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Cooperative advertising plans feature prominently in marketing programs in conventional channels and make up the majority of marketing funds in some product categories. Available data show that cooperative plans vary greatly with respect to their principal feature: the participation rate offered by manufacturers (the fraction of the reseller's advertising costs that the manufacturers pick up). The authors develop two formal models to study the effects of advertising "spillovers," differentiation across competing retailers, and differentiation across competing manufacturers on the participation rate. The models show that more generous participation rates are called for with less targetable media, less differentiated retailers, more differentiated brands, and more upscale products within a category. The authors sketch out a managerial decision framework that incorporates these findings and offer some suggestions for empirical research.

Understanding Cooperative Advertising Participation Rates in Conventional Channels

Cooperative (coop) advertising is an important aspect of many manufacturers' promotional budgets. By one estimate (Rothschild 1988), more than $5 billion was spent on coop advertising in 1987, and other observers attach even higher numbers to these expenditures ($10 billion according to Somers, Gupta, and Herriott 1990). For some manufacturers, such as General Electric, budgets that support local advertising by retailers are three times as great as those that support national advertising (Young and Greyser 1982). Not surprising, these coop funds also constitute a significant fraction of retailers' advertising budgets. For example, appliance retailers obtain more than 75% of their total advertising dollars from coop advertising programs (Bovee and Arens 1986).

To understand coop advertising, it is necessary to distinguish first between local and national advertising (Young and Greyser 1983). The former can be defined as promotional efforts undertaken by resellers in their own trading areas, whereas the latter refers to corresponding efforts undertaken by the manufacturer in the national marketplace. These types of advertising differ in important ways. To begin, the emphasis in national advertising is to create more favorable product attitudes, whereas local advertising is often price oriented, because its goal is to precipitate a purchase decision. There are also significant cost differences: Retailers have access to lower prices for local media such as newspapers, as well as to better local market information. We presume these differences are of a magnitude sufficient to create a role for local advertising above and beyond national advertising. We do not, however, preclude the possibility that national and local advertising could well support and/or trade off against each other.

By definition, *coop advertising* is an arrangement whereby a manufacturer pays for some or all of the costs of local advertising undertaken by a retailer for that manufacturer's products. Industry observers have stated that "no definition of cooperative advertising would be complete without pointing out that, despite its name, it is not a specialized kind of advertising. Instead, it is essentially a financial arrangement under which two [businesspeople] agree how the costs of mutual promotion are to be defrayed" (Crimmins 1984, p. 2). We focus on the most prominent aspect of these plans—the "participation" rate, that is, the percentage of the retailer's local advertising expenditures that the manufacturer agrees to pay. Although participation rates vary markedly from one product to another and from one market to another (Crimmins 1984; Dutta et al. 1995), the influences on participation rate decisions are not well understood.

Previous Literature

Much of the extant work on coop advertising is descriptive, charting trends in industry practice, legal issues, and management problems (e.g., Crimmins 1984; Young and Greyser 1983). However, a handful of studies examine coop plans from a more theoretical standpoint, including Berger (1972), Herriott (1988), and Corstjens and Lal (1989). These studies involve examining coop plans as a solution to the vertical coordination problem between a manufacturer and a retailer, the "double marginalization" problem first noted by Spengler (1950), in which a monopoly firm selling through a monopoly retailer suffers from retailer overpricing relative to the profit-maximizing level desired by the manufacturer. Although the specifics of their models are different, these studies share similar views of coop plans: They view them as combating the overpricing problem by offering retailers an indirect price subsidy, with the magnitude of the subsidy (i.e., participation rates) varying with the degree of the vertical problem and its associated losses.

The extant treatments of coop funds as price subsidies, however, leave some gaps in our understanding of the phenomenon. Observe that coop plans are not necessary to cope with the retailer overpricing problem: Previous studies (e.g., Jeuland and Shugan 1983; Moorthy 1987) show that quantity discounts and other "two-part" pricing plans can tackle the retailer overpricing problem directly; there is no need to resort to indirect subsidies like coop plans to cope with double marginalization.

Furthermore, coop plans are administratively burdensome. Their advertising copy requirements and associated claim documentation render them expensive to administer and enforce. Retailers cannot collect payments from the manufacturer unless they fulfill cumbersome requirements. These administrative requirements are a source of channel conflict, and retailers often urge manufacturers to permit them to claim coop allowances as off-invoice deductions. To the extent that coop plans are merely disguised pricing subsidies, we would expect manufacturers to be sympathetic to such requests. However, manufacturers vigorously resist the idea that coop plan dollars are equivalent to other price deductions. Evidently, they do not view coop advertising participation allowances as de facto deductions from wholesale prices (Brennan 1988).

One recent study tackles coop plans from a different standpoint: Desai (1992) studied "externalities" across franchisees as a determinant of coop "pooling" plans. He shows that franchisees can pool their local advertising dollars together, give them to the franchisor, and let the franchisor decide where and how the advertising dollars are to be spent, thus overcoming free-riding problems among franchisees. Although Desai's work provides valuable insight into the role of pooling plans in franchise systems, it is unclear how to extend his approach to understanding coop plans in "conventional" channels marked by arm's length relations between manufacturers and independent retailers. Observe that franchisees have much less discretion than independent retailers in setting their local advertising budgets, prices, and so on. Indeed, in the franchisee pooling plans studied by Desai, the franchisor decides how to spend the pooled funds. In contrast, coop plans in conventional channels do not give the manufacturer authority over the retailers' advertising budgets or schedules. Independent retailers cannot be forced to participate in coop plans, whereas franchisees have little discretion in these matters.

We propose to examine coop plans within a conventional channel setting. To reflect the significant structural features of conventional channels, we must incorporate certain elements. To begin, in conventional channels manufacturers do not have direct control over the advertising and pricing decisions of retailers that carry their product. Therefore, intrabrand competition among retailers is an important element we attempt to capture. We also implicate spillovers in local advertising as another important intrabrand issue in conventional channels. Specifically, we contend that the technology of local advertising does not enable retailers to target their local advertising only to their customers—competing retailers in the same trading area carrying the same item profit as well. This creates an incentive for each retailer to "under-advertise." Our models show that coop plans can combat both of these intrabrand issues by offering more generous participation rates.

Furthermore, retailers in conventional channels are not exclusive dealing outlets; typically, they carry products of competing manufacturers. So we must capture interbrand competition effects as well. Indeed, as Katz (1989, p. 696) notes, "the situation most often encountered in actual markets, but least seen in ... journals, is that of multiple manufacturers, each of whom has many dealers." As we show subsequently, we cope with this complexity by developing a second model (not a superset of the first) to capture the interbrand effects on the local advertising problem. Although some simplification of the problem is needed to make this model tractable, the findings are intriguing. Not only are our previous intrabrand findings robust, but we also find that greater interbrand differentiation increases the participation rate.

The rest of the article is organized as follows: In the next section we describe the first of the two models, analyzing the local advertising problem facing independent retailers with intrabrand competition; then we present a second model that accommodates interbrand competition; and in the concluding section we provide our managerial framework and discuss the limitations of the article.

MODEL 1: LOCAL ADVERTISING AND INTRABRAND COMPETITION

Consider a single manufacturer selling its product through multiple independent retailers. Consistent with a conventional channel, we assume the manufacturer cannot/does not consider forward vertical integration. Also, there is no franchise contract or other administrative mechanism that permits the manufacturer to undertake local advertising on behalf of the retailers. (National advertising is assumed to be occurring, though it is not modeled explicitly.)

Retailers

Given that the focus of this model is on intrabrand issues across retailers, we start by developing the retailers' problems. Local advertising decisions and retail prices are determined by independent retailers within the conventional channel.[1] The interaction among retailers is modeled as

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[1] If the manufacturer could undertake regional advertising it could coordinate the channel by undertaking all of the advertising directly. Because the manufacturer sees the effects of horizontal spillovers among retailers, the manufacturer will choose the appropriate level of advertising and still have enough pricing tools available to make this profitable. An example of this is when franchised outlets pool their advertising dollars and give it to the manufacturer to undertake coordinated advertising plans (Desai 1992).

Nash behavior. Retailers buy the product at a wholesale price, w, incurring no other variable costs. Each retailer maximizes its profits by choosing advertising and price levels (specifically each retailer selects a reach level for its local advertisements, r_i, retail price, p_i, and the distance over which the advertisements will be sent, d_i).

To capture intrabrand competition, let the retailers be differentiated sellers of the manufacturer's product. This differentiation could be the physical location of retail outlets or a more psychological dimension, such as the image of the retail store. This intrabrand differentiation is captured in a spatial structure, where retailers are located symmetrically on a circle of unit circumference. The metaphor is that of a ring road with consumers living all along the length of the road. These consumers are differentiated with respect to their preferences for retailers. Specifically, assume they are distributed uniformly along the circle. Each consumer's location corresponds to his or her ideal point. There is a preference disutility per unit distance, t, for a purchase made from a retailer not at a consumer's ideal point. This captures intrabrand competition (with a lower t representing more intrabrand competition). The economic value of the product is set at v; hence, a purchase from a consumer's ideal point retailer at a zero price yields utility of v. The corresponding value for a purchase from a retailer at a distance z from a consumer's ideal point at a price p is $(v - tz - p)$. Each consumer maximizes his or her utility by purchasing from the retailer that offers him or her the highest non-negative value of $(v - tz - p)$.

To see how demand is derived in this structure, consider the case of two adjacent retailers (i and k); all consumers are aware of the product (i.e., there is no role for local advertising here). For retailer i, the marginal consumer to the retailer in consideration is indifferent to buying from either retailer, and all consumers closer than this marginal consumer will find i their most preferred retailer.[2] Denote the marginal consumer between i and k as z_{ik}. This marginal consumer solves

$$v - tz_{ik} - p_i = v - t\left(\frac{1}{n} - z_{ik}\right) - p_k \text{ so } z_{ik} = \frac{p_k - p_i}{2t} + \frac{1}{2n}.$$

The size of retailer i's demand with respect to retailer k then is given by the length of the arc between i and this marginal consumer times two, because there is a marginal customer on each side of the retailer. We can do similar calculations to derive demand when there are more retailers.

The Role of Local Advertising

Recall that local advertising is distinguished from national advertising in that the latter is generally more concerned with creating favorable attitudes toward the product, whereas local advertising is more concerned with precipitating a purchase decision (Young and Greyser 1983). To capture this, we model consumers as making a purchase decision when retailers reach them through local advertising. Consistent with our view of local advertising, we assume

that local advertising messages do not change consumers' product preferences or utilities; rather, they only trigger a purchase decision whereby the consumer compares across retailers and buys from the retailer with the highest non-negative value. Therefore, the only role of local advertising in the model is to increase the size of the market for the retailer by making more customers aware of the product.

Let the reach level, r, represent the fraction of people who initiate a purchase decision as a consequence of a local advertising campaign. Let this campaign cost A(r) per person. We bound the function by noting that doing no local advertising should cost nothing and that 100% reach is virtually impossible. Also, local advertisements should show diminishing returns. We assume that A(r) is twice continuously differentiable and that $A'(r) > 0$, $A''(r) > 0$, $A(0) = 0$, and A(1) is very large.

To capture the idea of advertising spillovers, we allow for the possibility that local advertisements by one retailer can reach consumers who prefer to buy from a competing retailer. Although each retailer strives to send local advertisements to its target consumers, such targeting is imperfect. To capture this spillover, let β represent the percentage of people whom a retailer successfully reaches with its selected reach level (r_i), but who nonetheless do not buy from it.[3] This spillover is assumed to be shared evenly by all other retailers.[4] For a market with n retailers, we get

$$(1) \qquad \text{adjusted } r_i = (1 - \beta)r_i + \frac{1}{n-1}\sum_{k \neq i}\beta r_k.$$

The effect of introducing spillovers in local advertising is that retailer i's demand is also a function of the adjusted r_i of a retailer taking into account the advertising spillover, $(1 - \beta)r_i + \Sigma_{k \neq i}\beta r_k$, times the full information demand. Therefore, retailer i's demand is

$$\left[(1 - \beta)r_i + \frac{1}{n-1}\sum_{k \neq i}\beta r_k\right] \times 2\left(\frac{p_k - p_i}{2t} + \frac{1}{2n}\right).$$

The Conventional Channel Problem

In a conventional channel, a retailer faces the manufacturer's choice of a wholesale price, w; a fee, F_f; and participation rate, α. Each retailer also faces the price, p^o, and reach level, r^o, selected by competing retailers. The retailer maximizes its individual profits by solving

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[2]Here, and throughout the paper, we assume that v is large enough that all consumers will buy the product from some retailer. If this assumption is violated, then the retailers become local monopolists. Our results still will hold in this situation, but because we are attempting to study intrabrand competition here, we assume that v is large.

[3]This is a particular form of advertising spillovers. Its two major properties are that it is linear and symmetric in its treatment in gains and losses (i.e., the β and $(1 - \beta)$). This makes the model easier to solve, but our results hold when we weaken these assumptions. For example, our results hold even if we replace the $(1 - \beta)r_i$ term with r_i. Also, our results hold for a variety of nonlinear spillover structures including $r + \beta r^o(1 - r)$, $r^{(1 - \beta)}(r^o)^\beta$, and $[(1 - \beta)r + \beta r^o]^2$. Finally, the spillovers can be distributed more unequally. Advertisements might be considered to spillover to customers only in adjacent retailers' territories. In this formulation, Equation 1 becomes $(1/2)\beta r_{i+1} + (1/2)\beta r_{i-1} + (1 - \beta)r_i$. Our results are robust to this, among other specifications of spillovers in local advertising.

[4]We assume customers lost by a retailer are nonoverlapping with customers gained by the same retailer. Allowing overlap would have the effect of reducing the adjusted r_i in Equation 1; however, the substantive conclusions remain unchanged. We thank Paul Messinger for bringing this to our attention.

$$(2) \quad \max_{p,r} 2\big[(1-\beta)r + \beta r^o\big](p - w)\left(\frac{p^o - p}{2t} + \frac{1}{2n}\right)$$

$$- 2(1-\alpha)A(r)\left(\frac{p^o - p}{2t} + \frac{1}{2n}\right) - F_r - F_f$$

subject to $p \geq 0$, and $0 \leq r \leq 1$.

Here p^o and r^o are the price and advertising levels of all other retailers, which are taken as given as per our Nash assumptions. The demand for this retailer is $2[(p^o - p)/2t + 1/2n]$. Note that in these equations we solve for situations where $r_j^o = r_k^o$ and $p_j^o = p_k^o$ for $j,k \neq i$.[5] Consistent with the structure of a conventional channel, we allow for free entry by retailers. Hence, in equilibrium, retailers earn 0 economic profits (see Equation 5).

Consider the profits for any one retailer: The retailer chooses price, p_i, and an advertising reach level, r_i, to maximize its own profits, and the variable, n, is the number of retailers that choose to enter the market.

The first order necessary conditions for this problem[6] are

$$(3) \quad 2\big[\beta r^o + (1-\beta)r^*\big]\left(\frac{w + p^o - 2p^*}{2t} + \frac{1}{2n^*}\right)$$

$$+ \frac{2(1-\alpha)A(r^*)}{2t} = 0$$

and

$$(4) \quad 2(1-\beta)(p^* - w)\left(\frac{p^o - p^*}{2t} + \frac{1}{2n^*}\right)$$

$$- 2(1-\alpha)A'(r^*)\left(\frac{p^o - p^*}{2t} + \frac{1}{2n^*}\right) = 0,$$

and the market clearing condition is

$$(5) \quad 2\big[\beta r^o + (1-\beta)r^*\big](p^* - w)\left(\frac{p^o - p^*}{2t} + \frac{1}{2n^*}\right)$$

$$- 2(1-\alpha)A(r^*)\left(\frac{p^o - p^*}{2t} + \frac{1}{2n^*}\right) - F_r - F_f = 0.$$

Equations 3, 4, and 5 characterize retailers' responses in a conventional channel setting .[7]

Manufacturer's Problem

The manufacturer produces the product at a constant marginal cost c. The manufacturer chooses a coop participation rate,[8] α, and pricing to the retailer. We allow for nonlinear pricing by letting the manufacturer set both a wholesale price, w, and a fixed fee, F_f. Although fixed fees are rare in conventional channels, some form of nonlinear pricing is common practice, and we use a two-part tariff as our representation of nonlinear wholesale prices. Jeuland and Shugan (1983) and Moorthy (1987) show that quantity discounts and other pricing plans commonly used in conventional channels are formally equivalent to a two-part tariff. Furthermore, we include a two-part tariff rather than a simple linear pricing scheme to account for the double marginalization issue. Absent a two-part tariff, the double marginalization problem itself would evoke a coop plan. As noted previously, this is unappealing because coop plans are an awkward means of combating the retail overpricing that results from double marginalization. Using fixed fees enables us to focus on intrabrand issues across retailers in this model.[9]

The manufacturer selects levels of these variables to maximize its profits while taking into account the retailers' responses to the choices. In this model the manufacturer will maximize its profits if it can get the independent retailers to realize the same levels of price, advertising, and numbers of retailers as if the manufacturer were implementing a vertically integrated solution.[10] So we first solve for those levels of retail prices, local advertising, and numbers of retailers that yield the highest level of profits that can be attained by the channel as a whole in the following section. Next, we show how the manufacturer can choose levels of coop advertising, wholesale prices, and fixed fees within a conventional channel that ensure that its choices in the conventional channel yield the same levels of retail price, advertising, and number of retailers as the vertically coordinated benchmark.

The Vertically Integrated Benchmark

The highest level of profits available to the manufacturer and retailers (i.e., the joint profit maximizing choices) are the solutions to the multi-store monopoly problem at the retail level. We solve Equation 2 to find the joint profit-max-

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[5]Our central results would not change if we did have asymmetric retailers (i.e., we allowed different types of retailers in terms of cost or demand parameters). For example, spillovers still would lead to retailers underadvertising from the overall channel perspective. But the impact of a spillover then could vary by the type of retailer. For example, a large retailer might advertise more, and a small retailer less, for the same coop rate. The participation rate decision would have to deal with "average" retailer problems given Robinson-Patman considerations.

[6]The second order condition for this problem is $(1 - \alpha)A''(r)r - (1 - \beta)(t/2n) > 0$. We assume this holds in equilibrium.

[7]The fact that the advertising levels of other retailers, r^o, do not enter into Equation 4 is due to the linear structure of the spillover. Linear spillover structures often are used in the literature (for examples, see Kesteloot and Veugelers 1995; Mathewson and Winter 1984). Our results hold for both linear and nonlinear structures of the spillover.

[8]Note that we model only the participation rate. There is another contractual term that we do not model here, known as the "accrual" rate, which is the total dollars allowed as a fraction of sales. We assume that the accrual rate is either unlimited or else not binding in the sense that it is set high enough that some coop dollars are left unused by the retailer. Several reasons prompted this decision. First, industry observers note that accruals are not meant to be binding and should be set at a level larger than the retailers expected expenditures (e.g., Crimmins 1984, Chapter 9; Fraser 1980). Indeed, many observers note that large fractions (30%–50%) of allocated coop advertising dollars are left unused by retailers (e.g., Rothschild 1988). Second, there are suggestions in the trade press that open-ended coop (i.e., unlimited accrual) is on the rise (Crimmins 1986). Finally, from a modeling standpoint, only one of the two aspects of the contract can be binding at the same time. Because allowances would be equivalent to cutting wholesale prices, we chose participation rates to be binding in the model.

[9]Our central results, in particular the relationship between participation rates and spillovers, will not change if only wholesale prices can be used by manufacturers (rather than the nonlinear prices used here).

[10]See the example that follows to understand better the relationship between the manufacturer's objective function and the vertically integrated solutions. This equivalence follows from the nonlinear prices that enable the manufacturer to obtain all the economic profits in the conventional channel.

imizing levels of retail prices, p_i, advertising reach, r_i, and number of retailers, n.

(6) $$\max_{p_i, r_i, n} \sum_{i=1}^{n} \left(2 \left\{ \left[(1-\beta)r_i + \frac{1}{n-1} \sum_{k \neq i} \beta r_k \right] \right. \right.$$

$$\left. \left. (p_i - c)z(p_i, n, t, v) \right\} - 2A(r_i)z(p_i, n, t, v) - F_r \right)$$

subject to $n > 0$, $p_i > 0$, $0 \leq r_i \leq 1$, and

$z(p_i, n, t, v) = 1/(2n)$ if $p_i \leq v - (t/2n)$
$= (v - p_i)/t$ if $p_i > v - (t/2n)$.

Equation 6 sums the profits of each of the n retailers, where such profits are sales for each retailer minus variable costs and advertising costs and fixed costs. Sales are expressed as each retailer's market distance, $z(p_i, n, t, v)$, times its adjusted reach, $(1-\beta)r_i + [1/(n-1)]\Sigma_{k \neq i} \beta r_k$, times its price, p_i. The unit cost of sales is c, advertising costs are $A(r_i)\ z(p_i, n, t, v)$, and the cost of an outlet is F_r.

This integrated multi-store firm can choose the retail price, p_i; the advertising levels for each retailer, r_i; and the number of retailers, n. We find the optimal symmetric solution (i.e., $p_i = p_j$ and $r_i = r_j$ for all i and j). Observe that the firm will serve all customers in the market if v is sufficiently large relative to F_r.[11] In this case the marginal consumer is characterized by $z = 1/(2n)$, and the retail price will be set according to $p = v - t/(2n)$.[12] Substituting the results that $z(p_i, n, t, v) = 1/(2n)$ and $p = v - t/(2n)$, and noting that spillovers are not an issue in this setup, we can show that Equation 6 reduces to

(7) $$\max_{r, n} n \left[\left(v - \frac{t}{2n} - c \right) \left(\frac{r}{n} \right) - \frac{A(r)}{n} - F_r \right]$$

subject to $n \geq 0$ and $0 \leq r \leq 1$.

The first order necessary conditions[13] to this problem are

(8) $$\frac{\partial}{\partial r} : A'(r_c) = v - \frac{t}{2n_c} - c$$

and

(9) $$\frac{\partial}{\partial n} : \frac{r_c t}{2 n_c^2} = F_r \Rightarrow n_c = \sqrt{\frac{r_c t}{2 F_r}},$$

and the retail price is given by $p_c = v - (t/2n_c)$. So to maximize profits the manufacturer must select those levels of its choice variables (w, α, and F_f) such that r_c and p_c emerge as the optimal choices of retailers under the arrangement, and n_c emerges as the optimal number of retailers in equilibrium. We explain how to do this in the following section.

Implementing the Vertically Integrated Benchmarks Using Participation Rates

The question now becomes how the manufacturer can implement these solutions using participation rates and pricing. Going back to the solutions to the retailers' problems in the conventional channel, in a symmetric equilibrium, $r^o = r$ and $p^o = p$.[14] Equations 4 and 5 now become

(10) $$2r^* \left(\frac{w - p^*}{2t} + \frac{1}{2n^*} \right) + \frac{2(1-\alpha)A(r^*)}{2t} = 0$$

and

(11) $$2(1-\beta)(p^* - w)\left(\frac{1}{2n^*} \right) - 2(1-\alpha)A'(r^*)\left(\frac{1}{2n^*} \right) = 0.$$

Setting $r^* = r_c$ and $n^* = n_c$, and solving for $p_c - w$ leaves us with

(12) $$p_c - w = \frac{t}{n_c} + \frac{(1-\alpha)A(r_c)}{r_c}$$

and

(13) $$p_c - w = \frac{(1-\alpha)A'(r_c)}{1-\beta},$$

which combine to yield

(14) $$\frac{t}{n_c} + \frac{(1-\alpha)A(r_c)}{r_c} = \frac{(1-\alpha)A'(r_c)}{1-\beta}.$$

Solving this expression for α, the optimal coop advertising participation rate[15] is

(15) $$\alpha^* = 1 - \frac{t}{n_c \left(\frac{A'(r_c)}{1-\beta} - \frac{A(r_c)}{r_c} \right)}.$$

Given this solution for the optimal coop advertising participation rate, α^*, the optimal wholesale price, w^*, is

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[11]When the combined firm is not servicing all the available customers, by adding an extra retailer it can obtain additional profits by servicing those additional consumers. The profits it gains will be a function of v because the price it can charge is a function of v. When v is sufficiently large compared with F_r then the profitability of a new outlet is very high, and it is optimal to serve all customers. Therefore, we assume that v is large enough relative to F_r that the demand for each symmetric retailer is $1/(2n)$.

[12]The optimal price when all customers are being served is $p = v - t/2n$. To see this, notice that if $p < v - t/2n$ the firm can increase profits by increasing p to be equal to $v - t/2n$. The firm will not lose any customers and will gain extra revenue for each customer sold by extracting all consumer surplus for the marginal consumer between each retailer. If $p > v - t/2n$, then all customers are not being served.

[13]The second order sufficient condition is that $A''(r)r - t/4n > 0$. Roughly, this means that the marginal costs of increasing advertising must be larger than the average disutility to consumers of buying from less preferred retailers. We assume that at r_c, n_c, and p_c, this condition holds.

[14]The central results here would not change if we did not have symmetric retailers (i.e., we allowed different types of retailers in terms of cost or demand parameters). For example, spillovers still would lead to underadvertising by retailers from the overall channel perspective. But the impact of a spillover then could vary by the type of retailer. For example, a larger retailer might advertise more, and a smaller retailer less, for the same coop rate. Using the participation rate decision, we would have to deal with "average" retailer problems given Robinson-Patman considerations.

[15]Notice that the solution to α^* will not be 0 if $\beta = 0$. In this model there are still intrabrand problems even if there are no advertising spillovers, specifically intrabrand retail Nash competition with entry. Essentially, the manufacturer wants to implement prices such that the marginal customer has a zero value, whereas the retailers are competing with each other on price. This leaves a role for the participation rate even when there are no spillovers present in the model (see Mathewson and Winter 1984). The existence of spillovers only increases that role. We thank an anonymous reviewer for this insight.

$$(16) \qquad w^* = p_c - \frac{(1 - \alpha^*)A'(r_c)}{1 - \beta}.$$

All that remains is to solve for the optimal fixed fee. Substituting the benchmarks into Equation 5 we get

$$(17) \qquad \frac{r_c(p_c - w^*)}{n_c} - \frac{(1 - \alpha^*)A(r_c)}{n_c} - F_r = F_f^*.$$

Applying Equations 15 and 16 to Equation 17 and simplifying gives $F_f^* = F_r$.

In summary, if the manufacturer were to set its coop advertising participation rate, wholesale price, and franchise fee at α^*, w^*, and F_f^*, respectively, the vertically integrated benchmark solution values also are the solution values to the independent retailer's first order necessary conditions.[16] In other words, the manufacturer achieves the benchmark levels and maximum profits. After presenting a simplified example, we turn to the task of describing the influence of exogenous model parameters on the optimal coop plan.

An Example

Perhaps the easiest way to see what is going on in this model is to present the results for a simplified example of two retailers (so we relax the assumption of entry) and a specific advertising cost function, say kr^2. Here the retailer's problem becomes

$$(18) \qquad \max_{p,r} 2\left[(1 - \beta)r + \beta r^o\right](p - w)\left(\frac{p^o - p}{2t} + \frac{1}{4}\right)$$

$$- 2(1 - \alpha)k\, r^2\left(\frac{p^o - p}{2t} + \frac{1}{4}\right) - F_r - F_f.$$

Solving this yields the following first order necessary conditions for price and advertising levels r and p:

$$(19) \qquad 2\left[(1 - \beta)r^* + \beta r^o\right]\left(\frac{w + p^o - 2p^*}{2t} + \frac{1}{4}\right)$$

$$+ \frac{2(1 - \alpha)k(r^*)^2}{2t} = 0$$

and

$$(20) \qquad 2(1 - \beta)(p^* - w)\left(\frac{p^o - p^*}{2t} + \frac{1}{4}\right)$$

$$- 4(1 - \alpha)kr^*\left(\frac{p^o - p^*}{2t} + \frac{1}{4}\right) = 0.$$

Solving these equations for p and r in equilibrium we get

$$(21) \qquad p^* = \frac{t}{1 + \beta} + w,\ r^* = \frac{t(1 - \beta)}{2k(1 - \alpha)(1 + \beta)}.$$

The manufacturer's maximization problem in this example is

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[16]The full reduced form solutions require that we substitute the solutions from Equations 8 and 9 into Equations 15 to 17. Unfortunately, we cannot do that without assuming a specific functional form for A(r). See the section titled "An Example" for solutions with a specific A(r).

$$(22) \qquad \text{Max}_{w,\alpha}\,(w - c)(r^*) - \alpha k(r^*)^2 + 2\,f_f.$$

Note that the solution for the manufacturer's problem of making v large enough, as we assume here, is to set wholesale price so that the marginal consumer will have 0 consumer surplus (i.e., $v - t/4 = p$); so $w = p - t/(1 + \beta) = v - t/4 - t/(1 + \beta)$. If the manufacturer were to find it optimal to price higher, then each retailer would be a local monopolist in terms of price, and the solutions to that maximization problem would be inserted into this maximization problem. This would not change the result with respect to spillovers.

Substituting the retailers' solutions for advertising and setting the fixed fee equal to retail profits (which equal $(v - t/4 - c)r^* - k(r^*)^2$) yields the manufacturer's profit function:

$$(23) \qquad \left(v - \frac{t}{4} - c\right)\left[\frac{t(1 - \beta)}{2k(1 - \alpha)(1 + \beta)}\right] - k\left[\frac{t(1 - \beta)}{2k(1 - \alpha)(1 + \beta)}\right]^2.$$

Solving this expression for the optimal participation rate we get the following:

$$(24) \qquad \left(v - \frac{t}{4} - c\right)\left[\frac{t(1 - \beta)}{2k(1 - \alpha)^2(1 + \beta)}\right]$$

$$- 2k\left[\frac{t(1 + \beta)}{2k(1 + \beta)}\right]^2 \frac{1}{(1 - \alpha)^3} = 0,$$

which becomes

$$(25) \qquad \alpha^* = 1 - \frac{t(1 - \beta)}{(1 + \beta)(v - t/4 - c)}.$$

This is exactly the solution we would have gotten by applying the vertically integrated solutions into Equation 15, substituting the vertically integrated solution for $r_c = (v - t/4 - c)/2k$ and $n = 2$.

INSIGHTS FROM MODEL I

Coop allowances are not de facto wholesale price reductions. They are a distinct channel mechanism that has markedly different benefits from price in achieving coordination among retailers with intrabrand competition and local advertising spillovers. This distinction explains the resistance manufacturers put up to retailer suggestions that coop advertising dollars should be deducted directly from the wholesale price. As Brennan (1988) notes, retailers prefer to have coop payments deducted from the invoice when products are shipped—after which they may or may not run an ad as they see fit. Our analysis explains manufacturers' desires to distinguish coop advertising payments from wholesale price discounts. If coop advertising funds were de facto wholesale price discounts, the manufacturer could not cope effectively with local advertising spillovers. Complex wholesale pricing plans (even two-part pricing or quantity discounts) are not sufficient to bring about the profit maximizing outcome. Manufacturers need a properly chosen coop advertising participation rate to provide retailers sufficient incentive to bring about the proper levels of local advertising in the presence of these spillovers.

How generous should the coop plan be? To address this question, observe that the comparative statics of Equation 15

are $\partial\alpha^*/\partial\beta > 0$; $\partial\alpha^*/\partial t < 0$; $\partial\alpha^*/\partial v > 0$; $\partial\alpha^*/\partial c < 0$; $\partial\alpha^*/\partial F_r < 0$.[17] Examining them, we can see the influence of different variables on the participation rate.

> Proposition 1: The optimal participation rate increases with greater spillovers in local promotions ($\partial\alpha^*/\partial\beta > 0$).

There is evidence in the existing literature that spillovers might be related to coop participation rates. Dutta and colleagues (1995, p. 19) suggest that some of their findings are consistent with this spillover argument. Furthermore, in a recent working paper, Chintagunta and Prasad (1995) test the hypothesis that "as the inter-retailer spillover of local advertising for a brand increases, the manufacturer's coop participation rate for the brand increases," and they find empirical support for this hypothesis. This is not surprising given the acceptance of spillovers as important factors in other channel decisions such as franchising (Lal 1990), exclusive territories (Mathewson and Winter 1984), and exclusive dealing (Marvel 1982).

This result can be used to contrast coop plans that involve different media vehicles such as print, broadcast, direct mail, point-of-purchase displays, and the like. We can rank these different vehicles by their spillover potential. To the extent that they vary in this regard, correspondingly different levels of participation rates are required. For example, in-store vehicles are likely to have relatively fewer spillover problems than at-home media, because the consumer is already in the store when exposed to the information. In the latter case, the consumer can readily shop at his or her preferred store after being exposed to the information. Likewise, direct mail is more targetable than mass media; hence, the spillover is reduced. The currently popular "database" marketing programs that use computerized lists of likely buyers should show even lower levels of spillover; in particular, "continuity" programs, which target repeat buying behavior, are likely to show the lowest potential for spillover.

From the preceding discussion, we see that Proposition 1 suggests that the coop participation rate for in-store promotions should be lower than it is for a print media or broadcast media based effort. Likewise, direct mail aimed at past customers of a retail store should be subsidized at a lower rate than a mass mailing or mail drop in a trading area. In summary, participation rates should be relatively more generous for media advertising; direct mail should be the next lowest; point-of-purchase displays should follow; and loyalty/continuity programs should be the lowest.

> Proposition 2: The optimal participation rate increases with greater intrabrand competition among retailers (i.e., $\partial\alpha^*/\partial t < 0$).

To the extent that independent retailers are more differentiated from one another, there is less need to subsidize local advertisements because each retailer is able to capture a larger fraction of the benefits from its activities. Some practitioners suggest that coop advertising is a "widespread competitive necessity" (Somers, Gupta, and Herriott 1990, p. 36). If we interpret competition to connote less differen-

tiation among retailers, this position is consistent with our results.

One observable indicant of retailer differentiation is store loyalty as measured by the degree of store switching (Blattberg and Neslin 1990, p. 113). When store switching is lower, participation rate can be lower. The product mix decisions of the manufacturer also influences the degree of intrabrand competition. For example, Bergen, Dutta, and Shugan (1996) discuss "branded variants" as a strategy whereby manufacturers of nationally branded products create minor variations in the product, which permits retailers to carry nonequivalent forms of the product. Consumer electronics is a product category in which such branded variants are commonplace. A bewildering variety of model features ensures that it is virtually impossible to find the exact item in multiple competing stores. This decreases the substitutability of the stores. From our perspective, this means that lower participation rates will suffice to support local advertisements.

> Proposition 3: The optimal participation rate increases with increases in the consumer's willingness to pay for the product (i.e., $\partial\alpha^*/\partial v > 0$).

This result is driven by the greater profits accruing to the manufacturer from focusing on higher v customers. Therefore, spillovers that reduce local advertising (and consequently marginal demand) are costly and must be combated. These customer differences in v are easiest to understand as segments within a category. Generally, consumers have higher willingness to pay for products perceived to be of higher quality. Therefore, within a given category, higher-quality products should have higher coop advertising participation rates associated with them. For example, in the clothing industry, a fashion-oriented or top-of-the-line item should be supported by higher coop advertising participation rates than should value-oriented or basic, functional items.

A related situation arises with segments of consumers. When the targeted segment of consumers for the product has a relatively higher willingness to pay, the coop advertising participation rate should increase. Hence, products targeted at upscale segments and sold through retailers catering to these segments will tend to have higher coop advertising participation rates. Likewise, firms selling through full-service retailers should offer higher participation rates than firms using a discount retail strategy in the same product category.

Trade marketing programs for industrial products also can benefit from this insight. Typically, the economic value of an industrial product varies greatly across customer segments. Often, firms try to target these different segments by using different channels or variations of the basic product. From Proposition 3, we contend that channel partners selling to customers with greater economic value for the product must be supported by higher participation rates.

Unresolved Issues

The influence of interbrand competition is missing from our model. We noted at the outset that conventional channels feature independent retailers that are free to sell products of competing manufacturers. To capture the interbrand competition aspect of conventional channels, we develop a model that sacrifices complexity in some respects and adds it in others. We describe this effort in the following section.

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[17]We omitted the derivations of all of the comparative statics that follow. They are available from the authors on request.

MODEL II: LOCAL ADVERTISING AND INTERBRAND VERSUS INTRABRAND COMPETITION

The fundamental mechanism implicated in our analysis is the disincentive for retailers to advertise sufficiently because their local advertising efforts profit their competitors as well. However, it also has been suggested that coop advertising is nothing more than a tool for manufacturers to compete for the attention of a retailer selling products from multiple firms (Crimmins 1986, p. 67). Are these intrabrand findings on competition and advertising spillovers robust to the introduction of interbrand competition?

To address this issue, it is simply not possible to add interbrand competition to the model developed here. Modeling competition at the manufacturer level as well as the retail level requires some simplification of the first model to keep the problem manageable. To reiterate, Model II is not a superset of Model I but serves to supplement it. Specifically, we model competition between two manufacturers, along with competition between two retailers. As with Model I, we allow for local advertising spillovers between retailers.

Our model structure uses a product attribute space that is similar to the one used by Matutes and Regibeau (1988) to study bundling. We extend their structure by assigning each dimension of the product space to a different level of the channel and by allowing for advertising.

Products

We consider each product to consist of two relevant (composite) attributes. One dimension represents a composite of all the relevant attributes provided by retailers, and the other one represents a composite of the attributes provided by manufacturers. Examples of dealer attributes include store location, quality of sales help, and store image, as discussed previously. Examples of manufacturer attributes include product functionality, image, and packaging.

There are two retailers, located at $x = 0$ and $x = 1$. Similarly, there are two manufacturers, located at $y = 0$ and $y = 1$. Therefore, there are four possible customer offerings representing the different combinations of dealer and manufacturer attributes located at the four corners of the product space. The simplification of this retail structure compared with Model I is that we do not allow retailers to have free entry.[18]

Consumers

Consumers are located uniformly throughout the unit square. Their locations in the square denote their ideal point. A consumer located at a point (x,y) buying product (j,k) enjoys a net value of $v - t_r |x - j| - t_m |y - k| - p_{jk}$. The differences across consumers for a given product are captured by the distance $|x - j|$ between consumer (x,y)'s preferred specification of the dealer attribute and the specification of the dealer attribute possessed by product (j,k), and the distance $|y - k|$ between consumer (x,y)'s preferred specification of the manufacturer level attribute and the specification of the manufacturer level attribute possessed by product (j,k). Here p_{jk} is the price of the product (j,k). The parameters t_r and t_m represent the degree of retailer and manufacturer substitutability respectively. We also can view them as the degree of intrabrand and interbrand competition respectively (with a lower t_r or t_m meaning greater competition). Finally, v is the value received by a consumer if he or she buys the product at his or her ideal point at a zero price.

Given these consumers and the four product prices, the customers maximize their utility by purchasing the offering with the highest non-negative net value. As in Model I, we solve for cases in which the products are priced so that all consumers have at least one product that gives them a non-negative surplus. This ensures that all consumers will buy a product and that all firms compete in equilibrium.[19] We focus on this case in order to highlight the effects of competition among both manufacturers and dealers.

To derive the demand for a product, say product $(0,0)$, we must again find the consumers between products who are just indifferent to buying the product and another product, say $(0,1)$. All consumers closer than these marginal consumers will prefer product $(0,0)$ over product $(0,1)$. In this model, the set of marginal consumers between any two products is a line somewhere between those two products. For example, the set of marginal consumers between product $(0,0)$ and product $(0,1)$ would be the consumers located at x and y that solve

$$v - t_r |x - 0| - t_m |y - 0| - p_{00}$$
$$= v - t_r |x - 0| - t_m |y - 1| - p_{01}.$$

Similar calculations yield the marginal consumers between product $(0,0)$ and product $(1,0)$. Because retailers set the same margin for both manufacturers' products, and retailers face the same manufacturer prices for the same product, these equations become

$$y = \frac{w_1 - w_0}{2 t_m} + \frac{1}{2}, x = \frac{m_1 - m_0}{2 t_r} + \frac{1}{2}.$$

This characterizes the demand along adjacent attributes.[20] The "full information" demand regions for retailer 0 are as follows. Here the first subscript represents the dealer's attribute location, and the second subscript represents the manufacturer's attribute location:

$$d_{00} = \left(\frac{m_1 - m_0}{2 t_r} + \frac{1}{2} \right) \times \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right),$$

$$d_{01} = \left(\frac{m_1 - m_0}{2 t_r} + \frac{1}{2} \right) \times \left(\frac{w_0 - w_1}{2 t_m} + \frac{1}{2} \right).$$

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[18]These locations are exogenous in our model. Because the focus of our model is on competitive participation rate decisions, we abstracted away from location choices, as in Lal and Matutes (1989). If location were also an endogenous decision of manufacturers and retailers, then whether these locations at the endpoints of the lines would not be chosen depends on the consumers' utility functions and the structure of the game.

[19]This assumption is equivalent to assuming that v is sufficiently large relative to t_r and t_m to guarantee that all firms will compete in equilibrium.

[20]It turns out that given these consumer preferences and under the assumptions that ensure that all people will buy the product, we do not need to check the marginal consumers between the product in the opposite corner, in this case product $(1,1)$.

Retailers

Because we are modeling conventional channels, we permit each retailer to carry products from both manufacturers. More precisely, each retailer will carry a manufacturer's product as long as it does not generate a loss. There are two retailers, one at x = 0 and one at x = 1. Denote these retailers as 0 and 1, respectively. As before, we assume the independent retailers face two part wholesale pricing terms, coop plans offered by manufacturers, and local advertising costs. As with Model I, we assume Nash behavior for retailer–retailer interactions, and they are followers in their interactions with manufacturers.

For tractability reasons, we assume that retailers choose one markup or margin for both products, but they might set different advertising levels for the two products carried. Because our focus is on advertising decisions, we chose to simplify the pricing decision at the retailer level. The common margin assumption is a simplification that makes the problem tractable by lowering the number of decision variables. It is not an unreasonable specification given our examination of industry practice. We contend that the margin decision often is made for a product category. In personal communications with pricing managers in the clothing and grocery industries, we find this heuristic to be employed commonly in price setting decisions.

Manufacturers

There are two manufacturers: one at y = 0 and one at y = 1. Denote these manufacturers as 0 and 1, respectively. They incur marginal production costs of c per unit. Consistent with the price-discrimination statutes, we assume that manufacturers must offer the same terms to all competing retailers selling their product. Therefore, they choose their wholesale price, w_i, a fixed fee, F_{fi}, and the percentage of retailer advertising costs, α_i; they will share (where I = 0 or 1) and offer these terms to both retailers. We assume Nash behavior for manufacturer–manufacturer interactions.

Advertising Technology

We use the same advertising technology as in Model I, but we simplify matters by choosing a specific functional form for advertising: $A(r) = kr^2$, where k is large enough relative to t_r and t_m so that levels of r < 1 are chosen. As in Model I, there are spillovers in local advertising. Observe, however, that we do not model spillovers among competing manufacturers. It is possible that spillovers among manufacturers might occur when one firm stimulates primary demand, but that is not our focus here.

Therefore, the demand for each of these demand regions must be adjusted to take into account the effect of advertising. As in Model I, demand for, say, retailer 0 becomes

$$d_{00} = \left(\frac{m_1 - m_0}{2\,t_r} + \frac{1}{2}\right) \times \left(\frac{w_1 - w_0}{2\,t_m} + \frac{1}{2}\right) \times \left[r_{00}(1 - \beta) + r_{10}\beta\right]$$

$$d_{01} = \left(\frac{m_1 - m_0}{2\,t_r} + \frac{1}{2}\right) \times \left(\frac{w_0 - w_1}{2\,t_m} + \frac{1}{2}\right) \times \left[r_{01}(1 - \beta) + r_{11}\beta\right].$$

SOLUTIONS TO MODEL II

Retailer 0, which sells products (0,0) and (0,1), faces the following maximization problem:

$$(26) \quad \max_{r_{00},r_{01},m_0} (m_0) \times \left(\frac{m_1 - m_0}{2\,t_r} + \frac{1}{2}\right) \times \left(\frac{w_1 - w_0}{2\,t_m} + \frac{1}{2}\right)$$

$$\times \left[r_{00}(1 - \beta) + r_{10}\beta\right] + (m_0) \times \left(\frac{m_1 - m_0}{2\,t_r} + \frac{1}{2}\right)$$

$$\times \left(\frac{w_0 - w_1}{2\,t_m} + \frac{1}{2}\right) \times \left[r_{01}(1 - \beta) + r_{11}\beta\right] - (1 - \alpha_0)kr_{00}^2$$

$$\times \left(\frac{m_1 - m_0}{2\,t_r} + \frac{1}{2}\right)\left(\frac{w_1 - w_0}{2\,t_m} + \frac{1}{2}\right) - (1 - \alpha_1)k\,r_{01}^2$$

$$\times \left(\frac{m_1 - m_0}{2\,t_r} + \frac{1}{2}\right)\left(\frac{w_0 - w_1}{2\,t_m} + \frac{1}{2}\right) - F_{f0} - F_{f1}$$

subject to $r_{0j} \geq 0$, $m_0 \geq 0$, and given α_0, α_1, r_{1j}, m_1.

Here w_0 and w_1 are the wholesale prices of manufacturers 0 and 1. The fixed fees of the manufactures are F_{f0} and F_{f1}. The margins for dealers 0 and 1 are m_0 and m_1, respectively. The parameter r_{ij} is the reach level attempted by retailer I's campaign for manufacturer j, β is the spillover parameter, α_0 and α_1 are the manufacturer's coop plan rates, and kr^2 is the advertising cost per person with an attempted reach of r.

In this equation, retailer 0's demand for manufacturer 0's product is $[(m_1 - m_0)/2t_r + 1/2] \times [(w_1 - w_0)/2t_m + 1/2]$. We multiply this term by retailer 0's margin, m_0, and adjusted reach for the manufacturer 0's product at this retail outlet, $r_{00}(1 - \beta) + r_{10}\beta$, to generate total revenues minus unit costs from manufacturer 0's product. The costs to the retailer are advertising per person $A(r_{00})$ times the number of people sent to $[(m_1 - m_0)/2t_r + 1/2] \times [(w_1 - w_0)/2t_m + 1/2]$, modified by the participation rate, $(1 - \alpha_0)$. Similar definitions hold for manufacturer 1's products.

Because each manufacturer must offer the same contract to both retailers, each retailer must face the same wholesale prices. Therefore, given w_0 and w_1, we solve for a symmetric equilibrium across dealers. In the symmetric dealer solution, first we take the first-order necessary conditions; then we set $r_{00} = r_{10} = r_0$, $r_{01} = r_{11} = r_1$, and $m_0 = m_1$. This enables us to solve dealer 0's problem only for r_0, r_1, and m. We find that the margin and advertising levels of the two retailers are

$$(27) \qquad m^* = \frac{2\,t_r}{1 + \beta}, \; r_0^* = \frac{t_r(1 - \beta)}{k(1 + \beta)(1 - \alpha_0)},$$

$$r_1^* = \frac{t_r(1 - \beta)}{k(1 + \beta)(1 - \alpha_1)}.$$

Manufacturers' Problems

Given these retail solutions, the manufacturers set their wholesale prices, fixed fees, and coop participation levels. Consider this problem for manufacturer 0:

$$(28) \quad \max_{w_0, \alpha_0, F_{f0}} 2(w_0 - c) \times \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right)$$

$$\times \left(\frac{m_1^* - m_0^*}{2 t_r} + \frac{1}{2} \right) \times (r_0^*) - 2 \alpha_0 k r_0^{*2}$$

$$\times \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right) \times \left(\frac{m_1^* - m_0^*}{2 t_r} + \frac{1}{2} \right) + 2 F_{f0}$$

subject to

$$(m_0^*) \times \left(\frac{m_1^* - m_0^*}{2 t_r} + \frac{1}{2} \right) \times \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right)$$

$$\times (r_0^*) - (1 - \alpha_0) k (r_0^*)^2$$

$$\times \left(\frac{m_1^* - m_0^*}{2 t_r} + \frac{1}{2} \right) \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right) \geq F_{f0},$$

where r_{i*} and m_{i*} are the solutions of the retailers' maximization problems in Equation 27.

In this equation we sum retailer 0 and retailer 1's demand for manufacturer 0's product, which becomes $2 [(m_1^* - m_0^*)/2t_r + 1/2] [(w_1 - w_0)/2t_m + 1/2] r_0^*$. We multiply this term by the manufacturer 0's margin, $w_0 - c$, and add in the fixed fees, which yield manufacturer revenues. There is also the coop advertising cost of $2 \alpha_0 k (r_0^*)^2 [(m_1^* - m_0^*)/2t_r + 1/2] [(w_1 - w_0)/2t_m + 1/2]$.

The constraint is set so that retailers earn non-negative profits on the manufacturer's product. The limit on the F_{f0} is the total retail profits due to sales of manufacturer 0's product at a retail outlet. On substituting the retail solutions from Equation 27, this becomes

$$(29) \quad F_{f0} \leq \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right) \left(\frac{t_r^2 (1 - \beta)}{2k(1 + \beta)(1 - \alpha_0)} \right).$$

Substituting the retail solutions from Equation 27 and the constraint on the fixed fee from Equation 29 into manufacturer 0's problem in Equation 28, we get

$$(30) \quad \max_{w_0, \alpha_0} (w_0 - c) \times \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right)$$

$$\times \left[\frac{t_r (1 - \beta)}{k(1 + \beta)(1 - \alpha_0)} \right] - \alpha_0 k \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right)$$

$$\times \left[\frac{t_r (1 - \beta)}{k(1 + \beta)(1 - \alpha_0)} \right]^2$$

$$+ \left(\frac{w_1 - w_0}{2 t_m} + \frac{1}{2} \right) \left[\frac{t_r^2 (1 - \beta)}{k(1 + \beta)(1 - \alpha_0)} \right].$$

Note that the other manufacturer solves a symmetric problem; therefore, we can solve for the symmetric manufacturers' equilibrium by taking the first-order necessary conditions and setting $w_0^* = w_1^*$ and $\alpha_0^* = \alpha_1^*$, which yield the solutions

$$(31) \quad w_0^* = w_1^* = c + 2 t_m - \frac{2 t_r}{(1 + \beta)},$$

$$\alpha_0^* = \alpha_1^* = 1 - \frac{t_r (1 - \beta)}{t_m (1 + \beta)}.$$

INSIGHTS FROM MODEL II

Our previous results for advertising spillovers and the degree of intrabrand competition (substitutability) between retailers continue to hold after accounting for the presence of interbrand competition. For example, the participation rate is related positively to the degree of spillovers between retailers. From Equation 31 we see that as β increases, the participation rate also will increase ($\partial \alpha^*/\partial \beta > 0$). Therefore, Proposition 1 is robust to allowing manufacturer competition. From Equation 31 we also see that as the degree of substitutability between retailers increases (i.e., t_r decreases) the participation rate increases ($\partial \alpha^*/\partial t_r < 0$). Recall that t in the previous model represented substitutability between retailers. Therefore, our present finding on t_r shows that Proposition 2 is robust to introducing interbrand competition among manufacturers.

One result that does not carry over from Model I is the effect of the v parameter. Unlike Model I, the consumer's willingness to pay, v, is not related to the participation rate in the current model. This is not surprising given that competition among manufacturers is driving manufacturer decisions more so than consumer willingness to pay. By introducing interbrand competition, we change the customer's value-based price level to a market-based price level. The degree of differentiation between manufacturers (t_m) can be interpreted usefully as the upper bound on prices imposed by the market. Note that as manufacturer differentiation increases, both w^* and α^* will increase as well (i.e., $\partial w^*/\partial t_m > 0$ and $\partial \alpha^*/\partial t_m > 0$). Then the spirit of Proposition 3 holds in this model, in that as t_m increases, manufacturers—which stand to gain more from each sale from the higher w^*—offer higher participation rates.

Effects of Interbrand Competition

Introducing competition among manufacturers provides us with new insights into the role of interbrand competition on coop advertising plan structure. From Equation 31 we see that as the degree of substitutability among manufacturers decreases (i.e., t_m increases) the participation rate increases ($\partial \alpha^*/\partial t_m > 0$). Therefore, when manufacturers are able to differentiate themselves and build a strong brand identity, the participation rates should be higher. The intuition is that firms with strongly differentiated brands earn larger margins; hence it is more worthwhile for them to subsidize local advertisements.

One empirical indicant of t_m is brand loyalty or brand switching (Blattberg and Neslin 1990, p. 102). When manufacturers sell to more brand-loyal customers, their products are less substitutable, and therefore our model would suggest that they use higher participation rates. A related empirical indicant is brand equity (Aaker 1991; Simon and Sullivan 1993). Clearly brands that have been able to differentiate themselves should possess a larger amount of brand equity. Again, our model suggests that manufacturers of prod-

Figure 1
INFLUENCES ON COOP PARTICIPATION RATE DECISION
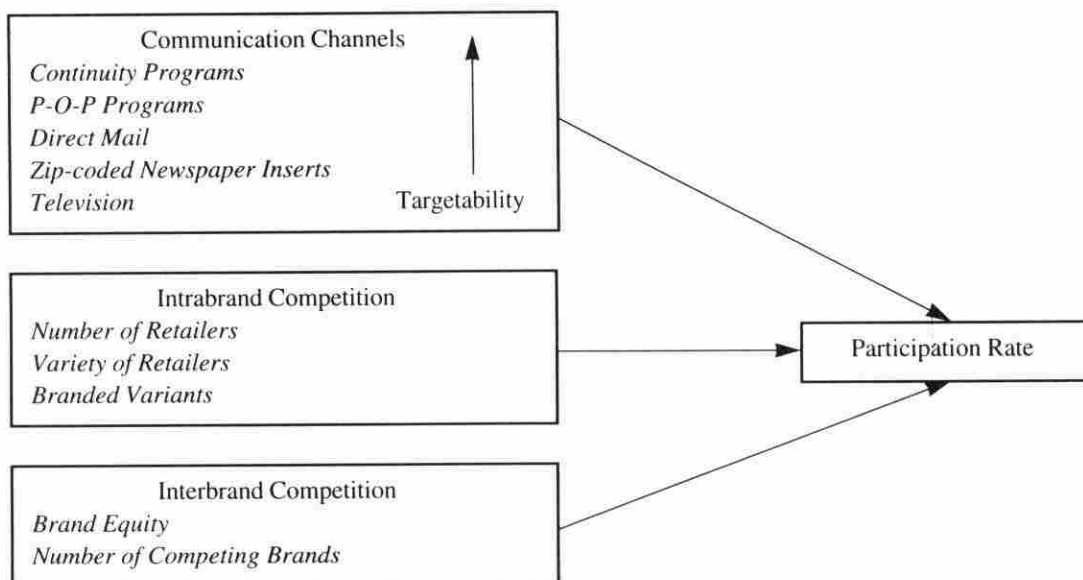
ucts with higher levels of brand equity would have higher participation rates.

Comparing the findings on brand loyalty (t_m) with our previous results on store loyalty in Proposition 2 (t in Model I and t_r in Model II) offers an interesting contrast. Recall that the participation rate is related to both the degree of brand loyalty and the degree of store loyalty, but in opposite directions. Quite aside from coop plans, these results extend the previous marketing literature on channel arrangements, which handles product differentiation with a single "substitutability" parameter (Coughlan 1985; McGuire and Staelin 1983; Moorthy 1988). Here we decompose this parameter into a measure of substitutability at each level of the channel and show that this can yield additional insights into choices on channel arrangements. This builds on emerging marketing literature that models competition at both levels of the channel in order to study exclusivity arrangements (Lee and Staelin 1994) and price promotions (Lal and Villas-Boas, forthcoming).

From a managerial perspective, this result implies that it is not enough to suggest that coop advertising is "a widespread competitive necessity" (Somers, Gupta, and Herriott 1990, p. 36), without taking both interbrand and intrabrand competition into account. When we talk about retailers, coop is a competitive necessity. Participation rates should be higher in situations in which the retailers are more substitutable. When we talk about manufacturers, however, coop is not a competitive necessity. Participation rates should be higher for manufacturers that are not as substitutable.

CONCLUSION

Managerial Framework for Setting Participation Rates

It is useful to fashion a managerial decision framework from the individual results of our analysis, because it puts the specific results into better perspective. We reiterate that these normative guidelines are meaningful only in a conventional channel with independent retailers and direct competition between the retailers selling the product in a trading area.[21] Note that the unit of analysis is the local market or trading area.

In Figure 1, we summarize the coop plan participation rate decision. To begin, the decision maker must assess the various communications channels under consideration for local efforts. Figure 1 shows commonly used communications channels in the order of their capability to target specific consumers. At the top of the list are continuity programs that rely on individual purchase histories in order to target specific customers. At the bottom is local television. Point-of-purchase materials and zip code–based newspaper inserts are between these extremes.

Rule 1: More generous participation rates should be offered for efforts that rely on the less targetable communications technologies or channels. When multiple channels are used simultaneously, the rates offered should vary across them as well.

Next, the manager must assess the extent to which any single retailer faces competition from other retailers of the product in the trading area. Structural features of the local trading area such as the variety of retailers are the obvious considerations. However, less obvious features such as manufacturers' policies about branded variants and "design for distribution"[22] also are important because these product

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[21]Also note that the models described here have a limited role for local price advertising.

[22]Design for distribution is the practice whereby different product lines in the same category are sold through different channels. For example, IBM sold its PS/1 line through computer super-stores and its Valuepoint line through direct mail.

policies buffer retailers from other retailers in the same trading area.

> Rule 2: More generous participation rates should be offered to retailers in trading areas where they face more intense competition from similar retailers carrying the same products.[23]

The final set of factors shown in Figure 1 assess the degree of competition between the focal brand and other firms' brands *in the trading area.* This must be diagnosed by examining the strength and uniqueness of the firm's product or brand (consequently enjoying higher margins), as well as the usual structural indicators of the intensity of competition (see Porter 1985).

> Rule 3: More generous participation rates should be offered to retailers in trading areas where the focal product or brand has a strong/unique image.

Future Research Directions

We see three natural directions for further work. First, the current model could be enriched. The role of local advertising could be extended to allow advertisements to change customers preferences for retailers, making the advertisements more competitive than those studied in this model.[24] We suspect this should lower the participation rate in the current model as retailers get "more bang for their buck": They can swing customers away from one another. However, the spirit of the results should not change. Adding uncertainty and asymmetric information also would enrich the model. For example, Desai (1992) studies asymmetric information, pricing, and advertising in a franchise setting. Further work also could be done to explore local price advertising more explicitly. And further work could attempt to relax our assumption of equal retail margins for both products in Model II.

Another profitable extension of this work might involve examining manufacturers' choices about national advertising in relation to local advertising (see Chintagunta and Prasad 1995). This is a topic of long-standing interest to marketers (e.g., Young and Greyser 1983). One way to accomplish this is to model the interbrand product differentiation parameter, t_m, as a function of manufacturers' advertising levels rather than as an exogenous parameter. This seems reasonable, because advertising intensity (the ratio of national advertising to sales) is recognized as a standard measure in industrial organizational research to describe the extant degree of product differentiation in an industry (for a review, see Schmalensee 1989). From our perspective, we know that more highly differentiated brands should lead to higher participation rates. Therefore, we speculate that coop plan participation rates should be higher in industries with higher advertising intensity. This implies that, rather than competing for the same budget dollar, higher national advertising levels could evoke greater subsidization of local advertising through higher coop plan participation rates— making these two forms of advertising complementary.

Finally, it is vital to generate empirical evidence on the variety of testable propositions the model generates. Absent empirical work to sort through the predictions, it is easy for the theory to outpace the evidence. Some headway in this regard has been made (e.g., Dutta et al. 1995), but more is needed.

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[23]Note that offering different coop plans in different trading areas is not a violation of price-discrimination laws. Comparable plans must be offered only to competing sets of retailers.

[24]We thank Sridhar K. Moorthy for bringing this to our attention.

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