Advertising Spillover Effects on Private Labels

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Although brand advertising increases demand for the originating brand, manufacturer advertising spillover effects on the demand for private label brands are positive, increasing consumers' demand on private label brands. Given a positive correlation among in-store products, this study shows that national advertising benefits store brands of retailers. While consumers infer product quality by observing the prices and advertising, a higher correlation among in-store products leads to a larger spillover effect of national advertising on private labels. Although retailers free ride on manufacturer's efforts, a rational expectations model shows that coordinated marketing activities initiated by retailers can reduce consumers' perceptive risk, thus benefit advertised brands.

Keywords: national advertising, spillover effect, free-rider

INTRODUCTION

Firms often advertise specific attributes of a product in addition to its availability. There is, however, a large variation in the amount of information advertised across product categories and advertising channels (Liu, 2022). Marketing mix activities on one product are expected to have an impact on the sales of other products under the same umbrella brands. The spillover effects refer to advertising of brand extensions produces significant spillover that favorably affects the choice of parent brands (Balachander and Ghose, 2003). However, advertising may also remind consumers of options that would not have been salient otherwise. Slade (1995) estimates a dynamic model in which advertising expands the demand for the category. Anand and Shachar (2011) showed evidence of advertising affecting consumers' information sets. Sahni (2016) provided empirical evidence that suggests that ads—in addition to promoting the advertised product—can make consumers aware of competing products that are not being advertised.

Lopez et al. (2015) found that although spillover effects significantly increase demand for brands in the same company, there are positive spillover effects on the demand for private label brands. Private labels tend to be copycats of familiar products, requiring much smaller advertising budgets than national brands do, and taking free rides on larger manufacturers' product development efforts (Quelch and Harding, 1996). This study constructs a rational expectations model to illustrate the hidden effect behind spillover effects.

The magnitude of spillover effects depends on the correlation of quality among products in the same category. A higher correlation strengthens the spillover effects in which retailers free ride on manufacturers' efforts. However, the free rider problem will not result in an adverse selection dilemma. The rational expectations model shows retailer can manipulate coordinated activities of overall stores to reduce perceptive risk. Without the retailer's role, the manufacturer cannot maximize the advertising benefits. In next section, we postulate a Cournot model to show how prices aggregate and reflect information. The relation between covariance of different products explains the risk reduction role of joint price promotions. Finally, this study explains the managerial implications of the model, ending with conclusions.

RATIONAL EXPECTATIONS MODEL

Assume two products possessed by a retailer, which demand is $Z_d(A,P) = \left[z_d^1, z_d^2\right]' = \lambda\gamma Var(Q|A,P)^{-1}(E(Q|A,P) - P) + (1-\lambda)\gamma Var(Q|P)^{-1}(E(Q|P) - P)$, where Q, A, P are quality, advertising and price, respectively, and $\lambda > 0$ denotes the ratio of informed consumers. We assume that the ratio of informed consumers depends on the advertising coverage and efforts, informed consumers infer quality through advertising and prices, while uninformed consumers infer quality based on the prices only. We assume z_d^1 is quantity of advertised good, while z_d^2 represents the quantity of private label owned by retailer. Advertising communicates quality plus a noise $A = Q + \varepsilon$, the noise follows a normal distribution where $\varepsilon \sim N(0, S)$, $S = \begin{bmatrix} s_{11} & s_{12} \\ s_{12} & s_{22} \end{bmatrix}$, and $Q \sim N(\bar{Q}, V)$. We assume there is no advertising expenditure for product 2, because it is private label. It is equivalent to assume $s_{22} \to \infty$. $V = \begin{bmatrix} v_{11} & v_{12} \\ v_{12} & v_{22} \end{bmatrix}$, while v_{11} and v_{22} are quality variance of the advertised good and private label, respectively. v_{12} is correlation between two products' quality. This setting enables us to investigate spillover effects of advertising, because v_{12} plays a spillover role for advertising. If consumers in general believe the products in the store are positively related in quality, $v_{12} > 0$ which is known as "retailer reputation" in the literature (Dawar and Parker, 1994).

The supply side also contains a noise, which can be expressed as $Z_s \sim N(\bar{Z}, U)$, where $\bar{Z} = [\bar{z}_1, \bar{z}_2\,]'$, $U = \begin{bmatrix} u_{11} & u_{12} \\ u_{12} & u_{22} \end{bmatrix}$. The frequency of price promotions can be expressed as u_{11} and u_{22}, co-movements in two products' promotion can be expressed as u_{12}. Based on Admati (1985), let $Z_d(A,P) = Z_s$, we can solve the equilibrium price P, that is a random variable, taking expectations of P yields the following results:

$$p_1^e = \bar{q} - b_{11}z_1 - b_{12}z_2, \tag{1}$$

$$p_2^e = \bar{q} - b_{12}z_1 - b_{22}z_2, \tag{2}$$

where

$$b_{11} = \frac{v_{11}\gamma}{(v_{11}v_{22} - v_{12}^2)}\left[\left(\frac{\lambda\gamma}{s_{11}} + \frac{u_{22}\gamma}{s_{11}u_{22} + (\lambda\gamma)^{-2}s_{11}^2(u_{11}u_{22} - u_{12}^2)} + \frac{v_{22}\gamma}{v_{11}v_{22} - v_{12}^2}\right)\left(\frac{v_{11}\gamma}{v_{11}v_{22} - v_{12}^2}\right) - \frac{v_{12}^2\gamma^2}{v_{11}v_{22} - v_{12}^2}\right]^{-1}$$

$$b_{12} = \frac{v_{12}g}{(v_{11}v_{22} - v_{12}^2)}\left[\left(\frac{\lambda/g}{s_{11}} + \frac{u_{22}g}{s_{11}u_{22} + (\lambda/g)^{-2}s_{11}^2(u_{11}u_{22} - u_{12}^2)} + \frac{v_{22}g}{v_{11}v_{22} - v_{12}^2}\right)\left(\frac{v_{11}g}{v_{11}v_{22} - v_{12}^2}\right) - \frac{v_{12}^2g^2}{v_{11}v_{22} - v_{12}^2}\right]^{-1}$$

$$b_{22} = \left[\frac{v_{11}\gamma}{v_{11}v_{22} - v_{12}^2} - \frac{v_{12}^2\gamma^2}{v_{11}v_{22} - v_{12}^2}\left(\frac{\lambda\gamma}{s_{11}} + \frac{u_{22}\gamma}{s_{11}u_{22} + (\lambda\gamma)^{-2}s_{11}^2(u_{11}u_{22} - u_{12}^2)} + \frac{v_{22}\gamma}{v_{11}v_{22} - v_{12}^2}\right)^{-1}\right]^{-1}$$

Equation (1) and (2) represent two products' demand function, assume the purchasing cost function of product i is $TC_i = cz_i$, the unit cost of production is $c > 0$, we can solve equilibrium quantity and profits for each product.

SPILLOVER EFFECTS AND QUALITY CORRELATION

Based on preceding demand functions, we assume that two products two firms competing against each other. The advertised good, faces demand function (1), while private label faces demand function (2). The total cost function of product i is $TC_i = cz_i$, $i = 1,2$, and its optimal output in a Cournot–Nash equilibrium is as follows:

$$z_1^* = \frac{(\bar{q}-c)(2b_{22}-b_{12}^2)}{4b_{11}b_{22}-b_{12}^2} \tag{3}$$

$$z_2^* = \frac{(\bar{q}-c)(2b_{11}-b_{12}^2)}{4b_{11}b_{22}-b_{12}^2} \tag{4}$$

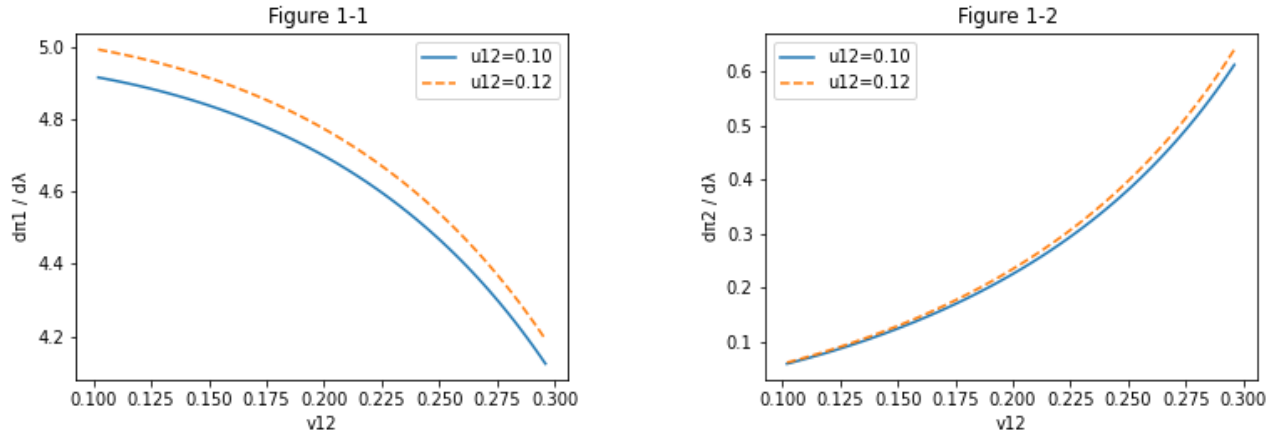
Then the profit for two products can be obtained by substituting preceding equations into (1) and (2). π_1 represents profit of advertised goods, and π_2 represents profit of private label, can be expressed as:

$$\pi_1 = \frac{(\bar{q}-c)^2(2b_{22}-b_{12}^2)(2b_{11}b_{22}-b_{12}^2-2b_{11}b_{12}+b_{11}b_{12}^2+b_{12}^3)}{(4b_{11}b_{22}-b_{12}^2)^2}$$

$$\pi_2 = \frac{(\bar{q}-c)^2(2b_{11}-b_{12}^2)(2b_{11}b_{22}-b_{12}^2-2b_{22}b_{12}+b_{22}b_{12}^2+b_{12}^3)}{(4b_{11}b_{22}-b_{12}^2)^2}$$

In this model, consumers infer the quality based on advertising and prices, because prices signal the quality information as well as advertising. The noises from supply side, such as price promotions, cause price variations thus influence consumers' expectations. We use a numerical analysis to illustrate the effects of changing parameters on profits and explain the economic intuition behind spillover effects. We use $d\pi_1/d\lambda$ to represent the effect of advertising on designated good, and use $d\pi_2/d\lambda$ to measure the spillover effect on private label. In Figure 1, we show the effect of correlation of quality v_{12} on advertising effect. Figurer 1-1 shows a higher v_{12} reduces advertising effect, because a positive v_{12} means that the private label's risk is associated with advertised good, thus adding extra noises into consumers' consideration.

FIGURE 1
ADVERTISING EFFECT AND SPILLOVER EFFECT



On the contrary, Figurer 1-2 shows a higher v_{12} strengthens the spillover effect of advertising. When consumers observe the advertising, given a positive correlation of two goods' quality, they would associate the private label with ad's information, thus the spillover effect gets stronger. Figures 1 illustrates the free rider problem of advertising in marketing channels of manufacturers and retailers. When consumers project a similar perception on all goods carried by retailers, advertising effect on designated good diminishes while the spillover effect on private label goes the opposite way.

On the presence of free rider problem, would a national brand leave retailers and cause the adverse selection? Figure 1 shows that retailers can take coordinated marketing activities to justify the advertising efforts, it shows a higher u_{12} gives a higher $d\pi/d\lambda$. A higher u_{12} represents a higher coordination between two products' supply. Retailers can launch event promotions, anniversary sales, festival sales, and various collective promotions to stimulate consumers' purchasing. Without these accompanying efforts, consumers have tendency to view a price cut as a quality reduction. On the presence of collective promotions, consumers would realize the price promotions are a result of seasonal events, not a quality reduction.

CONCLUSIONS

Consumers use advertising and retail prices to infer the quality of a product, advertising communicate quality information therefore reduces the perception risk. This study constructs a rational expectations model with two homogeneous goods where the manufacturer's product is advertised, and the retailer's private label is not. While the national brand spends large resources in advertising, a part of efforts actually flow into private label of retailer, causing free rider problem. However, national brand benefits from retailer's coordinated marketing campaigns, thus justify the spillover effect.

This study makes four contributions. First, it constructs the framework of spillover effect and quality correlation. Second, it indicates that the existence of private labels can improve the performance of price promotions on advertised brands. Third, a higher degree of synchronization between the advertised brand and the private label raises the profit of advertised brand. In summary, a giant retailer can act on behalf of manufacturers by coordinating the timing of sales promotions, popular events, festival sales and seasonal sales, the national brands' battles against the private labels in fact results in an alliance with private labels.

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