, an increase in the sales of a firm causes a decrease in the sales of the other. However, cross-elasticity of sales can be misleading. Day and Shocker(1976) indicated the cross-elasticity's drawbacks as follows: First, cross-elasticity might not be static, as changes in the environment and in product composition occur over time. Second, changes in marketing mix variable by one firm lead to a reaction from competitors. Third, the variability or the collinearity in the data makes the estimation difficult in some situations. Finally, the estimation is subject to bias due to missing variable.

Substitutability is also inferred from consumer judgments about similarities or dissimilarities between brands. The judgments data is used to derive the structure underlying the perceptual differences. However, the judgment data is often unreliable due to individual subjectivity.

The availability of data is another crucial issue in MSA. In general brand-switching data or purchase-interval data is not readily available in developing countries. Also, the security concern of

firms prevents other firms from reaching their competitors' sales data necessary for estimating cross-elasticity.

To overcome the weaknesses of MSA suggested in the previous literature, we introduce an approach using firm-based competition data, instead of using a consumer-oriented data to infer market structure.

In the literature of strategic groups, the products of all the firms in each strategic group are considered close substitutes, because the firms within a strategy group are inclined to use similar strategies (Thomas and Venkatraman, 1988). However, there is little empirical or substantial research supporting it. Because we use competitive response data, our analysis can identify strategic groups empirically.

Our study has the following purposes: First, we present a market structure analysis that uses firms' marketing response data. Second, we try to identify conditions of industry and the firms that the firm-based and consumer-based approaches lead to discrepant or convergent market structures.

A firm-based approach of MSA

Compared with the consumer-based approach, the firm-based approach seems closer to original intention of market structuring, that is, analysis of competitive intensity of firms. Specifically we use the competitive advertising responses as input data for MSA. The data we use reflects the firm's strategic behavior objectively. In consumer-product markets, firms use advertising more often than price as their means of competition, especially in Korea. Furthermore, the competitive advertising data is relatively easy to collect from secondary sources or through market surveys or interview with managers.

Assumptions : For firm-based MSA to show the same result as that of consumer-based MSA, the following presumptions should be satisfied. One is that firms in the market should know their competitors. The other is that firms should respond properly to their competitors' strategic moves.

Analysis : Our analysis goes through three stages: First, we estimate the intensity of competitive advertising responses. The data is used to derive the firm-based market structure. Second, cross-elasticities of advertising among firms are estimated. The data is used to derive the consumer-based market structure. Third, we check whether the two resulting market structures are convergent confirming that the assumptions are satisfied.

Data and Measure

Data : The unit of analysis is a SBU that makes all the decisions concerning a certain product category. Six product categories were selected : chocolate, cracker, thirst-quencher, shampoo, laundry detergent and cosmetics. In each case, leading SBUs were chosen on the base of advertising and market share.

Measure : Shin et al.(1996)'s advertising response function is used to measure competitive advertising response. We infer that there is firm's advertising response to competitors if the coefficient α_{ki} of equation(1) is positive. We consider only the short-term advertising effect, because goods we analyze are frequently purchased and low-involved.

$$A_{it} = \delta_i + \sum_{k=1}^{N} \alpha_{ki}A_{kt}, \quad i = 1,\dots,N, i \neq k \quad \dots \quad (1)$$

A_{it} : standardized competitive advertising expenditures of firm i at time t

δ_i : advertising scale for firm i,

α_{ki} : pseudo reaction elasticity of firm i to firm k,

N : number of leading competitive firms in a certain product category.

Cross elasticity of advertising is estimated by equation (2) following Allenby (1989). If b_{ij} is negative, firms i and j are regarded as having competitive relationship.

$$Ln(MS_i) = a + b_{ij}Ln(AD_j) \quad \dots\dots\dots (2)$$

MS_i : market share of firm i,

Ad_j : advertising expenditure of firm j

Analysis and Results

1. Estimation and Market Structure Analysis

First, advertising cost are pre-whitened through deseasonalizing and detrending with OLS. Then we estimate advertising response in equation (1) and cross elasticity in equation (2) employing SUR. Our market structuring uses the arrow-representation (see the left side of Figure1). The two-sided arrow indicates reciprocal competitive relations. The one-sided arrow indicates that advertising of a firm affects the sales of another, but the reverse is not true, that is, an asymmetric relation. The representation shows that there are overlapping competitive relationships, especially for the case of leaders. A representation of market structure with arrows seems more realistic than that with tree graph which cannot represent overlapping structures.

2. Comparison of the Two MSA Approaches

Among the relationships represented in the two MSA results, about fifty percents are consistent. Looking from the industry-level, chocolate(33%), cosmetics(35%) and thirst-quencher(42%) market has low consistency, whereas detergent(75%), cracker (67%) has high. Shampoo (50%) is in the middle.

Conditions That the Two Approaches Give More Convergent Market Structures

We would like to reveal why the half of the results of two approaches are different. We suggest hypotheses that explain the difference focusing on characteristics of industries and firms.

1. Do Firms Know their Competitors?

If market is not stable as in new industries, the number of new entrants increases and demand fluctuates. In such markets, it can be difficult for a firm to tell which one is its competitor. Stable market is represented in terms of the stage of product life cycle(PLC), market growth rate, and possibility of new entrance.

Hypothesis : It is easier for firms to identify their competitors as the market is more stable. The two approaches give more convergent structures when;

H1 : the product is older

H2 : the market growth rate is lower

H3 : the possibility of entrance is lower

Market concentration is commonly measured with the total market share of several leading firms. In addition, the market concentration is thought to be lower as the number of firms in the market increases. Therefore, in the market with lower market concentration, firms have difficulties in identifying their competitors.

H4 : The two approaches give more convergent structures when the market is more concentrated.

If a firm understands its customers and competitors, it will respond to its competitors better, because it knows the market-structures which consumers perceive. Therefore, as the firm has higher market-predictability, it will identify its competitors and their responses better.

H5. The two approaches give more convergent structures when a firm has higher market-

predictability.

2. Do Firms React to their Competitors Properly?

Why a firm does not respond properly to competitors' advertising strategies? The seemingly wrong response may be the firm's intended strategy of product re-positioning. Or the firm may be trying to create or derive consumers' new wants. These hardly happen in highly structured markets. However, unstructured markets can provide good opportunity for implementing such strategies. Thus we present the following hypothesis and use H1-H3 to test it. The market is assumed to be more structured when the product is older, the market growth rate is lower and the possibility of entrance is lower.

Hypothesis : The two approaches give more convergent structures when the market is more structured

Gatignon et al.(1989) explain that the reason for firm's responding to new entrants passively is due to lack of their ability. We assume that the small-sized firms lacks ability to respond properly to their competitors.

H6. The two approaches give more convergent structures when the firm-size is bigger.

In the market where advertising does not have much influence, firms probably respond to their competitors with other marketing variables, such as promotion or price which have bigger elasticities than advertising. So we hypothesize that competitors react with advertising more than other marketing variable in the market where the role of advertising is important.

H7. The two approaches give more convergent structures when advertising plays more important role in the market.

Analysis and Result

Industry-level analysis : Because we analyze only six industries, we cannot but make a exploratory study at the industry level. We compare the two MSA through arrow representations as in Figure1.
Firm-level analysis : We use discriminant analysis to test hypotheses at the firm-levels. Dependent variable is whether two approaches show the same result or not. The positive sign of a firm's competitive advertising response and the negative sign of a firm's cross-elasticity to another firm mean a competitive relationship of the firm to the competitor. Independent variables are the

<Figure1. Examples of market structuring>

	Competitive response	Cross-elasticity
detergent		
cosmetics		
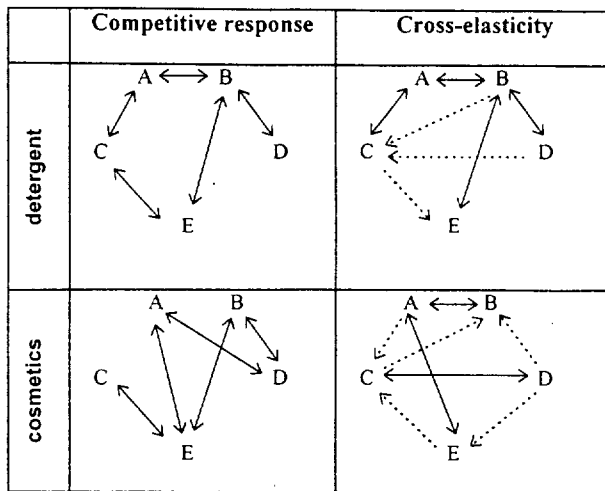
A ⟷ B : two-sided competitive relation
A⟵·· B : advertising of firm B affects sales of firm A

< Table1. Result of Discriminant analysis >

Variable	Means for cases		Pr > F
	consistent	inconsistent	
H1 : PLC	3.25	3.00	0.07*
H2 : Market growth rate	6.00	15.09	0.07*
H3 : New entrants rate	2.00	3.09	0.03*
H4 : Market concentration	79.8	79.0	0.87
H4 : Number of competitors	4.19	4.09	0.76
H5 : Market predictability	3.56	3.09	0.04*
H6 : Size of firm***	4266	5344	0.11
H7 : Ad's role**	2.5	2.27	0.25

*   10% significant level
**   ad's role is reversibly scaled.
*** size of firm is measured as the number of employee
**** market concentration is measured in two ways : number of competitors and sum of market share of leading firms in a market.

characteristics of industries and firms. The data was collected through a survey to product managers of SBUs.

Table1 shows that PLC, market growth rate and the possibility of entrance are significantly higher in consistent cases when compared to other cases(α =0.1). So hypotheses 1,2,3 are supported. Also H5(market-predictability) is accepted. The hypotheses regarding market concentration, the role of advertising, and the size of firms are rejected. The role of advertising seems to have little variance because data of similar consumer products are used.

The size of firm is significant but has the opposite sign to our expectation. Aaker et al.(1995) suggest that market leaders are in a better position when they do not respond directly to followers.

Discussion

Our research has several limitations. We dealt with small number of industries confined to consumer-goods. Also, the cross-elasticity measure we used for consumer-based MSA has a serious limitation when changes in marketing mix variable by one firm lead to a reaction of its competitors. If a firm reacts to its competitor's advertising properly so that it keeps the market share, then the cross-elasticity cannot reveal the competitive relationship.

The contribution of our research is as follows. Market is consisted of consumers and firms, and can be changed by either of them. However, most of the previous market structure analyses were performed from the viewpoint of consumers. The analyses are relevant only when the market is stable and highly structured. Therefore, both consumer and firm-based approaches should be considered at the same time. It is especially important when the market is more unstable and unstructured. In this situations, the firm-based approach is more necessary.

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