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Does Generic Advertising Help or Hurt Brand Advertising?

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Abstract

The purpose of this study is to investigate whether the generic advertising helps or hurts the brand advertising within the differentiated product environments. We develop an analytical model that includes both generic and brand advertising expenditures considering vertical product differentiation. Then the analysis is devoted to examine how marginal effects of expenditure affect each other under product differentiation. To help examine the relationship, we also include a new variable, the degree of product differentiation. Analytical results show that when the generic advertising increases the product differentiation, the high quality brand tends to take benefits while the low quality brand loses. When generic advertising includes messages that do not differentiate quality attributes, the high quality brand loses while the low quality brand takes benefits.

Keyword: check off, generic advertising**,** brand advertising, vertical product differentiation**.**

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1. Introduction

U.S. farmers are assessed over $750 million annually through commodity checkoffs to fund various generic commodity promotion programs such as generic advertising, consumer education, and product research. Historically, major commodity groups (e.g., dairy, beef, and pork) have invested majority shares of their checkoff budgets in generic advertising. Many studies in the agricultural economics literature indicate that the generic advertising has successfully increased the industry demand for most commodity groups. One of important assumptions of generic advertising is that each industry produces a homogeneous product. Therefore the purpose of generic advertising is to increase the industry demand while expecting equal benefit to each producer. However, in recent years, as agricultural and food industries are more concentrated and vertically integrated, products of these industries become more differentiated, which leads to various agricultural product brands and separate brand advertising programs. Brand advertising intends to increase market share of its own brand by persuading consumers to prefer its own brand to other brands. Through various brand advertising programs, producers try to differentiate their products emphasizing their unique quality attributes. Obviously, this is not consistent with the objective of generic advertising. Opponents of generic advertising claim that since generic advertising sends a signal that all products are homogeneous, it weakens brand messages by producers of differentiated products.

The purpose of this study is to investigate whether the generic advertising helps or hurts the brand advertising within the differentiated product environments. We develop an analytical model that includes both generic and brand advertising

expenditures considering vertical product differentiation. Then the analysis is devoted to examine how marginal effects of expenditure affect each other under product differentiation. To help examine the relationship, we also include a new variable, the degree of product differentiation. Analytical results are expected to show conditions of complementary or substitutive relationship between the two types of advertising programs. A numeric simulation is to be conducted for empirical analysis for the U.S. dairy industry.

2. Literature Review

There have been several studies investigating the relationship between generic and brand advertising under product differentiation. The papers mostly focus on theoretical development of the effectiveness of advertising programs at firm and industry levels. Crespi and Marette (2002) investigate the effects of generic advertising on the product differentiation among competing brands. Crespi and Marette's framework follows Mussa and Rosen (1978) to develop an analytical model under the assumption of vertical product differentiation. The analytical derivation examines how the effectiveness and the optimal level of brand advertising are affected by generic advertising when market demands are derived from consumer utilities with differentiated product qualities. Results of the study show that generic advertising may benefit the low quality producers more than the high quality producers. The findings bring an important implication to agricultural and food industries where products are becoming more differentiated.

Hunnicutt and Israelsen (2003) examine the brand advertising effects from individual producers which are voluntarily funding under differentiated product industry.

Considering the monopolistically competitive industry, they develop a conceptual model for generic and brand advertising, which includes the market share and degree of product differentiation. Advertising benefits are clearly examined by showing the market expansion effects and branding effects through comparative statistic analyses. Chakravarti & Janiszewski (2004) examine effects of the generic advertising on the brand preferences through experiments under various scenarios. Results of the experiments suggest that the generic advertising may affect consumers' choice of brand through increasing or decreasing their perceived brand differentiation. They also found that contrary to the objective of generic advertising, the generic advertising may increase the brand differentiation. Bass et al. (2005) analyze effects of generic and brand advertising in a duopoly market using an optimal control model. In this study, each firm can make decision its price, and generic and brand advertising levels. The study shows that a stronger firm is more likely to invest in generic advertising, and the market share mainly depends on the brand advertising. Crespi (2007) and Isariyawongse et al. (2007) extend the Crespi and Marette (2002)'s framework to vertical differentiation and horizontal product differentiation in duopoly market, respectively.

Although these previous studies provide useful framework for understanding the relationship between generic and brand advertising programs, the relationship has not been clearly identified. Most analytical results from these studies were not able to sign the marginal effects of optimal brand advertising and its effectiveness with respect to generic advertising. In addition, the empirical analysis has been rarely conducted.

3. Model

In an agricultural commodity market, we assume there are 2 firms represented $i = 1, 2$,

and each firm provides a different variant characterizing its quality $q_i \in [q^-, q^+]$. Firm 1 produces a high quality product, denoted by brand 1. The firm 2 produces a low quality good, denoted by brand 2. The two types of variants are vertically differentiated such that if both products were offered at the same price, consumers would prefer to buy a good supplied from the high quality product producer, firm 1.

The two firms conduct their own brand advertising and pay the assessment for the generic advertising which sets from the marketing board to increase overall industry demand. Firm 1 spends more brand advertising expenditure than firm 2 ($B_1 \geq B_2$). It is assumed that other variable costs of each firm are the same between the two firms.

There is a continuum of consumers where consumers are identified by θ, the marginal willingness to pay for quality (intensity of preference for quality). The marginal willingness to pay for quality is uniformly distributed over $[\theta^-, \theta^+] \in [0, \infty) \rightarrow \mathrm{R}_+$. It is assumed that a consumer type θ either buys one unit of a brand 1 or 2, or does not buy at all, and the income is sufficient to purchase the commodities in the market.

An indirect utility for a consumer type θ who purchases a brand i can be written by:

(1) $$V_i(y, P_i, q_i, \delta; \theta, \gamma) = y - P_i + \theta q_i + \gamma\delta, \quad i = 1,2,$$

where y is the consumer's income and P_i is the own price which come from consumers' budget constraint $P_i(q_i) + x \leq y$. Here, x is the composite commodity, and y and $P_i(q_i)$ are measured in terms of x (Mussa and Rosen 1978). P_i is a function of the brand's perceived quality, which is, $P_i = P_i(q_i)$. q_i is the perceived quality of brand 1 or 2, which

consumers perceive by experiencing the quality of variants or through advertising messages. The perceived quality is depending on intrinsic quality such as nutrition, taste, shape and so on (physical quality φ_i), generic advertising (g), and brand advertising (B_i). That is: $q_i = f(\varphi_i, B_i, g)$. The term δ in equation (1) represents the relative difference in quality between brands 1 and 2. When consumers consume brand 1, $\delta = q_1 - q_2$. When consumers consume brand 2, $\delta = q_2 - q_1$. The term δ will either positively or negatively affect consumers' utility depending upon the assumption on q_1 and q_2. Since we assumed that firm1prodces higher quality that firm 2, $q_1 > q_2$. In this paper, δ represents the degree of product differentiation[1]. We assume that δ depends on the brand advertising of the two firms and generic advertising, $\delta = h(B_i, B_j, g)$. γ is the parameter of the degree of product differentiation.

There exists the marginal consumer $\bar{\theta}$ who is indifferent between purchasing brand 1 or brand 2. Then, the value $\bar{\theta}$ is the solution to the equation $V_1(y, P_1, q_1, \delta; \theta, \gamma) = V_2(y, P_2, q_2, \delta; \theta, \gamma)$. By solving the equality, we obtain, $\bar{\theta} = \frac{P_1 - P_2}{\delta} - 2\gamma$.

Demand for each brand in the market depends on consumer preferences, income, products qualities or characteristics, and market prices. To simplify the derivation of demand functions, we assume that the income is sufficiently high, and consumers have unit demands. In this market, therefore, the demand function is given by: $Q_i^d = Q(P_i, P_j, q_i, q_j, \delta; \theta, \gamma)$, $i,j = 1,2.$, $i \neq j$.

Assuming there is a continuum of consumers who are characterized by the consumers' preferences (θ), which is uniformly distributed from lowest (θ^-) to highest (θ^+), and consumers purchase either brand 1 or brand 2, or nothing at all, the market demand for each brand simply becomes the density of the consumers' preferences in

one of the segments along the unit interval multiplied by the total number of consumers in the industry, N. Then, demand for brands 1 and 2 can be written as:

$Q_1^d(P_1, P_2, q_1, q_2, \delta; \theta, \gamma) = (\theta^+ - \bar{\theta})N$, and $Q_2^d(P_1, P_2, q_1, q_2, \delta; \theta, \gamma) = (\bar{\theta} - \theta^-)N$, respectively.

The total number of consumer N is a function of generic advertising, N=N(g), and it is increasing function with decreasing rate $\left(\partial N/\partial g > 0,\ \partial^2 N/\partial g^2 < 0\right)$. It means that generic advertising may expand the market size as it would attract to potential consumers and/or it would make the variants still be consumed at some (more) level. The brand advertising, however, affects on the market shares and differences as it makes to alter the consumers' quality perception of each brand, so that the quality perceptions of each good is increased with decreasing rate $\left(\partial q_i/\partial B_i > 0,\ \partial^2 q_i/\partial B_i^2 < 0\right)$.

The firms have constant unit costs of production, and we assume that these costs are zero, i.e., c_1=c_2=0, except advertising costs, B_i. We also assume that each firm pays the same per-unit assessment rate g for generic advertising. Then, the profit function of each firm is given by:

(2) $$\Pi_i = (P_i - g)Q_i^d(P_1, P_2, q_1, q_2, \delta; \theta, \gamma) - B_i, \quad i = 1,2.$$

The generic advertising expenditures are exogenously given by the marketing board, and given generic advertising expenditures, two firms make decision on price and brand advertising expenditures. Therefore, it is reasonable to model completion in price and brand advertising by a two-stage game. In the first stage, firm 1 and 2 simultaneously consider the own brand advertising expenditures given the rate of g. In the second stage, the firms compete through prices by simultaneously choosing their prices, so that the prices are the Nash equilibrium prices.

To solve the two-stage game by backward induction, we first determine the equilibrium prices of two firms. Taking derivatives the equation (2) with respect to the own price of each firm, and then simultaneously solving the first order condition can get the Nash equilibrium prices as:

$$(3)\qquad \begin{aligned} P_1^* &= \frac{1}{3}\delta\left(2\theta^+ - \theta^- + 2\gamma\right) + g, \\ P_2^* &= \frac{1}{3}\delta\left(\theta^+ - 2\theta^- - 2\gamma\right) + g. \end{aligned}$$

In this case, we can easily find that $P_1^* > P_2^*$, which is consistent with the vertical product differentiation assumption posited previously.

Replacing prices in the profit function, equation (2), with the equilibrium prices in equation (3) gives equilibrium profits of the two firms as:

$$(4)\qquad \Pi_1^* = \frac{1}{9}\delta\left(2\theta^+ - \theta^- + 2\gamma\right)^2 \cdot N - B_1,$$

$$(5)\qquad \Pi_2^* = \frac{1}{9}\delta\left(\theta^+ - 2\theta^- - 2\gamma\right)^2 \cdot N - B_2.$$

Since the equilibrium profits means that the profit maximization levels for the two firms, we assume that the optimal levels of the brand advertising for each firm exist and include in the equilibrium profits. The optimal brand advertising is denoted by B_i^*, which is a function of generic advertising *g*, i.e. $B_i^* = B_i^*(g)$. These optimal brand advertising levels can be obtained by solving optimal profit equations (4) and (5) simultaneously. Taking derivatives the optimal profits with respect to the brand advertising, and then the first order conditions can be written as:

$$(6)\qquad \frac{\partial \Pi_1^*}{\partial B_1} = \frac{1}{9}\left(\frac{\partial \delta\left(B_1^*, B_2^*, g\right)}{\partial B_1}\right)\left(2\theta^+ - \theta^- + 2\gamma\right)^2 \cdot N(g) - 1 \equiv 0,$$

$$(7) \qquad \frac{\partial \Pi_2^*}{\partial B_2} = \frac{1}{9}\left(\frac{\partial \delta\left(B_1^*, B_2^*, g\right)}{\partial B_2}\right)\left(\theta^+ - 2\theta^- - 2\gamma\right)^2 \cdot N(g) - 1 \equiv 0 .$$

As differentiating the first order conditions with respect to *g*, the effects of generic advertising on the marginal brand advertising effects on optimal profits can be written as:

$$(8) \frac{\partial^2 \Pi_1^*}{\partial B_1 \partial g} = \frac{1}{9}\left\{\left(\frac{\partial^2 \delta}{\partial B_1^2}\frac{\partial B_1^*}{\partial g} + \frac{\partial^2 \delta}{\partial B_1 \partial B_2}\frac{\partial B_2^*}{\partial g} + \frac{\partial^2 \delta}{\partial B_1 \partial g}\right)N(g) + \frac{\partial \delta}{\partial B_1}\frac{\partial N(g)}{\partial g}\right\}\left(2\theta^+ - \theta^- + 2\gamma\right)^2 ,$$

$$(9) \frac{\partial^2 \Pi_2^*}{\partial B_2 \partial g} = \frac{1}{9}\left\{\left(\frac{\partial^2 \delta}{\partial B_2^2}\frac{\partial B_2^*}{\partial g} + \frac{\partial^2 \delta}{\partial B_2 \partial B_1}\frac{\partial B_1^*}{\partial g} + \frac{\partial^2 \delta}{\partial B_2 \partial g}\right)N(g) + \frac{\partial \delta}{\partial B_2}\frac{\partial N(g)}{\partial g}\right\}\left(\theta^+ - 2\theta^- - 2\gamma\right)^2 .$$

Some parts of equations above can be signed. The term $\frac{\partial^2 \delta}{\partial B_1^2}$<0 and from the negative definite condition of the Hessian matrix, $\frac{\partial^2 \delta}{\partial B_2^2}$ should be negative, $\frac{\partial^2 \delta}{\partial B_1 \partial B_2}$ = $\frac{\partial^2 \delta}{\partial B_2 \partial B_1}$<0, and $\frac{\partial \delta}{\partial B_1}$>0. Since brand advertising of brand 2 would lower the degree of product differentiation, $\frac{\partial \delta}{\partial B_2}$<0. Since a successful generic advertising program is expected to increase overall demand for the industry, $\frac{\partial N(g)}{\partial g} > 0$. However, signs of other terms are undetermined at this point.

Results of Chakravati and Janiszewski (2004) show that when generic advertising delivers messages that differentiate attributes of taste, the appeal of the

higher quality brand ('premium brands') are increased. The reverse case is found when generic advertising discusses the non-differentiating attribute of nutrition (p 497). Based on findings from Chakravati and Janiszewski (2004), we can determine the directions of the generic advertising effects on the effectiveness of brand advertising's effort on brand differentiation, i.e., $\frac{\partial^2 \delta}{\partial B_1 \partial g}$ and $\frac{\partial^2 \delta}{\partial B_2 \partial g}$.

First, if generic advertising focuses on the differentiating attributes (informative advertising), then the appeal of the high quality brand increases, but the appeal of low quality brand decreases. Therefore, we have $\frac{\partial^2 \delta}{\partial B_1 \partial g}$>0, and $\frac{\partial^2 \delta}{\partial B_2 \partial g}$<0. In this case, the partial derivative of advertising expenditure for brand 1 with respect to generic advertising would be negative, i.e., $\frac{\partial B_1^*}{\partial g}$<0, while the partial derivative of advertising expenditure for brand 2 with respect to generic advertising would be positive, i.e., $\frac{\partial B_2^*}{\partial g}$ >0. As a result, the generic advertising helps the effectiveness of brand advertising for the high quality product, brand 1, i.e. $\left(\partial^2 \Pi_1^* / \partial B_1 \partial g\right)$>0. Firm 2 producing low quality product would do not conduct its own brand advertising under this circumstance because there would be no benefits from the generic advertising because the partial derivative the product differentiation with respect to brand advertising expenditures, $\frac{\partial \delta}{\partial B_2}$ <0 and therefore $\frac{\partial \delta}{\partial B_2} \frac{\partial N(g)}{\partial g}$<0.

Second, if generic advertising messages focus on non-differentiating attributes (persuasive advertising), the generic advertising messages are likely to deter the brand 1's advertising effort to differentiate the premium product from the lower quality

product, i.e., $\frac{\partial^2 \delta}{\partial B_1 \partial g}$ <0, while the generic advertising messages are likely to help the brand 2's advertising effort to reduce the product differentiation, i.e., $\frac{\partial^2 \delta}{\partial B_2 \partial g}$>0. In this case, the firm 1 should spend more for the brand advertising, but firm 2 may save its brand advertising cost. With this condition, the effect of generic advertising on the brand advertising's effect on the optimal profit would be negative $\left(\partial^2 \Pi_1^* / \partial B_1 \partial g\right)$<0. Hence, in this case the generic advertising may actually hurt the effectiveness of brand advertising from the high quality firm (brand 1). In contrast, the low quality firm (brand 2) can get benefit from the generic advertising because $\left(\partial^2 \Pi_1^* / \partial B_1 \partial g\right)$ >0.

4. Results

In this paper, we try to investigate whether the generic advertising helps or hurts the brand advertising under vertical product differentiation market. We divide the role of generic advertising into two cases: case 1, generic advertising focuses on differentiating attributes of products, and case 2, undifferentiating attributes. When generic advertising delivers messages that differentiate quality attributes, the brand advertising for high quality brand would benefit from the generic advertising since the generic advertising messages would help increase the degree of product differentiation in the market. In this case, the low quality brand would lose from generic advertising that delivers product differentiation messages. When generic advertising brings the information of the undifferentiating and generic attributes of products, the effectiveness of high quality brand advertising would decrease due to the generic messages from generic advertising. The firm producing high quality products should spend more advertising cost to

increase the product differentiation. However, the firm producing low quality products would benefit from generic advertising because the generic message from generic advertising would help lower the product differentiation in the market.

5. Directions for Further Research

The analytical framework should be extended to the empirical verification of the relationship between generic and brand advertising. Empirical simulations will be conducted and presented at the conference.

1. Singh and Vives (1984) define the degree of product differentiation more precisely. In this paper we use more simplified notation of it for the derivation.

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