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Why We Choose Cooperative Advertising? An Analysis of Channel Competition

Yueyun Zhang

Lab and Equipment Management, Jiangnan University, Wuxi, 214122, China

Abstract: *Conventional wisdom believes that the spring-up of cooperative advertising is owing to the difference between the manufacturer's national advertising and the retailer's local advertising. This paper develops a channel competition model to investigate the efficiency when manufacturers or retailers shoulder the responsibility of advertising. It is found that if manufacturers sponsor advertising, they are likely to engage in fierce advertising competition. Yet if it is the retailers who decide the advertising volume, they have not any motivation to advertise at all! This is because all the extra earnings received from advertising would be robbed by the manufacturers. Therefore, it is claimed that cooperative advertising may be a consequence of the retailer's downstream role. In a competitive retail market, the downstream sector is not as likely as the upstream firm to invest heavily in advertising, thereby avoiding the prisoner's dilemma.*

Keywords: *cooperative advertising, advertising competition, distribution channel*

1. Introduction

Cooperative advertising refers to a marketing strategy that the manufacturer in a channel pays for a portion of the retailer's advertising cost in order to induce sales. It is reported that in the personal computer industry, IBM pays 50% and Apple pays 75% of advertising costs for their retailers [14]. Total expenditures of U.S. companies on cooperative advertising reveal a trend of rapid growth over the recent years [9,15,17]. There is now a consensus among the analysts that cooperative advertising is a consequence of the difference between national advertising and local advertising. National advertising, sponsored by the manufacturer, is mainly used to inform consumers about the existence of the goods, build up a good brand image, and increase consumer valuation and their reservation price. Local advertising, launched by the retailer, plays an important role in arousing consumer desire and inducing immediate sales. National advertising and local advertising have their own merits in marketing and they cannot replace with each other [2,7].

In this paper, we first develop a simple model that specifically excludes the conventional explanation for why manufacturers pay for retailers' advertising costs. Thus, we assume that the manufacturer's advertising and the retailer's advertising have the same influence on consumers. Within this framework, we analyze how two distribution channels compete on advertising and prices, each consisting of one manufacturer and one retailer. We discuss two scenarios: (a) Manufacturers make advertising decisions, or (b) retailers decide the volume of advertising. We find that, if manufacturers do advertising, they are apt to use advertising as weapons to attack the rival firm. Nevertheless, this is a prisoner's dilemma: they would be better if they could commit not to advertise. If retailers make advertising decisions, they have no incentive to advertise because doing so brings them nothing and their upstream sectors can appropriate all the additional gainings. In light of this view, retailers are more effective than manufacturers as advertisers, and this must be one important reason that gives rise to the popularity of cooperative advertising.

2. Related literature

Our present work is closely related with previous works on the roles of advertising in distribution channels. Shaffer and Zettelmeyer study the competitive effects of persuasive advertising in a distribution channel, where there are two manufacturers and one common retailer[10]. They suggest that the channel conflicts can be partially mitigated by sophisticatedly targeting the advertising. Under slightly different assumption on the role of persuasive advertising, Wu et al. complement their results by demonstrating the possibility that targeted advertising may completely eliminate the conflicts

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between channel members[13]. We differ from the above literature in that we focus on two independent competing channels. We investigate that which channel structure, integration or disintegration, is more profitable and that who, manufacturers or retailers, are more effective to be the advertisers. Perhaps the most relevant work to ours is Wang et al. and Zhang et al. [12,17]. Considering two competing channels, they argue that the introduction of independent retailers may intensify advertising competition between manufacturers and therefore make the manufacturers worse off. Our conclusions are precisely the opposite, simply because they assume advertising's effect on consumer valuation is exogenous while we regard it as a decision variable.

Recently, vertical cooperative advertising in manufacturer-retailer channels has been the focus of many research studies [3,14,16]. Under the co-op advertising strategy, the manufacturer advertises mainly for national consideration (e.g., creating brand images) while the retailer advertises for local sense (e.g., inducing immediate sales). As an incentive, the manufacturer shares some of the retailer's advertising expenditures. Centralization generally provides the highest efficiency in this branch of literature while it is not the case in our paper.

Another relevant area of research is the literature on the efficiencies of channel structures. Spengler (1950) first proposed the double marginalization problem, which refers to the fact that the retailer in a distribution channel has incentives to distort retail prices away from the channel's optimal level[11]. However, there exists another extension of literature confirming that decentralization may be implemented as a strategic tool. McGuire and Staelin (1983) state that if the market is highly competitive, by introducing independent intermediaries into channels the manufacturers are better off [8]. The retailers act as buffers in terms of relaxing price competition. Under the monopolized market, Coase (1972) argues that in the context of durable goods manufacturing, the monopolistic manufacturer may be forced to lower prices to the competitive level by forward-looking consumers who rationally expect that the monopolist has incentives to lower prices in order to sell more after an initial round of sales is completed[4]. Due to the Coase problem, strategic decentralization through inserting a retailer into the channel can boost the manufacturer's profit if the manufacturer can commit to future wholesale prices with the retailer [5]. Similarly, Arya and Mittendorf (2006) suggest that a vertically integrated firm may not be so effective and channel conflicts may help in alleviating the time-inconsistency problem of durable goods production[1]. The benefits of decentralization are robust against changes in the manufacturer's ability to commit. Our paper contributes to this branch of literature by incorporating advertising competition into channels' structure selection problem. We find that when channels engage in both price and advertising competitions, adding intermediaries into channels may benefit all channel members, or saying, a Pareto improvement may be achieved through strategic disintegration. It may have both anti-price competition and anti- advertising competition effects.

3. Model and assumptions

Consider a standard Hotelling (1929) market with two channels located at the two ends of a unit line[6]. Denote the channel located at point 0 as channel A and that at point 1 as channel B. Each channel consists of one single manufacturer and one single retailer. Manufacturer i produces a product at zero cost and sells it to retailer i at the wholesale price wi, on a take-it-or-leave-it basis. Then, retailer i resells the product to end consumers at the retail price pi.

Consumers are uniformly distributed along the market with a density of one. Assume that consumer valuation is v and each consumer desires at most one unit of a product. Therefore, a consumer located at x$\in$[0,1] obtains a surplus $V_A - tx - p_A$ from the consumption of product A and gets a net utility $V_B - t(1-x) - p_B$ by consuming product B. The parameter t refers to the unit transportation cost. An increase in t implies that product A and product B become less substitutable.

Advertising is assumed to be persuasive. In particular, we assume that consumer valuation for product i is increased by Δ_i due to channel i's advertising effort. The advertising cost equals $\alpha\Delta_i^2$, where α is an input parameter. We call Δ_i the advertising intensity, which can be controlled by the manufacturer or the retailer. Denote $v + \Delta_i$ by V_i. We assume that v is large enough with respect to t such that in equilibrium all consumers are served, and that t is not too small with respect to α to ensure that each firm earns positive profits under advertising campaigns (i.e., $2v/9 > t > 1/(3\alpha)$).

The sequence of events is as follows. Under the case of manufacturer advertising (M-format), manufacturer i sets wi and Δ_i simultaneously to maximize its profit Π_{mi}, and then retailer i chooses pi to maximize its profit Π_{ri}. Under the case of retailer advertising (R-format), manufacturer i first sets wi, and then retailer i selects pi and Δ_i. Firms at the same channel level act simultaneously and

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non-cooperatively.

4. Main analysis

We derive the equilibrium results of the two cases using backward induction, based on which important insights are proposed. Throughout this paper, we drop the subscripts A and B to denote symmetric equilibrium. All the proofs are obtained from the authors upon request.

4.1 Equilibrium results

The derivation process is as follows. From the equation $V_A - t\hat{x} - p_A = V_B - t(1-\hat{x}) - p_B$, we get the marginal consumer's location

$$\hat{x} = \frac{t+V_A-V_B-p_A+p_B}{2t}. \quad (1)$$

Thus, channel A's demand equals $\hat{x}$ and channel B's demand equals $1-\hat{x}$. We therefore obtain channel i's demand function

$$D_i = \frac{t+V_i-V_j-p_i+p_j}{2t}. \quad (2)$$

Under M-format, the profit functions of the manufacturer and the retailer are, respectively,

$$\Pi_{mi} = w_i D_i - \frac{\alpha}{2}\Delta_i^2, \quad (3)$$

$$\Pi_{ri} = (p_i - w_i)D_i. \quad (4)$$

Under R-format, we have

$$\Pi_{mi} = w_i D_i, \quad (5)$$

$$\Pi_{ri} = (p_i - w_i)D_i - \frac{\alpha}{2}\Delta_i^2. \quad (6)$$

Under either format, there are 2×2 subgames we need to solve: the subgame when both channels advertise, the subgame when both channels do not advertise, the subgame when only channel A does advertising, and the subgame when only channel B does advertising. In each subgame, we should first solve the retailer's decision(s) to maximize Π_{ri}, conditional on the other retailer's decision(s); and then solve the manufacturer's decision(s) to maximize Π_{mi} using the response functions of the two retailers, conditional on the competitor's decision(s). After all subgames are solved, we can determine the unique Nash equilibrium in pure strategies for different advertising format.

We list the advertiser's payoffs under different subgames as in Table 1 and Table 2 (MA for manufacturer A, MB for manufacturer B, RA for retailer A, RB for retailer B).

Table 1: Advertising games under M-format

		MB: No-ad	MB: Ad
MA	No-ad	$\frac{3t}{2}, \frac{3t}{2}$	$\frac{3t}{2}\left(\frac{18t\alpha-2}{18t\alpha-1}\right)^2, \frac{18t^2\alpha(12t\alpha-1)}{2(18t\alpha-1)^2}$
	Ad	$\frac{3t}{2}\left(\frac{18t\alpha-2}{18t\alpha-1}\right)^2, \frac{18t^2\alpha(12t\alpha-1)}{2(18t\alpha-1)^2}$	$\frac{3t}{2}-\frac{1}{8\alpha}, \frac{3t}{2}-\frac{1}{8\alpha}$

Table 2: Advertising games under R-format

		RB: No-ad	RB: Ad
RA	No-ad	$\frac{t}{2}, \frac{t}{2}$	$\frac{t}{2}, \frac{t}{2}-\frac{1}{8\alpha}$
	Ad	$\frac{t}{2}-\frac{1}{8\alpha}, \frac{t}{2}$	$\frac{t}{2}-\frac{1}{8\alpha}, \frac{t}{2}-\frac{1}{8\alpha}$

Based on Table 1 and Table 2, we have the following proposition.

Proposition 1. Under M-format, both manufacturers invest in advertising, falling into a prisoner's dilemma. Under R-format, both retailers do not invest in advertising, getting out of the prisoner's dilemma.

Under M-format, the subgame when there is no advertising yields an equal market share and the

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same profit for the two manufacturers. If one manufacturer advertises to increase consumer valuation while the other keeps silent, then consumers value the advertised brand more than the silent brand. It is clear that the advertising firm will gain a larger market share and improve profits at the expense of the silent firm. Thus, each manufacturer has an incentive to expand demand by advertising. However, once both manufacturers sponsor advertising, consumers will value the two brands equally as before, and the two manufacturers will gain the original market share and the original revenue. That is to say, advertising fees are wasted! Even so, no firm is willing to withdraw the advertising; otherwise the unadvertised firm would lose more. Therefore, we claim that if manufacturers decide the advertising volume, they will be caught into a prisoner's dilemma.

Under R-format, although unilateral advertising can also increase the advertised brand's relative valuation, the retailer cannot appropriate any of the enhanced revenues. This is because the manufacturer, as the Stackelberg leader, always squeezes the maximum channel profit by adjusting the wholesale price, leaving the retailer only the critical marginal revenue to accept the contract. Now that advertising would be of no use, both retailers will keep in silence, thereby avoiding the prisoner's dilemma.

Based on Table 1 and Table 2, the final equilibrium results under M-format and R-format can be easily obtain, as collected in Table 3.

Table 3: Equilibrium results under M-format and R-format

	Δ		p	w	Π_r	Π_m	Π
M-format	$\frac{1}{2\alpha}$		$4t$	$3t$	$\frac{t}{2}$	$\frac{3t}{2}-\frac{1}{8\alpha}$	$2t-\frac{1}{8\alpha}$
R-format	0		$4t$	$3t$	$\frac{t}{2}$	$\frac{3t}{2}$	$2t$

4.2 Profit implications

From Table 3 we have the following proposition.

Proposition 2. Retailers are more effective than manufacturers as retailers in improving channel profits.

As shown in Proposition 1, both retailers choose not to advertise and hence successfully avoid being trapped into the prisoner's dilemma when they make advertising strategies. On the contrary, when manufacturers decide whether to advertise, they show great enthusiasms for advertising, and thus fall into the prisoner's dilemma. At the symmetric equilibrium, advertising make advertisers incur additional costs while it cannot help them expand the market scale, leading to lower profits. Therefore, from the perspective of the entire channel, retailers are more effective than manufacturers as retailers.

Remarkably, when it comes to the problem that who should shoulder the advertising responsibility in a distribution channel, the manufacturer and the retailer are not in conflict with their own self-interests. From the perspective of the retailer, it will choose not to advertise under R-format and its profit is also not influenced under M-format. Therefore, the retailer is indifferent about that who should be the advertiser. From the perspective of the manufacturer, it prefers the retailer to decide the volume of advertising. Only under R-format can they escape from the prisoner's dilemma. In consequence, channel conflict is alleviated.

Proposition 2 helps explain the popularity of cooperative advertising. In a competitive retail market, manufacturers are more likely to use advertising as a weapon to attack the rival firm, thereby engaging in fierce advertising competition. Strategic manufacturers can encourage their retailers to decide the advertising volume, for example, by cooperative advertising. In this way, the advertising control power transits to the downstream firm who is less likely to invest in advertising, being aware of the upstream firm's Stackelberg advantage. This explanation is rather different from conventional wisdom that attributes the advantage of cooperative advertising to the different performances of national advertising and local advertising. Therefore, we claim that the channel structure itself must be one important reason that gives rise to cooperative advertising.

5. Conclusion

In this paper, we analyze the competitive effects of persuasive advertising under the case when manufacturers decide the advertising volume and the case when retailers make advertising decisions. It

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is found that retailers are more effective than manufacturers as advertisers in improving channel profits. However, retailers have no incentive to shoulder the responsibility of advertising. Manufacturers can use cooperative advertising as a device to encourage retailers to control advertising. This can explain the spring-up of cooperative advertising, although there is a consensus that cooperative advertising is owing to the different performances of national advertising and local advertising. We claim that the superiority of retailer-controlled advertising is also one reason that gives rise to cooperative advertising.

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