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Comparative Advertising and In-Store Displays

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Manufacturers often have a choice of whether to advertise something positive about their own products without mentioning their rivals' products (a noncomparative ad) or whether to portray their rivals negatively in addition to promoting their own products (a comparative ad). In this paper we ask: First, if a manufacturer in a distribution channel can choose between a comparative ad and a noncomparative ad, all else being equal, which should it choose? Second, under what conditions would a manufacturer want to reinforce its advertising message at the point of sale with in-store displays, and when should the retailer allow the displays? Third, how does the possibility of in-store displays influence the manufacturer's choice of ad content? We find that a manufacturer will prefer to run comparative ads over noncomparative ads for advertising that is untargeted or that appeals primarily to the manufacturer's core consumers, and run noncomparative ads over comparative ads for advertising that appeals primarily to the rival's core consumers. We also find that in-store displays will be optimal for the manufacturer and its retailers if and only if they increase the overall joint profit of the retailer, the manufacturer, and its rival. Finally, we find that the possibility of offering in-store displays increases a manufacturer's incentive to run noncomparative ads. However, some comparative ads may be so attractive to the manufacturer that it will run them with or without retailer help. Our paper is the first to introduce a channel-based explanation for why manufacturers may or may not want to engage in comparative advertising.

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1. Introduction

It has been estimated that about 20%–30% of all manufacturer advertising is comparative (see Crask and Laskey 1990). An example is the Duracell television commercial about a race between two bunnies, one powered by a battery with the Duracell name visible on its back and the other powered by a battery with no brand name. The Duracell bunny is in front throughout the race. On two occasions the exhausted non-Duracell bunny is replaced by a similar runner who emerges from a hiding place along the track. The voice-over at the end of the commercial says, "While Duracell Alkaline keeps on running, Eveready Super Heavy Duty can't keep up...with up to three times more power, Duracell always beats Eveready Super Heavy Duty."[1]

Advertising something positive about one's own products without mentioning rival products, or portraying rival products negatively in addition to promoting one's own products, is often a strategic choice. In the above example, the Duracell ad was clearly

meant to be comparative by making Eveready batteries look bad. However, Duracell could have implemented a similar ad concept as a noncomparative ad. For example, it could have shown that its bunny goes on forever, without showing that other bunnies run out of steam (e.g., this is the approach taken by Energizer in its bunny ads, which began as a spoof on the Duracell bunny ads).

Whether a manufacturer should enlist retailer support in running its comparative ad and whether retailers should support the manufacturer's ad message at the point of sale with in-store displays are also strategic choices. The latter in particular is not obvious when retailers sell both the favored product (e.g., Duracell) and the product of comparison (e.g., Eveready).

In this paper we look at a manufacturer's incentive to run comparative ads and consider whether and when this may cause channel conflict with its retailers. To make the distinction between comparative and noncomparative ads more precise, we compare between ads that lead to the same increase in consumers' valuations for the advertising firm's product

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[1] See Brock (2004).

but differ in their effect on consumers' valuations for the rival firm's product. We say that the firm's advertising is comparative if the latter valuations decrease and noncomparative if otherwise.

One might think that a manufacturer should always try to weaken its competitors by engaging in comparative advertising whenever possible. However, this is not what is observed in reality. One reason is that the manufacturer may not want to alert consumers to the existence of a rival's product if the rival's product is not well known. Another reason is that consumers may have such a distaste for negative advertising that any manufacturer that denigrates its rival's product may also end up hurting consumers' valuations for its own product. These kinds of explanations have been widely studied in the behavioral marketing literature (see Wilke and Farris 1975, Golden 1979, Belch 1981, Pechman and Stewart 1991, Barry 1993, Batra et al. 1996, Grewal et al. 1997).[2] Yet another reason why a manufacturer might refrain from engaging in comparative advertising is if it fears that competitors will retaliate in response.

In contrast, we introduce in this paper a channel-based explanation for why firms may not want to portray their rivals negatively. This explanation results from adding only a retailer to the standard Hotelling model of competition, and unlike the explanations above, it does not depend on the existence of imperfectly informed consumers, a distaste for negative advertising, or whether competitors would engage in retaliatory comparative advertising in response.

Specifically, we consider a distribution channel in which manufacturers sell their products through a common retailer, and we ask three questions. First, we ask when should a manufacturer advertise comparatively, all else being equal. Second, we ask when will a manufacturer want to reinforce its advertising message at the point of sale with in-store displays and when should the retailer allow the displays (given that a comparative ad would help one of the products it sells but hurt another). Third, we ask how does the possibility of in-store displays influence the manufacturer's choice of ad content (should, for example, the manufacturer be willing to alter the content of its advertising message to induce retailers to display its advertising).

A common theme in all these questions is whether manufacturer comparative ads and the possibility of in-store displays help align manufacturer and retailer incentives or, conversely, create more channel conflict. To answer this, we develop a theory of advertising that applies generically to settings in which a manufacturer can choose between making its ad comparative or noncomparative and in which the retailer can choose whether to display the ad in its stores.

In response to our first question, we find that the manufacturer's preferred type of advertising depends on the audience to whom the ad appeals. We show that the manufacturer prefers to run a comparative ad when the advertising would appeal more to its core consumers (those who prefer the manufacturer's product, all else being equal) and a noncomparative ad when the advertising would appeal more to its noncore consumers (those who prefer the rival's product).

In response to our second question, we find that the manufacturer would want to reinforce its advertising message at the point of sale if and only if the message would increase overall joint profit (the sum of the retailer and manufacturers' profits) and that this is also when the retailer would want to allow in-store displays. We further show that although a retailer will always want to allow in-store displays of noncomparative advertising, it will only want to allow in-store displays of comparative advertising if the advertising manufacturer's market share is sufficiently large relative to that of its rival. The more negative the focus of the ad, the larger the manufacturer's market share must be to induce the retailer to display the ad.

In response to our third question, we find that if the manufacturer can design separate ads for in-store displays, it will always choose an ad with a noncomparative focus, all else being equal. Even if the manufacturer cannot design an ad specifically for in-store display, in-store displays will often be important enough to induce the manufacturer to run noncomparative ads. However, in some cases, there may be comparative ads that are so negative in emphasis that the retailer will not allow the manufacturer to display them but nevertheless are so attractive to the manufacturer that it will want to run them even without retailer support.

This paper thus makes three main contributions. First, it shows how channel considerations may affect a manufacturer's decision whether to make its advertising comparative (it depends on the consumers to whom the advertisement appeals).[3] Second, it

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[2] The literature also looks at the effect of product comparisons in advertising on various consumer measures relating to the advertised products (for example, attention, recall, perceived similarity, persuasion, and attitude). Other studies suggest that product comparisons may be more effective for some firms than others. A common result is that comparative ads are more effective for new, less-established brands (see, for example, Gnepa 1993).

[3] There is related literature on firm conduct in distribution channels (see, for example, Jeuland and Shugan 1983, Moorthy 1987, Ingene and Parry 1995, Iyer 1998). This literature tends to focus on the channel management concerns of an upstream monopolist. Models in which competing upstream firms sell through a common retailer tend to focus on conditions in which one manufacturer can exclude another (see, for example, O'Brien and Shaffer 1997) or on competition when wholesale prices are linear (see, for example, Choi 1991).

characterizes when a retailer might want to display such advertising in its stores (it depends on the manufacturer's market share and on whether the advertising is comparative or noncomparative). Third, it shows how retailers' decisions on in-store displays may influence a manufacturer's choice of advertising.

In related literature, Lal and Narasimhan (1996) consider the effect of advertising on the margins of manufacturers and retailers. Like us, they assume that advertising directly affects consumers' preferences. However, our paper differs in that our focus is on comparative advertising and on whether the retailer will participate in the manufacturer's ad.

Shaffer and Zettelmeyer (2002) consider the effects of information on the profits of channel members when the information is supplied by third parties. Shaffer and Zettelmeyer (2004) consider when manufacturers should advertise so as to reduce the cross-price elasticity between their products. In this paper, we use some elements of the modeling framework in both papers. Our Proposition 1, for example, is a replication of the distribution-of-profits result that was proved in Shaffer and Zettelmeyer (2002), and our approach to modeling advertising messages builds on the demand framework used in Shaffer and Zettelmeyer (2002, 2004). All other findings are new; this is the only one of the three papers to consider the kind of advertising manufacturers would choose and the strategic role of the retailer in allowing in-store displays.[4]

The rest of the paper proceeds as follows. Section 2 models the effect of comparative versus noncomparative advertising on consumer preferences. This section also derives the equilibrium profits of channel participants. Section 3 considers the manufacturer's decision whether to run a comparative or a noncomparative ad. Section 4 considers when the retailer might want to allow the manufacturer to advertise in its stores. Section 5 considers how the potential for in-store advertising may affect the manufacturer's ad design decision. Section 6 concludes the paper.

2. Consumers, Advertising Messages, and Channel Profits

Two competitors, X and Y, each produce a substitute product. Consumers want at most one unit of one product but differ in the strength of their preferences over two product attributes a and b. Consumers who like attribute a the most like attribute b the least, and vice versa.

As in Shaffer and Zettelmeyer (2002), let a_i and b_i denote the maximum difference in consumers' valuations for attributes a and b in product i, respectively, and let v_i denote the baseline utility for product i that is common to all consumers. Furthermore, let θ index the mass of consumers, which we normalize to one. Then, assuming consumers are distributed uniformly on $[0, 1]$, the utility of a type θ consumer from consuming product i is given by

$$U_i(\theta) = v_i + (1 - \theta)a_i + \theta b_i.$$

The parameter v_i captures two aspects of consumers' utility. First, it allows there to be other attributes that affect the utility for product i, as long as the value of these attributes does not vary with θ. Second, it allows consumers to be indexed by $\theta \in [0, 1]$ without implying that consumers at zero (one) place zero value on attribute b (a). For example, the value placed on attribute b by consumers located at zero can be thought of as being subsumed in v_i, $U_i(0) = v_i + a_i$.

We assume without loss of generality that consumers located at zero prefer product X to product Y, and vice versa, for consumers located at one: $v_x + a_x > v_y + a_y$ and $v_y + b_y > v_x + b_x$. We also assume that the monopoly profit when both products are sold exceeds the monopoly profit when only one product is sold[5] and that each product "specializes" in a different attribute, with product X being better on attribute a and product Y being better on attribute b; i.e., $a_x > b_x$ and $a_y < b_y$. These assumptions on consumers' valuations are depicted in Figure 1.
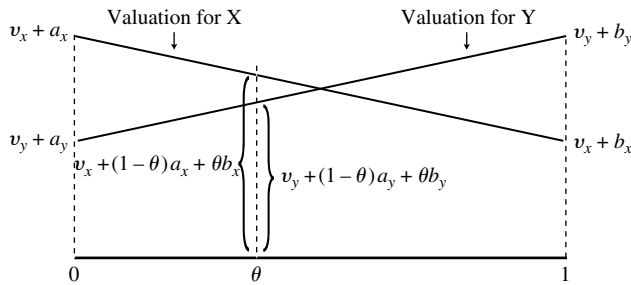
2.1. Advertising Messages
We define an advertising message as a marketing communication that has the effect of increasing consumers' valuations for the favored product and (weakly) decreasing consumers' valuations for the compared product. Without loss of generality, let product X be the favored product.

Advertising messages differ in their emphasis (by how much do consumers' valuations of product X increase relative to the decrease in their valuations for product Y) and target audience (to which consumers do the messages appeal). To operationalize these terms, let $m_x(\theta)$ and $-m_y(\theta)$ denote the change

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[4] To our knowledge, we are one of the first to model comparative advertising in a game-theoretic framework. Other literature on advertising focuses mostly on whether there is too much or too little advertising relative to a social welfare benchmark. In some of this literature, advertising plays an informative role, alerting consumers to a product's existence, quality, or price (e.g., Zhao 2000). In other literature, advertising plays a persuasive role, changing consumers' preferences (e.g., Dixit and Norman 1978). We use the latter approach in this paper.

[5] As we showed in an earlier version of this paper, this assumption is tantamount to assuming that $|v_x - v_y| < \min\{a_x + b_y - 2b_x, a_x + b_y - 2a_y\}$, or, in other words, that the difference between v_x and v_y is sufficiently small.

Figure 1   Consumers' Valuations for Products X and Y

in a type θ consumer's valuation for products X and Y, respectively,

$$m_x(\theta) \equiv \Delta v_x + (1-\theta)\Delta a_x + \theta\Delta b_x \geq 0,$$

and

$$m_y(\theta) \equiv -(\Delta v_y + (1-\theta)\Delta a_y + \theta\Delta b_y) \geq 0,$$

where for all θ, Δv_i is the change in v_i, Δa_i is the change in a_i, and Δb_i is the change in b_i.

2.1.1.   Emphasis of an Advertising Message. We define the emphasis of a given advertising message to a type θ consumer as

$$e(\theta) \equiv \frac{m_x(\theta)}{m_x(\theta) + m_y(\theta)},$$

where $e(\theta)$ obtains an upper bound of one when $m_y(\theta) = 0$ (i.e., only positive changes) and a lower bound of zero when $m_x(\theta) = 0$ (i.e., only negative changes). We say that an advertising message has a comparative focus when $e(\theta) < 1$ and a noncomparative focus when $e(\theta) = 1$.

The left-hand side of Figure 2 depicts a message with a noncomparative focus. In this case, the message increases consumers' valuations for product X without decreasing their valuations for product Y. In contrast, the right-hand side of Figure 2 depicts a message with a comparative focus. In this case, the message increases valuations for product X and decreases valuations for product Y. In these and all subsequent examples, the dashed (solid) line denotes consumers' valuations before (after) consumers have been exposed to the advertising message.
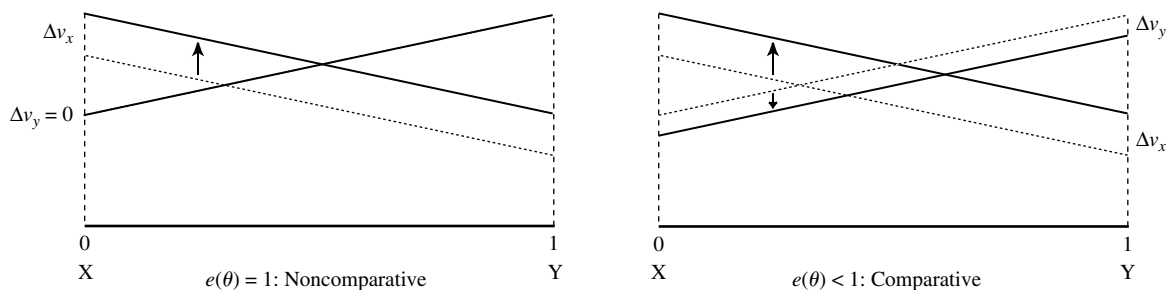
2.1.2.   Target Audience of an Advertising Message. We distinguish between advertising messages that appeal more to manufacturer X's "core consumers" (consumers who are located closer to manufacturer X) and those that appeal more to manufacturer X's "noncore consumers" (consumers who are located closer to manufacturer Y).

We say that a given message that affects only attribute a appeals more to manufacturer X's core consumers because, for $\Delta a_x > 0$, consumers' valuations for product X will rise from $v_x + (1-\theta)a_x + \theta b_x$ to $v_x + (1-\theta)(a_x + \Delta a_x) + \theta b_x$, which is an increase for all consumers but a larger increase for consumers with the smallest θs. Similarly, for $\Delta a_y < 0$, consumers' valuations for product Y will fall from $v_y + (1-\theta)a_y + \theta b_y$ to $v_y + (1-\theta)(a_y + \Delta a_y) + \theta b_y$, which is a decrease for all consumers but a larger decrease for consumers with the smallest θs.

The left-hand side of Figure 3 illustrates the effect of an advertising message that appeals more to X's core consumers. As an example consider an advertising campaign by the Clorox Company that compares its Soft Scrub cleanser (product X, located at 0 on the line) against Ajax, the leading powdered cleanser (product Y, located at 1 on the line). Suppose consumers care primarily about two attributes, a cleanser's gentleness (attribute a) and cleaning performance (attribute b). Consumers who care more about gentleness are located closer to 0 and consumers who care more about cleaning performance are located closer to 1. Then, because Soft Scrub traditionally excels in consumer's minds by being gentle to surfaces whereas Ajax is associated by consumers with superior cleaning performance, an ad campaign by Clorox in which Soft Scrub is shown to scratch most common tiles far less than Ajax will appeal more to consumers that care more about a product's gentleness than about its cleaning performance.

Conversely, we say that a given message that affects only attribute b appeals more to manufacturer X's noncore consumers, as illustrated in the right-hand side of Figure 3 for the case of $\Delta b_x > 0$ and $\Delta b_y < 0$. Continuing with our cleanser example, an ad campaign by Clorox in which Soft Scrub is shown to clean

Figure 2   Examples of Different $e(\theta)$

Figure 3   Examples of Core and Noncore Comparative Advertising Messages
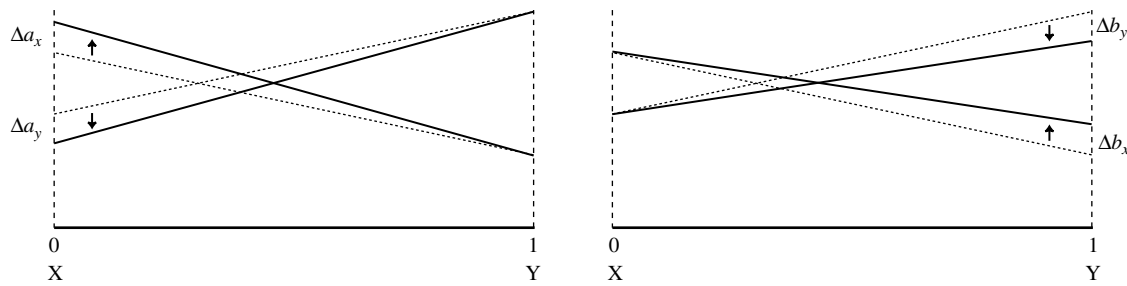
as thoroughly as Ajax for most common household tasks will appeal more its noncore consumers (those located closer to 1) because this is more relevant for consumers that care more about cleaning performance than about gentleness.

More generally, a given communications message may affect any combination of parameters a, b, and v. In the examples in Figure 2, the messages affect only v_x and v_y. In this case, we say that the message is untargeted (i.e., the ad appeals equally to all consumers) because an increase in v_x causes an equal increase in the valuation of all consumers for product X, and a decrease in v_y causes an equal decrease in the valuation of all consumers for product Y. Continuing with our cleanser example, this corresponds to a campaign in which Clorox advertises that Soft Scrub is more environmentally friendly than Ajax (or that two of three consumers prefer Soft Scrub to Ajax). This ad is untargeted if there is no correlation between consumers' preferences between gentleness and cleaning performance and their concern for the environment.

2.2.   Channel Profits

We now turn to the channel structure of the model and assume, for simplicity, that the two manufacturers sell their products through a common retailer that has local monopoly power.

We consider a two-stage game and use subgame perfection as our solution concept. In the first stage, each manufacturer announces a contract that specifies how much the retailer must pay as a function of how much it buys from the manufacturer. Let $T_x(\cdot)$ denote manufacturer X's contract and let $T_y(\cdot)$ denote manufacturer Y's contract. In the second stage, taking contracts $T_x(\cdot)$ and $T_y(\cdot)$ as given, the retailer chooses how much to buy from each manufacturer.

Let $x \geq 0$ and $y \geq 0$ denote how much the retailer purchases of products X and Y, respectively, and let $R(x, y)$ denote the retailer's revenue as a function of its quantity choices.[6] Then the retailer's profit is $R(x, y) - T_x(x) - T_y(y)$, manufacturer X's profit is

$T_x(x)$, and manufacturer Y's profit is $T_y(y)$, where we assume that production costs are zero for simplicity.

We allow for contracts of the form T_i: $\Re_+ \to \Re$, $i \in \{x, y\}$, subject to three restrictions. First, we assume that $T_i(0) = 0$. This says that the retailer's payment to manufacturer i must be zero if it purchases nothing. Second, we assume that $T_i(\alpha) \geq T_i(\beta)$ for all $\alpha \geq \beta$. This says that the retailer's payment to manufacturer i must be nondecreasing in the quantity purchased (thus, for example, we do not allow the retailer to buy marginal units from manufacturer i at negative prices). Third, we assume that $T_i(\cdot)$ is continuous and at least twice differentiable.[7]

2.2.1.   Solving the Game: Stage Two. We solve the game backwards by first considering the retailer's quantity choices given $T_x(\cdot)$ and $T_y(\cdot)$. Our assumption of a unit mass of consumers, and the fact that each consumer buys at most one unit of one product ensures that the retailer will be able to sell at most one unit. Because the retailer's payment to each manufacturer is nondecreasing, this implies that the retailer will choose $x + y \leq 1$ (the retailer will never purchase more than it can possibly resell). Depending on the terms of its contracts, however, the retailer may choose to buy from manufacturer X only ($x \leq 1$, $y = 0$), from manufacturer Y only ($x = 0$, $y \leq 1$), or from both manufacturers.

If the retailer buys only from manufacturer X, then we know that consumers will buy product X if and only if their willingness to pay for product X is greater than or equal to the price of product X. In this case, the retailer's inverse demand is given by $p_x(x)$, where

$$p_x(x) \equiv v_x + (1 - x)a_x + xb_x, \quad x \in [0, 1],$$

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[6] The assumption that manufacturers can commit to their offers is not inconsistent with retailers as monopolists. The plausibility of

take-it-or-leave-it offers depends on things like the manufacturers' patience and their ability to commit, whereas whether a retailer is a monopolist or faces competition only determines whether the manufacturers have outside options. In bargaining, the notions of commitment and outside options are distinct.

[7] The first assumption is needed in lieu of a formal "accept or reject" stage in the model; the retailer "accepts" the contract if it purchases a positive quantity, and the retailer "rejects" the contract if it purchases zero. The assumption that the retailer's payments are nondecreasing in quantities satisfies antitrust laws on predatory pricing. If it were relaxed, the possibility of equilibria that are supported by noncredible threats would arise.

and thus the retailer's revenue is given by $R(x,0) = p_x(x)x$. Similarly, if the retailer buys only from manufacturer Y, then the retailer's inverse demand is given by $p_y(y)$, where

$$p_y(y) \equiv v_y + (1-y)b_y + ya_y, \quad y \in [0,1],$$

and thus the retailer's revenue is given by $R(0,y) = p_y(y)y$. Moreover, if the retailer buys from both manufacturers, then its revenue is given by $R(x,y) = p_x(x)x + p_y(y)y$, where $x \geq 0$, $y \geq 0$, and $x + y \leq 1$ are jointly satisfied. It follows that the retailer's profit-maximizing quantities solve

$$\max_{x,\, y \in \Omega} R(x,y) - T_x(x) - T_y(y), \quad (1)$$

where Ω is the set of all x, y, such that $x \geq 0$, $y \geq 0$, and $x + y \leq 1$ are jointly satisfied.

2.2.2. Solving the Game: Stage One. In stage one, the manufacturers simultaneously choose their contracts subject to the constraint that the retailer's quantities solve (1). In general, there will be a multiplicity of equilibria, as the precise contract forms are not uniquely pinned down. However, as is well known from previous literature, the division of channel profit will be unique, with each manufacturer earning the difference between the maximized overall joint profit (the common retailer internalizes the demand externalities between products) and the monopoly profit of the retailer and its rival.[8]

PROPOSITION 1. *Subgame-perfect equilibria exist, and in all such equilibria, manufacturer X's profit is* $\Pi_{xy} - \Pi_y$, *manufacturer Y's profit is* $\Pi_{xy} - \Pi_x$, *and the retailer's profit is* $\Pi_x + \Pi_y - \Pi_{xy}$, *where* $\Pi_{xy} \equiv \max_{x,\, y \in \Omega} R(x,y)$, $\Pi_x \equiv \max_{x \in [0,1]} R(x,0)$, *and* $\Pi_y \equiv \max_{y \in [0,1]} R(0,y)$.

Note that each firm earns positive profit in equilibrium (since $\Pi_{xy} > \Pi_x$, $\Pi_{xy} > \Pi_y$, and $\Pi_x + \Pi_y > \Pi_{xy}$). Intuitively, each manufacturer captures only what is unique about its product, leaving the residual for the retailer. In the limit, as products X and Y go to perfect substitutes, the retailer's profit goes to Π_{xy} and each manufacturer earns zero. As the products become less substitutable, however, each manufacturer's profit increases and the retailer's profit decreases.

3. What Type of Advertisement Should the Manufacturer Run?

We can now answer our first motivating question: When will manufacturer X prefer to run a comparative ad campaign? To answer this question, we make

two simplifying assumptions. First, we assume that manufacturer X's choice is between two ads that are equally effective in increasing consumers' valuations for product X (i.e., $m_x(\theta) > 0$ is the same for both ads).[9] This allows us to keep the focus on whether manufacturer X prefers an ad that has $m_y(\theta) < 0$ or an ad that has $m_y(\theta) = 0$. Second, we abstract from long-run considerations that may arise because of the possible retaliation of manufacturer Y if manufacturer X's ad is comparative.[10]

Using Proposition 1, manufacturer X's profit can be written as

$$\pi_x = \Pi_{xy} - \Pi_y,$$
$$= p_x(x^*)x^* + p_y(y^*)y^* - p_y(\tilde{y})\tilde{y}, \quad (2)$$

where x^* and y^* are the quantities of x and y that maximize overall joint profits, and $\tilde{y}$ is the quantity of y that maximizes the monopoly profit of the retailer and manufacturer Y when only product Y is sold. Because X and Y are substitutes, it follows that $\tilde{y} > y^*$ whenever overall joint profits are maximized when both products are sold (which is our maintained assumption).

Recognizing that x^*, y^*, and $\tilde{y}$ depend on the underlying parameters v_i, a_i, and b_i, and totally differentiating (2), yields

$$d\pi_x = m_x(x^*)x^* - m_y(1-y^*)y^* + m_y(1-\tilde{y})\tilde{y}, \quad (3)$$

which uses the fact that the sum of the terms involving dx^*, dy^*, and $d\tilde{y}$ are zero from the respective first-order conditions. Because $m_x(x^*)$ is the same for both, it follows that, for small changes, manufacturer X will prefer to run the comparative ad, which increases its profit by (3), over the noncomparative ad, which increases its profit by $d\pi_x = m_x(x^*)x^*$, if and only if

$$m_y(1-\tilde{y})\tilde{y} > m_y(1-y^*)y^*. \quad (4)$$

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[8] See Lemma 1 in O'Brien and Shaffer (1997), who solve the game considered here using a more general formulation of demand, and Proposition 1 in Shaffer and Zettelmeyer (2002), who use the same Hotelling setup.

[9] Recall that one of the concerns in the behavioral literature is that consumers may have such a distaste for negative advertising that manufacturer X may also end up hurting consumers' valuations for its own product. Note, however, that although a decrease in consumers' valuations for both products would necessarily decrease Π_{xy}, it would also decrease Π_y, and so on net the change in $\Pi_{xy} - \Pi_y$ could still be positive. This implies that manufacturer X might still run such ads. Clearly, however, this would make running comparative ads less likely.

[10] Manufacturer Y's retaliation could take many forms, including responding with its own comparative ad campaign or engaging in a limited (all-out?) price war. If the retaliation is in the form of a comparative ad campaign, then the same principles in Proposition 1 would also apply to manufacturer Y. In this case, one might reasonably anticipate that manufacturer Y's retaliatory ad campaign would either be untargeted or appeal more to Y's core consumers, and manufacturer X would then have to determine whether on net it would expect to be better or worse off. A complete analysis of the possibility of a price war is beyond the scope of the paper.

Figure 4   Comparison of Noncomparative and Comparative Advertising (Core Case)
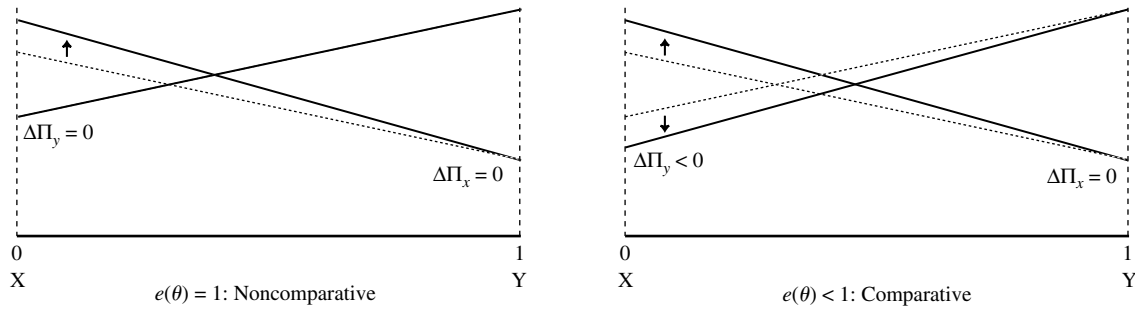
Condition (4) is easily interpreted. In the case of ads that are untargeted, for example,

$$m_y(1 - \widetilde{y}) = m_y(1 - y^*) = -\Delta v_y,$$

where $-\Delta v_y > 0$. Condition (4) thus simplifies to $\widetilde{y} > y^*$, which holds for all y^*. Similarly, one can show that (4) holds for all y^* when the ads appeal more to X's core consumers. Surprisingly, however, it does not hold for any y^* when the ads appeal more to X's noncore consumers.[11] Because nonlocal changes in consumers' valuations can be obtained by a sequence of local changes in consumers' valuations, all of which have the same sign, we have the following proposition:

PROPOSITION 2. *It is optimal for manufacturer X to run comparative ads for messages that are untargeted or that appeal more to its core consumers, all else being equal. In contrast, it is not optimal for it to run comparative ads for messages that appeal more to its noncore consumers.*

PROOF. See the appendix.

Proposition 2 implies that manufacturer X will prefer ads that have a comparative focus if and only if the ads are untargeted or appeal more to X's core consumers. Intuitively, manufacturer X can increase its profit in two ways. First, it can advertise in a way that increases overall joint profits all else being equal (knowing that it will be able to capture its product's incremental contribution to the increased surplus), and second, it can advertise in a way that, regardless of what happens to overall joint profits, the retailer's monopoly profit with manufacturer Y is reduced. Messages that have a noncomparative focus work solely through the former effect. Messages that have a comparative focus also work through the latter effect.

For ads that are untargeted or that appeal more to X's core consumers (see Figure 4), the decrease in the retailer's monopoly profit with manufacturer Y more than offsets any loss in overall joint profits when the

focus is comparative, making manufacturer X better off. In contrast, for ads that appeal more to X's non-core consumers (see Figure 5), there is no decrease in the retailer's monopoly profit with manufacturer Y when the focus is comparative. In this case, the loss in overall joint profits that occurs is not offset, making manufacturer X worse off.

We can illustrate these results by recalling our earlier discussion of an ad campaign by the Clorox Company that features Soft Scrub versus the competing product Ajax. Proposition 2 suggests that conditional on emphasizing that Soft Scrub is gentle, Clorox should prefer a comparative ad. For example, Clorox should state that Soft Scrub is shown to scratch most common tiles far less than Ajax. Conversely, the proposition suggests that conditional on emphasizing Soft Scrub's cleaning performance, Clorox would be better off not comparing Soft Scrub to Ajax.

Because comparative ads decrease overall joint profit relative to noncomparative ads (assuming both increase consumers' valuations for product X by the same amount), one might think that the retailer could persuade manufacturer X not to run them. To consider this, note that the increase in the retailer and manufacturer X's joint profit if the noncomparative ad is run is $\Delta\Pi_x > 0$, which is the same as what the increase in their joint profit would be if the comparative ad is run. In other words, from their joint perspective, it makes no difference whether the focus of manufacturer X's ad is comparative or noncomparative. It follows that, for untargeted and core messages, a comparative ad increases manufacturer X's profit relative to what it could earn with a noncomparative ad by the same amount as it decreases the retailer's profit. Thus, the retailer cannot compensate manufacturer X for foregoing the ad and at the same time make itself better off. This contracting failure arises because manufacturer Y is not a party to the negotiation. Together, manufacturer Y and the retailer could jointly increase their profit by compensating manufacturer X for not running comparative ads, but unfortunately, this kind of three-party contracting

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[11] This assumes that $\widetilde{y} = 1$ for simplicity. If $\widetilde{y} < 1$, then (4) may be satisfied for some parameter values.

Figure 5   Comparison of Noncomparative and Comparative Advertising (Noncore Case)

$e(\theta) = 1$: Noncomparative $e(\theta) < 1$: Comparative
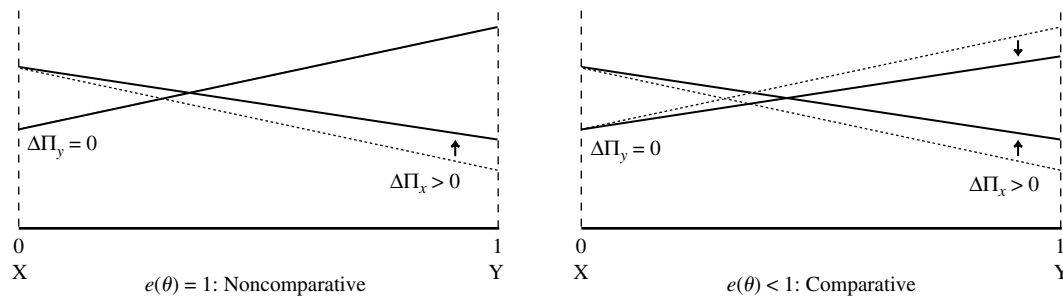
would be prohibited under Sherman Act laws against collusion.[12]

4.   In-Store Display of Manufacturer Advertising

We now turn to our second motivating question: When will a manufacturer want to advertise at the point of sale with in-store displays, and when should the retailer allow the displays (i.e., allow the manufacturer to advertise in its store)? In practice, manufacturers often like to reinforce their advertising messages at the point of sale by setting up display areas inside retailers' stores. For example, Verizon Wireless has a display area inside Target retail stores. The area showcases Verizon's plans and services and contains a large tagline that reads "choose America's *most reliable* network" (italics our own). The display area is directly adjacent to a display with a similar layout showcasing the plans and services of T-Mobile, a competing cell phone carrier.

By seeking an in-store display, Verizon, i.e., manufacturer X, is hoping to increase its profit. By allowing an in-store display, the retailer is also hoping to increase its profit. Surprisingly, and in contrast to comparative advertising that occurs outside the retailer's store, channel incentives are always aligned in this case. As we now show, whenever it is in the interest of the manufacturer to have an in-store display, it will also be in the retailer's interest to allow it.

Consider first the case in which manufacturer X can require the retailer to use in-store displays (this implicitly assumes that manufacturer X can monitor compliance on the part of the retailer—which is plausible because the displays and the necessary floor space are observable). If the retailer accepts X and Y's offers, its payoff will equal the overall joint profit, which we denote by $\tilde{\Pi}_{xy}$, less each manufacturer's profit, which we denote by π_x and π_y, respectively,

$$\tilde{\Pi}_{xy} - \pi_x - \pi_y. \tag{5}$$

In contrast, if the retailer accepts Y's offer but rejects X's offer, its payoff will be $\Pi_y - \pi_y$.[13] It follows from this and (5) that manufacturer X's payoff must be less than or equal to $\tilde{\Pi}_{xy} - \Pi_y$ if the retailer is to be induced to accept its offer. Because manufacturer X can make take-it-or-leave-it offers, it will choose T_x such that its payoff will be exactly this amount in equilibrium.

On the other hand, if manufacturer X does not wish to have an in-store display and forbids it by contract, then from Proposition 1, manufacturer X's payoff will be $\Pi_{xy} - \Pi_y$. Comparing payoffs with and without the display, it follows that manufacturer X will want the retailer to have an in-store display if and only if the display increases overall joint profit, $\tilde{\Pi}_{xy} - \Pi_{xy} > 0$.

Suppose now that in-store displays are not contractible (it may be that monitoring each retailer's compliance is prohibitively costly for the manufacturer, who may be selling through hundreds of different retail outlets). In this case, for all contracts T_x and T_y, it is in the unilateral interest of the retailer to display manufacturer X's ads if and only if the display increases its profit. Because contracts T_x and T_y will be such that in equilibrium the retailer is the residual claimant to overall joint profit,[14] it follows that the retailer will display X's ads if and only if it increases the overall joint profit.[15] This is exactly the

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[12] This would be an instance in which laws against collusion may actually be harmful to consumers, as otherwise manufacturer X could be compensated and the decrease in consumers' valuations for product Y could be avoided.

[13] This follows because the manufacturers' offers are made simultaneously, and thus the fixed payment that manufacturer Y receives from the retailer is independent of whether the retailer accepts manufacturer X's offer.

[14] See the derivation of equilibrium contracts in O'Brien and Shaffer (1997) and Shaffer and Zettelmeyer (2002).

[15] It is important to distinguish the retailer's incentive ex ante, prior to contracting, and ex post, after contracting. Ex ante, the retailer might prefer to commit not to have an in-store display that increases overall joint profit because in equilibrium, the gains from such ads might accrue to the manufacturers (see Proposition 1). However, ex post, after all contracting with the manufacturers is complete, the retailer's incentive is to have an in-store display that increases overall joint profit because in equilibrium, it is the residual claimant of this profit.

same condition we derived above for when manufacturer X would want the ads displayed if it could ensure compliance.

PROPOSITION 3. *Regardless of whether compliance can be monitored, the retailer will allow, and manufacturer X will want, an in-store display of the manufacturer's advertising message if and only if the display increases overall joint profit. Thus, although it is always optimal for noncomparative ads to be displayed, it need not be desirable to display comparative ads.*

The last line in Proposition 3 follows immediately on noting that noncomparative ads weakly increase all consumers' valuations and thus cannot lead to a decrease in overall joint profit, whereas the same cannot be said for comparative ads. Of course, this begs the question under what conditions will comparative ads increase overall joint profit and when will they not.

To consider this, recall that overall joint profit prior to advertising can be written as

$$\Pi_{xy} = p_x(x^*)x^* + p_y(y^*)y^*.$$

Let the changes in a type θ consumer's valuation for products X and Y that would arise as a result of any in-store advertising be denoted by $m_x(\theta)$ and $m_y(\theta)$, respectively.[16] Then

$$d\Pi_{xy} = m_x(x^*)x^* - m_y(1 - y^*)y^*.$$

Here, we see that $d\Pi_{xy}$ is always positive for noncomparative ads, whereas for comparative ads, $d\Pi_{xy}$ is nonnegative if and only if $m_x(x^*)s_x - m_y(1 - y^*) \cdot (1 - s_x) \geq 0$, where s_x is manufacturer X's market share. Intuitively, manufacturer X's ad will be displayed if and only if the extra profit to be had on product X more than offsets the decrease in profit on product Y. Rearranging the latter expression to obtain s_x by itself, we obtain a necessary and sufficient condition for in-store displays to be optimal when changes in consumers' valuations are small:

$$s_x \geq \frac{m_y(1 - y^*)}{m_x(x^*) + m_y(1 - y^*)}.$$

This can also be written as a function of the emphasis of the retailer and X's in-store display,

$$s_x \geq 1 - e(x^*). \tag{6}$$

If (6) is satisfied at a particular s_x, then it will also be satisfied for all larger values of s_x. Thus, in-store displays will always be optimal for manufacturer X and the retailer even for nonlocal changes in consumers' valuations (because, among other things, the in-store display of X's ads will always weakly increase X's market share). Thus, we obtain the following proposition:

PROPOSITION 4. *It is optimal for the retailer (and manufacturer X) to display X's ads in store if $s_x \geq 1 - e(x^*)$. If $s_x < 1 - e(x^*)$, then it may not be optimal to display manufacturer X's ads in store, and it will not be optimal if the changes in consumers' valuations are small enough.*

Proposition 4 suggests that whether or not it is optimal for the retailer to display manufacturer X's ads in store depends on manufacturer X's market share prior to the in-store display and the emphasis of the message. For example, in the case of noncomparative advertisements, $e(x^*) = 1$, and thus the sufficient condition in (6) is always satisfied. More generally, we obtain

• For a given emphasis $e(x^*)$, the retailer is more likely to allow manufacturer X to display its ads the larger is manufacturer X's market share prior to the in-store display.

• For a given market share s_x, the retailer is more likely to allow manufacturer X to display its ads the more positive is the message's emphasis.

These insights relate to the overall joint profit condition in Proposition 3 in that a given comparative ad message is less likely to decrease overall joint profit the larger is X's market share. This is because the decrease in consumers' valuations for product Y are in a sense weighted less when Y's market share is smaller. Similarly, holding market shares fixed, a given in-store display is less likely to decrease overall joint profit when the emphasis is more positive.

Recall the above-mentioned in-store displays at Target. Proposition 4 suggests that Target should always allow in-store displays of noncomparative advertising. In fact, displays with purely positive advertising messages are common. For example, there are such displays for Nintendo Wii and Microsoft Zune at Target. At Best Buy, such displays exist for TiVo DVRs, Bose audio systems, Sony TVs, Sansa MP3 players, and many other products. In addition, at Home Depot, such displays exist for GE Café appliances, Andersen windows, and other products. Proposition 4 also suggests that Target should only consent to the display of comparative advertising messages if the emphasis is not very negative and the advertising manufacturer has a sufficiently large market share. This is consistent with the example at the beginning of this section—namely, that Verizon claims in its in-store display that it has "the most reliable

network." This is a fairly mild comparative ad and the display comes from the manufacturer with the largest market share for cell phones. In several visits to stores such as Target, Best Buy, OfficeMax, and Home Depot, we did not find any strongly negative comparative ads.

5. Influence of the Retailer on Advertising Content

We now turn to our third motivating question: How does the possibility of in-store displays influence the manufacturer's choice of ad content? We consider two cases. In the first case, we assume manufacturer X can design an ad that is specifically targeted for in-store display. In the second case, we assume manufacturer X wants to have the same advertising message inside the store as it does outside the store (perhaps because of economies of scope in ad design).

When the ads can be separated, manufacturer X's decision of what ad campaign to run *outside* the store environment is described in §3. As for its decision of what message to run *inside* the store environment, it follows from §4 that manufacturer X will choose from among the set of feasible messages the one that increases overall joint profit the most. Thus, in choosing between two messages that are equally effective at increasing consumers' valuations for product X, manufacturer X will prefer the one with the more positive emphasis.

PROPOSITION 5. *When designing an advertising message specifically for in-store display, it is optimal for manufacturer X to choose an ad with a noncomparative focus, all else being equal.*

Proposition 5 implies that regardless of which consumers the advertising message targets, it is always optimal for manufacturer X to choose an ad with a noncomparative focus for display within the store, all else being equal. This result reflects, in part, manufacturer X's sensitivity to the fact that the retailer also sells the rival's product, and thus disparaging the rival's product at the point of sale can only hurt the retailer's ability to extract surplus from consumers. However, it would be incorrect to infer from this that manufacturer X's optimal ad choice hinges on mitigating conflict within the channel. In the case of a noncomparative ad that appeals to its core consumers, for example, the in-store display will ultimately increase manufacturer X's profit and decrease the retailer's profit (because $\Pi_x = \Pi_y = 0$ and $\Pi_{xy} > 0$).

When it is optimal to have only one advertising message (for example, when manufacturer X wants a consistent message across channels, or when there are economies of scope in designing TV and print advertising with the same message as in-store displays), manufacturer X must take into account the relative effects of the two kinds of advertising. We model this as follows. Suppose that for every \$1 of change in consumers' valuations from direct advertising, in-store displays change valuations by \$$\lambda$. That is, suppose in-store displays are λ times as effective as the manufacturer's direct advertising. When $\lambda = 0$, in-store displays have no effect, when $\lambda > 1$, in-store displays are more effective, and when $\lambda < 1$, in-store displays are less effective.

Recall that if the retailer sells both products, manufacturer X's advertising message will be displayed inside the store if and only if it increases overall joint profit, whereas the retailer will never display manufacturer X's advertising message if it only sells product Y. Thus, if manufacturer X's choice is between two advertising messages, one with a comparative focus and one with a noncomparative focus, with the same $m_x(\theta)$, where both would increase overall joint profit, manufacturer X will prefer the comparative ad if and only if the following holds

$$m_y(1-\widetilde{y})\widetilde{y} > (1+\lambda)m_y(1-y^*)y^*. \qquad (7)$$

Comparing condition (7) and its analogue in condition (4), we see that the right-hand side of (7) is larger than the right-hand side of (4) for all $\lambda > 0$. It follows immediately that the more effective in-store displays are, the less apt manufacturer X will be to run the comparative ad. In particular, in the case of ads that are untargeted or for ads that appeal more to X's core consumers, it no longer holds that manufacturer X will always prefer to run comparative ads.

PROPOSITION 6. *If manufacturer X desires to have the same advertising message for in-store display as it does when it advertises outside the store environment, it will prefer to run ads that are comparative for messages that are untargeted if $\widetilde{y} \geq (1+\lambda)y^*$. If, instead, $\widetilde{y} < (1+\lambda)y^*$, manufacturer X may prefer to run ads that are noncomparative and will strictly prefer to do this if the changes in consumers' valuations are small enough. In the case of ads that appeal more to manufacturer X's core consumers, the analogous condition to hold is $\widetilde{y} \geq \sqrt{(1+\lambda)}y^*$.*

PROOF. See the appendix.

This contrasts with the results in Proposition 2, which imply that manufacturer X will always prefer to run comparative ads in these cases when in-store displays are not possible. Intuitively, manufacturer X has two "levers" with which to increase its profit. It can increase its profit by increasing overall joint profits, or it can increase its profit by decreasing the retailer's monopoly profit with manufacturer Y. The latter, however, is independent of whether in-store displays are possible, as it would never be optimal for the retailer to display manufacturer X's ad if it only sold product Y. Thus, relative to when in-store

displays of the ad are not possible, the manufacturer will put more "weight" on ads that increase overall joint profit, and thus it will put more weight on running noncomparative ads when it has access to in-store displays.

We turn now to one final question: Will manufacturer X always want to choose its advertising message so as to encourage the retailer to display the ad in its stores? One might think so, given that in-store display increases the ad's effectiveness by a factor of λ. However, we have shown that the retailer will display manufacturer X's ad if and only if it increases overall joint profit. This means that manufacturer X may sometimes be forced to choose between a comparative ad that has the effect of decreasing overall joint profit but nevertheless does a good job of decreasing the retailer's monopoly profit with product Y and a noncomparative ad with the same $m_x(\theta)$ that has no effect on the retailer's monopoly profit with product Y. In the former case, the ad's effect on manufacturer X's profit (knowing that the retailer will not display the ad) is given by (3), whereas in the latter case, the ad's effect on manufacturer X's profit (knowing that the retailer will display the ad) is given by $d\pi_x = (1+\lambda)m_x(x^*)x^*$.

PROPOSITION 7. *Suppose manufacturer X must choose between running a noncomparative with a given $m_x(\theta)$ and a comparative ad with the same $m_x(\theta)$ but with an emphasis that would decrease overall joint profits. Then, if $m_y(1-\tilde{y})\tilde{y} > m_y(1-y^*)y^* + \lambda m_x(x^*)x^*$, manufacturer X will prefer to run the comparative ad even though the retailer will not display the message.*

Intuitively, if the effectiveness of in-store advertising (as measured by λ) is sufficiently low, then at least for the case of untargeted comparative ads, or for comparative ads that appeal more to X's core consumers, in-store displays become secondary to X's goal of reducing the retailer's monopoly profit with manufacturer Y. Overall joint profit in these cases are lower and the ad message is not displayed in the retailer's store, but manufacturer X's profit is higher.

In summary, these results suggest that the possibility of in-store displays make running comparative ads relatively less attractive. If the manufacturer can select an ad specifically for in-store display, it will always choose an ad with a noncomparative focus. If the manufacturer prefers to have only one ad message, then comparative ads that increase overall joint profit become attractive only if the conditions in Proposition 6 hold and comparative ads that decrease overall joint profit become attractive only if the condition in Proposition 7 holds.

6. Concluding Remarks

We have made three contributions with this paper. First, we have considered how channel considerations and the consumers to whom the ads are targeted influence a manufacturer's decision whether to run a comparative ad campaign. We found that a manufacturer will prefer to run comparative ads for advertising that appeals primarily to its core consumers and noncomparative ads for advertising that appeals primarily to its noncore consumers.

We found that a manufacturer's incentive when it sells its products through a common retailer may operate in a different direction from what has been previously assumed about comparative advertising. Specifically, studies have suggested that comparative ads—because of the way consumers react to them—are more effective for new, less-established brands (see, for example, Gnepa 1993, Grewal et al. 1997). Adding the retailer to the manufacturers' consideration of whether to choose comparative instead of non-comparative ads shows that the channel gives rise to incentives that may operate in the opposite direction as the incentives created by consumers' reactions to comparative ads. Specifically, we found that larger manufacturers have a *greater* incentive to run comparative ad campaigns than smaller manufacturers. If the smaller manufacturers are the ones that tend to have the newer, less well-established brands, then this result contrasts with that in the behavioral literature.

The second contribution of this paper is to consider the role a retailer plays in supporting in-store advertising. We found that it is desirable for the manufacturer to have an in-store display and for the retailer to want to display the manufacturer's message, if and only if the display increases overall joint profit. This will be the case if the manufacturer's advertising message is noncomparative or if the advertising message is comparative but its emphasis is not too negative about the manufacturer's rival. For any given message, display of the ad is more likely the larger is the market share of the manufacturer that is favored in any comparison.

The third contribution of this paper is to show how considerations of in-store displays may influence the kind of advertising the manufacturer prefers overall. We found that when the manufacturer prefers to have a single advertising message inside and outside the store, the possibility of in-store displays increases the manufacturer's incentive to run noncomparative ad campaigns. However, we also found that there are some comparative ads that are so negative in emphasis that the retailer will refuse to allow the manufacturer to display them but yet are so attractive to the manufacturer that it will choose to run them over a noncomparative ad, even if the noncomparative ad would have induced the retailer to allow the in-store display.

Acknowledgments

Appendix

Proof of Proposition 2. The condition for when manufacturer X will prefer comparative ads is given by

$$m_y(1 - \tilde{y})\tilde{y} > m_y(1 - y^*)y^*. \tag{8}$$

Case of untargeted ads. In the case of untargeted ads, we have $m_y(\theta) = -\Delta v_y > 0$, and thus

$$
\begin{aligned}
m_y(1 - \tilde{y})\tilde{y} &= -\Delta v_y \tilde{y} \\
&> -\Delta v_y y^* \\
&= m_y(1 - y^*)y^*.
\end{aligned} \tag{9}
$$

This implies that, with untargeted ads, manufacturer X prefers ads with a comparative focus.

Case of core ads. In the case of core ads, we have $m_y(\theta) = -(1 - \theta)\Delta a_y > 0$, and thus

$$
\begin{aligned}
m_y(1 - \tilde{y})\tilde{y} &= -\tilde{y}\Delta a_y \tilde{y} \\
&> -y^*\Delta a_y y^* \\
&= m_y(1 - y^*)y^*.
\end{aligned} \tag{10}
$$

This implies that, with core ads, manufacturer X prefers ads with a comparative focus.

Case of noncore ads. In the case of ads that appeal more to manufacturer X's noncore consumers, we have $m_y(\theta) = -\theta\Delta b_y > 0$, and thus, assuming the market is covered when only product Y is sold, implies

$$
\begin{aligned}
m_y(1 - \tilde{y})\tilde{y} &= -(1 - \tilde{y})\Delta b_y \tilde{y} \\
&< -(1 - y^*)\Delta b_y y^* \\
&= m_y(1 - y^*)y^*.
\end{aligned} \tag{11}
$$

This implies that, with noncore ads, manufacturer X prefers ads with a noncomparative focus.

Proposition 2 follows on noting that nonlocal changes in consumers' valuations can be obtained by a sequence of local changes in consumers' valuations, all of which have the same sign.   Q.E.D.

Proof of Proposition 6. For this proof, we consider the joint impact of manufacturer X's outside campaign and in-store advertising. Let the in-store advertising be λ times as effective as the outside advertising. Then the total change in a type θ consumer's valuation for products X and Y is, respectively,

$$(1 + \lambda)m_x(\theta) \quad \text{and} \quad (1 + \lambda)m_y(\theta). \tag{12}$$

Thus, the condition for when manufacturer X will prefer comparative ads is given by

$$m_y(1 - \tilde{y})\tilde{y} > (1 + \lambda)m_y(1 - y^*)y^*. \tag{13}$$

The first thing to notice is that manufacturer X never prefers ads with a comparative focus in the case of noncore ads. Thus, this conclusion is the same as the one in Proposition 2.

Case of untargeted ads. In the case of untargeted ads, we have $m_y(\theta) = -\Delta v_y > 0$, and thus

$$m_y(1 - \tilde{y})\tilde{y} = -\Delta v_y \tilde{y}, \tag{14}$$

and

$$(1 + \lambda)m_y(1 - y^*)y^* = -(1 + \lambda)\Delta v_y y^*. \tag{15}$$

This implies that, for small changes in consumers' valuations, in the case of ads that are untargeted, manufacturer X prefers ads with a comparative focus if and only if $\tilde{y} \geq (1 + \lambda)y^*$.

Case of core ads. In the case of core ads, we have $m_y(\theta) = -(1 - \theta)\Delta a_y > 0$, and thus

$$m_y(1 - \tilde{y})\tilde{y} = -\tilde{y}\Delta a_y \tilde{y}, \tag{16}$$

and

$$(1 + \lambda)m_y(1 - y^*)y^* = -(1 + \lambda)y^*\Delta a_y y^*. \tag{17}$$

This implies that, for small changes in consumers' valuations, in the case of core ads, manufacturer X prefers ads with a comparative focus if and only if $\tilde{y} \geq \sqrt{1 + \lambda}y^*$.

Nonlocal changes are more difficult to evaluate because the local if and only if conditions may not be satisfied for small changes but may become satisfied for larger changes. However, if the local conditions are satisfied for a particular y^*, then they will be satisfied for nonlocal changes also, as the ads always decrease manufacturer Y's market share. Q.E.D.

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