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Competitive Pricing Behavior
in Distribution Systems

Steven M. Shugan
Abel P. Jeuland

Competition is a major force shaping the institution of channels of distribution. Researchers and practitioners in the distribution area usually distinguish between horizontal-channel competition and channel-system competition. (See Kotler). Horizontal competition refers to competition at the same channel level. For example, wholesalers are in horizontal competition. System competition refers to competition between different channels. System competition can occur between different types of channels. Stern calls this form of competition “inter-type competition.”

These concepts of competition are useful for better understanding within channel relationships, such as channel cooperation and channel coordination. Channel members (e.g., manufacturers, wholesalers, retailers, dealers, and manufacturer representatives) often seek cooperation. Jeuland and Shugan show that cooperation can increase channel profitability because channel cooperation leads to a coordination of channel decision-making. Jeuland and Shugan also discuss different mechanisms used by channel members to achieve coordination. Such mechanisms are important because channels do not easily achieve coordination. For example, a manufacturer may often disagree with its own dealers. Behavioral scientists, as well as researchers with a sociological orientation, call these disagreements “within-channel competition” or “channel conflict.” Vertical-channel conflict can destroy coordination and lead a channel away from maximum profits.

Behavioral science approaches and sociological approaches continue to contribute to the channel literature. These traditional approaches have greatly influenced research in the area of channels of distribution and, particularly, research on channel competition. A few papers have deviated from this tradition and employed a multivariate statistical approach. This approach seeks to uncover significant factors affecting distribution decisions. Until recently, the quantitative modeling research approach of theory building has been very notably absent. It is not the purpose of this chapter to explore the reasons underlying this absence. Instead, as quantitative marketing modelers, we will attempt to partially remedy this situation. We believe that there is a great benefit derived from employing different research approaches in the important area of channel research. Within this vast area of research there are many problems. And different approaches may be applicable to different problems.

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In the past few years, several model-oriented papers have helped develop the economics of channels of distribution. These papers include Doraiswamy, McGuire, and Staelin [1979], McGuire and Staelin [1983a,b], Zusman and Etgar [1981], Jeuland and Shugan [1983a,b, 1988], Coughlan [1985], and Pasternak [1985]. This research in marketing is complemented by work in economics that continues to investigate the area of channels and, particularly, the area of vertical integration. The economic theory of agency is proving to be a very potent approach to analyzing multimeber institutions such as channels of distribution.

The objective of this chapter is to draw some of the general principles and concepts that emerge from the marketing articles just cited and that deal with the simple economics paradigm of profit maximization. More specifically, we operationalize the concept of competition as a reaction function and study two basic sets of influences on the nature of the reaction function of the channel: first, within-channel interactions; and, second, between-channels interactions. The first case of within-channel interactions deals with the vertical dimension of the channel. For this case, we address the issue of durability of channel structure. Then, the equilibrium between competing channels with the same or different structures is derived. The equilibrium implications result from the joint effect of within-channel interactions and horizontal competition. We confirm the link uncovered by McGuire and Staelin between equilibrium profitability and both the vertical dimension of the channel (channel structure) and the horizontal dimension of product differentiation, even though some of our assumptions differ from theirs. Coughlan generalizes McGuire and Staelin’s work to include a more general demand function and multiple middlemen. She argues that middlemen can be used to shield the manufacturer from competition by decreasing the reactivity of the channel. She also examines some of the institutional arrangements we discuss in this chapter. Finally, we extend the model by incorporating fixed costs and show their influence on the specific problem of intrabrand competition.

Our chapter is thus organized as follows. The next section develops the different reaction functions corresponding to different channel arrangements: coordinated, leader-follower, or conventional channels. The subsequent major section addresses the stability of these different channel arrangements, a question not considered by McGuire and Staelin or by Coughlan. Coordination is found to be a stable arrangement, a finding that may explain the emergence of vertical marketing systems as the dominant form of channels of distribution. The following section discusses the equilibrium implications—what the market price is—of different channel arrangements and different degrees of product substitutability. The relationships between channel reactions and equilibrium prices and profits are discussed. The section after that introduces fixed costs in the analysis and shows their critical importance in one example: intrabrand competition. The final section gives our conclusion and tries to foresee future research on channel competition in the modeling area.

**Operationalizing the Notion of Channel Competition:**

**Channel Reaction as a Function of Channel Structure**

The notion of competition should capture a firm’s reaction to its environment and, in particular, to the other firms in the same market. This partial definition of competition appears to be generally applicable and, thus, applicable in the channel area. Consequently, we begin by operationalizing the notion of a reaction function in the context of channels of distribution. For example, we expect that a vertically integrated channel does not react in the same way as a conventional channel (i.e., a channel comprised of independent buyers and resellers). Because many types of decisions (e.g., advertising, shelf space, and margins) are made by resellers, many different types of reaction functions could be defined. For example, we could define advertising reaction functions or margin (price) reaction functions. However, at this early stage of research, it is not productive to investigate too many phenomena at once. For this reason, this chapter will deal with only one type of reseller decision—the margin (or price) decision. We do not wish to imply that margin decisions are more important than advertising decisions, shelf-space decisions, or other reseller-support decisions. We merely seek a research strategy aimed at developing a simple yet general framework. We hope that future research will provide additional complexities and realism. Ultimately, our framework should predict how the structure of the channel affects retail prices. We start by studying reaction functions because particular channel arrangements, (e.g., vertically integrated, conventional, leader-follower) will imply specific within-channel reaction functions. For example, an independent wholesaler may react differently to a manufacturer’s price increase than a franchise will react to its manufacturing franchisor. We expect that the price to the end buyer will be a function of the intermediate within-channel margin-reaction functions.

To formalize resellers’ pricing decision making, we first specify the demand conditions. We follow McGuire and Staelin [1983b] in postulating a duopolist model of demand for two differentiated products:

\[
q_i = a - b p_i + \gamma p_j \quad i,j = 1,2 \quad j \neq i
\]

where \(q_i\) is the demand for product \(i\) sold through reseller \(i\) at price \(p_i\) given that the price of the other product is \(p_j\). The parameters of the demand equa-
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The condition \( b > y > 0 \) is necessary for the demand function to be well behaved. For example, if both products are available at the same price \( p \), \( q_i = q_j = q = a - (b - y)p \) and is decreasing with price if and only if \( b > y \). \( y \) measures the effect of the other product’s price on the own product demand and thus operationalizes the degree of substitutability between the two products. The closer \( y \) is to \( b \), the greater is the substitutability between the products. This measure of substitutability is used by Coughlan [1985]. She shows that substitutability can be defined with a more general demand function.

We select a two-product market rather than a more general situation of multiple products and multiple resellers in order to keep the model simple. We believe that a two-product market is sufficiently rich to be a useful first step toward modeling more complex and, possibly, more realistic situations. However, realism is not totally compromised because, in many local markets, competition often means competition between two different outlets and two products or product lines. Figure 10-1 illustrates the economic scenario under investigation.

Also, following McGuire and Staelin, we assume that the manufacturer and reseller profit functions are respectively given by

\[
\pi_i = w_i q_i \quad i = 1, 2 \tag{2}
\]

and

\[
\pi_i = m_i q_i = (p_i - w_i) q_i \quad i = 1, 2 \tag{3}
\]

where \( w_i \) is the wholesale price for product \( i \) (the price that manufacturer \( i \) charges reseller \( i \)) and \( m_i \) is reseller \( i \)'s margin. \( p_i \) is the price paid by the buyer to the reseller. Because total channel profits are \( \Pi_i + \pi_i = p_i q_i \), if one also assumes zero marginal costs for the reseller, the relation between price, \( p_i \), and manufacturer and reseller decision variables, \( w_i \) and \( m_i \), is given by

\[
p_i = w_i + m_i \tag{4}
\]

Equation (4) shows that the price is the immediate consequence of the separate margin decisions, \( w_i \) and \( m_i \), of the manufacturer and the reseller. We assume that the channel members (manufacturers and resellers) seek to maximize their own profit functions. We also assume that no cooperation exists at any horizontal level. It is indeed illegal for two manufacturers to cooperate and also for two resellers (wholesalers or retailers) to cooperate. In addition, we limit our investigation to the situation where the manufacturer and reseller of one channel cannot observe the relationship between manufacturer and reseller of the competing channel. As a result, noncooperative behavior of one channel implies that only the price of the other channel is taken as given. For example, manufacturer 1 maximizes his profits \( \Pi_1 \), taking \( p_2 \) as given. We thus differ from McGuire and Staelin [1983b], who allow manufacturer 1 to maximize his profits \( \Pi_1 \), given \( w_2 \).

**Reaction Function of the Conventional Channel (C)**

We first assume that the relationship in the channel is symmetric and that all channel members display equal degrees of sophistication. We define as conventional the symmetric arrangement where the manufacturer and the reseller independently maximize their own profit, assuming no degree of control over the other partner’s decision. In other words, the conventional manufacturer-reseller channel is the situation where manufacturer and reseller independently choose their own margin, taking the other’s margin as given:

\[
\begin{align*}
\text{Manufacturer:} & \quad \max \Pi_i \quad i, j = 1, 2 \quad j \neq i \tag{5} \\
& \quad w_i, m_i, p_j \\
\text{Reseller:} & \quad \max \Pi_i \quad i, j = 1, 2 \quad j \neq i \tag{6} \\
& \quad w_i, p_j
\end{align*}
\]

Figure 10-1. Distribution of Two Differentiated Products
It is easy to derive from optimization (5), i.e., \( \partial \Pi_i / \partial w_i \big|_{w_j, p_j} = 0 \), the following condition
\[
W_i = \frac{a - bm_i + \gamma p_j}{b} \quad i, j = 1, 2 \quad j \neq i
\]  
(7)

and from optimization (6), i.e., \( \partial \Pi_i / \partial m_i \big|_{w_j, p_j} = 0 \), the condition
\[
m_i = \frac{a - bm_i + \gamma p_j}{2b} \quad i, j = 1, 2 \quad j \neq i
\]  
(8)

Equations (7) and (8) are within-channel reaction functions. Equation (7) represents the manufacturer’s wholesale price, \( w_i \), as affected by reseller \( i \)’s margin \( m_i \). Equation (8) represents the retailer’s margin as a function of the manufacturer’s wholesale price. In addition, both \( w_i \) and \( m_i \) are functions of the price, \( p_j \), charged by the competing channel. In other words, decision rules (7) and (8) reflect both within-channel division of the total profit margin between manufacturer and reseller, and horizontal competition between the two channels. If the price of the other channel, \( p_j \), is increased, the two channel members find that they should increase their own margins \( w_i \) and \( m_i \). However, if reseller \( i \) increases \( m_i \), the manufacturer finds that he must decrease his margin \( \Delta w \) (and reciprocally). This means that the pressure to compete with the other channel makes each partner partially compensate for the actions of the other channel member. It would be useful to investigate the class of demand functions for which this result holds.

We derive the reaction of the conventional channel that results from the interplay of the just-mentioned manufacturer and reseller decision rules, i.e., the functional form that links \( p_i \) to \( p_j \). Using equation (4), we obtain
\[
p_i = \frac{2}{3b}(a + \gamma p_j)
\]  
(9)

As explained earlier, the size of parameter \( \gamma \) in relation to \( b \) is a measure of substitutability between the two products. Hence, we expect that channel price reaction should be increasing in \( \gamma \) and decreasing in \( b \). Coughlan [1985] also shows that channel reactivity and channel-member reactivity depend on substitutability.

**Reaction of the Leader-Follower Channel (LF)**

This situation corresponds to the departure from the symmetry of the conventional arrangement and assumes that the manufacturer is more sophisticated than the reseller. The reseller is still assumed to maximize his profit independently given \( p_j \) and \( w_j \). However, the manufacturer realizes the existence of the reaction function of his reseller—that is, \( m_i(w_i, p_j) \)—given by equation (8). He factors this internal reaction function into his own decision rule. We, therefore, denote the manufacturer as the leader.

\[
\begin{align*}
\text{Leader} \quad &w_i = \max \Pi_i, \quad i, j = 1, 2 \quad j \neq i \\
\text{Reseller} \quad &m_i = \max \Pi_i, \quad i, j = 1, 2 \quad j \neq i \\
\text{Follower} \quad &w_j = \max \Pi_j, \quad i, j = 1, 2 \quad j \neq i
\end{align*}
\]

The optimization problem of the manufacturer (leader) follows.
\[
\max_{w_i} \Pi_i = w_i a - b(w_i + m_i) + \gamma p_j
\]  
(10)

Equation (10) shows that, given the same price of the competing channel, \( p_j \), the more sophisticated manufacturer wants a larger margin than the manufacturer who does not take his reseller’s decision into account (because \( a - bm_i + \gamma p_j < a + \gamma p_j \)). As a consequence, the reseller receives a smaller margin. Combining equations (8) and (10) gives the reaction function of the leader-follower channel arrangement:
\[
p_i = \frac{a + \gamma p_j}{2b}
\]  
(11)

Contrasting equations (9) and (11) illustrates that the LF channel (leader-follower) responds with a higher price than the C channel \((3/4) > (2/3)\). The higher price is caused by the manufacturer demanding a larger margin and the reseller not completely compensating for this increase. The higher price of the C channel is quite significant. The higher price implies that the structure of the channel (C versus LF) does have an influence on the way the channel competes.
CHANNEL STRUCTURE S = V, C, or LF

More competitive
Lower price

C - Channel

LF - Channel

Less competitive
Higher price

V - Channel

k_v = 5

k_c = 67

k_lf = 75

Figure 10-2. Channel Price Reaction, \( p_s \), to Price of Other Channel, \( p_j \), as a Function of Channel Structure S (S = V, C, or LF)

\[ p_s = k_s \left( a + \gamma p_j \right)/b \]

Reaction of the Vertical System (V)

Another important channel arrangement is the situation where manufacturer and reseller coordinate their decisions. This case corresponds to the maximization of total channel profits, i.e., \( (w_l + m_i)q_i = p_i(a - \beta p + \gamma p_j) \) given the competitive channel price. Given the price charged by the competing channel, \( p_j \), the vertical channel reacts according to the following function.

\[ p_v = \frac{a + \gamma p_j}{2b} \] (12)

As a consequence, the V-type channel (vertical system or coordinated system) responds with a lower price than the C channel and the LF channel. Figure 10-2 summarizes our findings. We find the V-type channel to be the most competitive. The existence of within-channel reaction functions, given respectively by (7) and (8) for the C channel and (8) for the LF channel, make these channels less responsive to the outside environment. In other words, these channel arrangements are less competitive. In order to survive, the LF and C channels must have some compensating advantage (for example, lower marginal costs).

Having established the competitiveness of different channel structures, we might ask which structure is more enduring. For example, is the more competitive V-type structure more or less stable than the less competitive LF and C structures?

Are Certain Channel Structures More Enduring?

Given our premise of channel members seeking profit maximization, the last question can be rephrased as follows: "Can channel profits be increased by switching from one channel arrangement to another?"

This question is straightforward to answer. Given the price of the competing channel \( p_j \), the profit-maximizing reaction is, by definition, the V-type reaction, because the V-type channel maximizes total channel profits. In other words, V-arrangement profits can always be divided between manufacturer and reseller in such a way that both are more profitable than they would be under the LF-profit division or the C-profit division. In fact, at any given price \( p_j \) of the competing channel, one can easily quantify the gain by switching from the C or LF structures to the V arrangement. Given the best response of equation (12) to the price \( p_j \) charged by the competing channel, maximum achievable profits are

\[ \pi_V = \Pi_i + \pi_i = p_i q_i = \frac{(a + \gamma p_j)^2}{4b} \] (13)

In contrast, the C-channel—with a response function given by equation (9)—would only achieve

\[ \pi_C = \frac{2(a + \gamma p_j)^2}{9b} \] (14)

i.e., 83 percent of maximum achievable profits. The LF channel—with a response function given by equation (11)—would achieve

\[ \pi_{LF} = \frac{3(a + \gamma p_j)^2}{16b} \] (15)

i.e., 75 percent of maximum achievable profits. These results are quite intuitive. As the price is increased from the V price to the C price or the LF price (see figure 10-2), the higher channel margin (profit per unit sold) does not compensate for the decline in volume sold. Total channel profits, therefore, decline and channel members are worse off than they would be with an appropriate division of coordinated channel profits.

The implication of this finding is that vertical systems (or coordinated systems) may be more enduring than other channel arrangements. Channel-of-distribution specialists have indeed acknowledged the predominance of vertical marketing systems or systems acting as vertically integrated systems. Obviously, if different channel arrangements had widely different cost structures, cost advantages might favor an otherwise less profitable (lower-revenue) channel arrangement. It is beyond the scope of this chapter to address the complex issue of cost/structure interactions. Our model would need to incorporate many variables in order to satisfactorily address these cost interactions. For example, costs are generally related to the amount of information possessed by each channel member. The present research effort has at least highlighted the importance of these issues and should encourage future research.
Equilibrium of Duopolist Distribution: What Are the Market Prices?

The preceding two sections have dealt with the profit-maximizing behavior of channel members and the role of channel structure. The vertical system offers the best response in terms of generating revenues. If the costs of channel coordination or integration are not significantly larger than the costs of other channel arrangements, then vertical (or coordinated) systems are more profitable and thus more enduring. This result is consistent with the actual observation of vertical (or coordinated) systems being the dominant form of distribution, at least in the United States.

The profit maximizing behavior of the economic agents (as described in the previous sections) cause specific market prices. The equilibrium market prices result from the interplay of the economic agents' decisions rules (as specified by equations (9), (11), or (12) depending upon the channel arrangement). The market equilibrium is, by definition, the consequence of the economic agents' decisions and thus is not foreseen by them. Rules (9) and (11) lead to unstable or nonending equilibria because any channel moving from decision (9) or (11) to (12) would increase profits. In duopolist distribution, the equilibrium resulting from a V-channel competing against a V-channel is stable, while the others are not. However, these other equilibria (conditional equilibria), although unstable, may be of interest because their equilibrium point is very profitable. Table 10-1 summarizes the different possible equilibria (some being conditional equilibria); V/V is the duopolist structure where two vertical systems compete, C/C where both channels are conventional, C/LF where one channel is conventional and the other a leader-follower arrangement, and so on. The mathematical derivations are not difficult and have therefore been omitted. The V/V structure, for example, has an equilibrium price that is obtained by simultaneously solving $p_1 = \frac{a + \gamma p_j}{2b}$, for $i,j = 1,2$, $i \neq j$. The resulting equilibrium prices are $p_1^* = p_2^* = a/(2b - \gamma)$.

The resulting channel profits are $\pi_1^* = \frac{a^2b}{(2b - \gamma)^2}$, because a vertical system does not specify the division of total channel profits, $\pi_1^*$ and $\pi_2^*$ are indeterminate. The other arrangements, C and LF, implicitly divide channel profits between the manufacturer and the reseller. The resulting profits are reported in Table 10-1.

Table 10-1 also implies a rank ordering for the equilibrium price across different channel arrangements. Table 10-2 presents that rank ordering. The reaction functions, for each channel form, can be written as $p_1 = k_i(a + \gamma p_j)/b$. The $k_i$ coefficients for V, C, and LF channels are respectively $k_V = .5$, $k_C = .67$, and $k_{LF} = .75$ for channels 1 and 2 ($i = 1,2$). For the scenario of two colluding channels (the benchmark that defines the maximum profits achievable in the duopolist market), the implied reaction functions are $p_i = (a + 2\gamma p_j)/2b$ (see footnotes b and c to Table 10-1), which means that...
the $k_{MS}$ for collusion are not a constant: \( k_{MS} = \frac{(a + 2\gamma p_1)}{(2a + 2\gamma p_1)} \) depends both on the particular price currently charged by the other channel as well as the parameters of the model, i.e., \( a \) and \( b \). If \( \gamma \) is zero (the case of no product substitutability), \( k_{MS} = k_{LM} = \frac{1}{2} \), and we achieve the same result as for vertical systems. However, as demonstrated by table 10-1, if product differentiation is weak (\( \gamma \) approaches \( b \)), prices charged by the colluding channels are very high because \( a/2(b - \gamma) \) approaches infinity. Furthermore, \( k_{SM} = k_{SM} = 1 \), which is larger than \( k_{LP} \). In sum, rows 2 and 3 of table 10-2 give the reaction coefficients \( k_{i} \) for channels 1 and 2. Row 3 reports the average of these two channel coefficients. Row 4 reports the average of the equilibrium prices of the two competing channels. Finally, the last two rows report total profits \( (\Pi_1 + \pi_1 + \Pi_2 + \pi_2) \) for the cases of strong differentiation (\( \gamma \to 0 \)) and no product differentiation (\( \gamma \to b \)). The multiplicative constant \( a^2/b \) is not included.

The competitive duopoly scenario is the most profitable equilibrium when there is strong differentiation. This may be one additional argument why vertical marketing systems are so prevalent in the United States. Indeed, in many markets, product differentiation seems to be more the norm than no differentiation.

On the other hand, in situations of commodity marketing, higher prices increase industry profitability. This is why the constrained LF/LF scenario is, at equilibrium, more profitable. However, this arrangement is not stable, as explained earlier. At the equilibrium, the manufacturer receives profits of 2 and the reseller profits of 1 (channel profits are 3 and industry profits are 6). The price is \( 3a/(4b - \gamma) \to 3a/b \) as \( \gamma \to b \). Profits are \( \Pi_1 \to 3a^2/b \) and \( \pi_1 \to a^2/b \). If at price \( p_2 = 3a/b \), channel 1 was to unilaterally reorganize and act as a vertical system, thus charging \( p_1 - a + \gamma p_2/2b \to a/2b + (1/2)p_2 = 2a/b < 3a/b \), its profits would increase from \( 3a^2/b \) to \( (a + \gamma p_2)^2/4b \to 4a^2/b \). However, this increased profitability is achieved at the expense of the other channel that would see its profits decrease from \( 3a^2/b \) to \( \pi_1 = 3a/b \left( a - b \right) \). The situation is thus analogous to the famous prisoner’s dilemma: what one competitor gains is more than offset by the losses of the other. As the economic agents comprehend the situation, they may not choose to engage in self-satisfying behavior that will eventually make them worse off. It is for that reason that the non-stable LF/LF equilibrium may be lasting. Table 10-3 shows how total channel profits are divided between the manufacturer and reseller in different equilibria. The instability of the LF/LF equilibrium is further demonstrated by the fact that the C/LF equilibrium leads to higher profits for the reseller of the C channel (\( x_1 = 1.36 \)) than if this reseller were a member of a leader-follower channel (\( x_1 = 1 \)), while the other channel remains a leader-follower channel. This observation is also true for a strongly differentiated product (\( x_1 = .11 \) versus \( x_1 = .06 \).
In summary, we have established that the equilibrium of two vertical systems distributing strongly differentiated products is both stable and most profitable. For the case of commodity-type products, stability is still achieved with vertical systems. However, higher equilibrium profits are not achieved because competition in the distribution of a commodity is characterized by a prisoner's dilemma situation. The self-satisfying profit-maximization behavior of one channel is achieved at the expense of the other channel. After several price cuts, the channel prices converge to an equilibrium where both channels are worse off. It is most likely that competing distributors of a commodity would realize the destructive nature of these price cuts. However, this interpretation is beyond the static model of competition used in this chapter and the model employed by McGuire and Staelin. It requires a model of cooperation.

We conclude this section by noting that, in the gasoline market, strongly differentiated brands (e.g., Amoco and Shell) are distributed through channels that are more vertically coordinated than the independent distributor system handling nondifferentiated lower price brands.

Role of Fixed Costs in Intrabrand Competition

Until now, we have ignored fixed costs. Yet, fixed costs may have a significant role in shaping both horizontal competitive activity and competitive activity within the channel. (Remember that we defined within-channel competition as channel members competing for the largest share possible of channel profits.) It is beyond the scope of the present chapter to completely investigate the role of fixed costs. For this reason, we selectively analyze one specific question, namely whether reseller fixed costs play a role in manufacturers differentiating the products that competing resellers carry. In the language of channels of distribution, this question might be rephrased as "What is the role of fixed costs in determining the level of intrabrand competition?"

Consider the scenarios in figure 10-3. Scenario 1 corresponds to the manufacturer supplying the same product to both resellers and thus charging them the same wholesale price, $W$. This wholesale price is the sum of the manufacturer's variable cost, $C$, and his margin, $G$. (See the arrows in figure 10-4.) The other scenario corresponds to the manufacturer trying to lower intrabrand competition by introducing product differentiation. Hence, the manufacturer slightly modifies the products (without significant effects on production costs). For example, the manufacturer might introduce different brand names, different packages, and other minor differences in features. We contrast the two scenarios by labeling scenario 1 the national brand strategy and scenario 2 the distributor brand strategy.

The manufacturer makes independent decisions when pricing the two

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Table 10-3
Division of Equilibrium Industry Profits between Manufacturers and Resellers as a Function of Product Substitutability and Optimizing Behavior Scenario

<table>
<thead>
<tr>
<th>Substitutability</th>
<th>V/C</th>
<th>V/LF</th>
<th>C</th>
<th>C/LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong substitute</td>
<td>0.75</td>
<td>0.50</td>
<td>1.25</td>
<td>0.75</td>
</tr>
<tr>
<td>Weak substitute</td>
<td>0.70</td>
<td>0.40</td>
<td>1.10</td>
<td>0.70</td>
</tr>
<tr>
<td>Perfect substitute</td>
<td>0.65</td>
<td>0.30</td>
<td>1.00</td>
<td>0.65</td>
</tr>
<tr>
<td>No substitute</td>
<td>0.60</td>
<td>0.20</td>
<td>0.90</td>
<td>0.60</td>
</tr>
</tbody>
</table>

1. For an integrated channel, the division of channel profits is indeterminate.
products to the two resellers. (See the two arrows labeled $W_1$ and $W_2$ in figure 10-4.) We postulate our previous demand function, i.e., $q_i = a - b p_i + \gamma (p_j - p_i)$. We consider the measure of product substitutability, $\gamma$, to be different in each of the two scenarios. When the products are differentiated (in terms of name, packaging, features, and so on), $\gamma$ is smaller. In the national brand strategy (no differentiation), the manufacturer maximizes his profits $(W-C)q_1 + (W-C)q_2 - F$. In the second case, he maximizes $(W_1-C)q_1 + (W_2-C)q_2 - F$. In both situations, the resellers each maximize their own profit given by $m_i q_i - f = (p_i - w_i - c)q_i - f$, $i = 1, 2$. In order to eliminate effects other than the level of product differentiation, we assume that the retailers have the same fixed and variable costs. We summarize the objective functions below in figure 10-4.

Even though the two optimization problems are conceptually different, the symmetry dictates that $W_1 = W_2$. As a result, the mathematics of the two scenarios are the same. The derivations are straightforward and lead to the following equilibrium decisions and profits

$$W = W_1 = W_2 = C + \left( \frac{a}{b - TC} \right) \frac{b + \gamma}{3b + 2\gamma} \quad (16)$$

$$m_1 = m_2 = \left( \frac{a}{b - TC} \right) \frac{2b + \gamma}{3b + 2\gamma} \quad (17)$$

$$\Pi = 2 \left( \frac{b + \gamma}{3b + 2\gamma} \right)^2 - F \quad (18)$$

$$\pi_i = (b + \gamma) \left( \frac{a - b TC}{3b + 2\gamma} \right)^2 - f \quad (19)$$

where $TC = C + c$
another (e.g., national brand versus distributor brand) will depend on the increased revenues generated and the costs of implementing each strategy.

Conclusion

We have developed a simple framework where channel competition is operationalized as the set of reaction functions of the competing channels. These reaction functions incorporate the nature of demand (e.g., degree of product differentiation) and the nature of channel structure (i.e., whether the channel is a vertical system or not). This framework has enabled us to address several important questions: (1) What is the relationship between competitiveness and channel structure? (2) What is the stability of a given channel structure? (3) What are the market prices for different scenarios of two competing channels—channels that may or may not have the same structure? (4) What is the profitability resulting from these market prices? (5) What is the role of fixed costs?

Even though this set of questions is rich, the framework is limited. Doing justice to the area of channel management will require significant extensions in a number of dimensions. First, as stated earlier, channel decisions other than price and margin decisions are important. These include advertising and shelf-space. Second, channel members are involved in long-term relationships. As a result, the static framework used in this chapter cannot, by definition, accommodate the multiperiod decision making involved. We believe that competition is a repeated game that may lead to cooperative behavior (Radner 1981). In other words, a multiperiod framework may resolve the gap that we have noted between stability and equilibrium profitability in the situation of low differentiation. Third, channel decisions, like most management decisions, involve uncertainty. The present framework completely ignores this aspect. Channel structure is certainly affected by costs of monitoring one's partners in the channel as well as competing channels' actions.

In summary, the present chapter develops a set of tools that should prove useful in analyzing channels of distribution in greater depth. There is no doubt that marketing productivity will significantly improve in the near future as technological change makes possible the precise monitoring of how channels of distribution function and compete. The managers involved need specific guidelines to analyze the issues. The present research effort may be a step toward developing general, precisely defined concepts that are useful for structuring channel analysis.

In conclusion, pricing decisions in the marketplace cannot be understood without recognizing how pricing decisions are made in practice. And this involves recognizing the role of channels of distribution. The preceding research clearly shows that retail pricing is the complex outcome of margin decisions made by manufacturers and resellers.

As more powerful communications technologies become available, it becomes possible to further coordinate manufacturer and reseller decisions without incurring the costs of vertical integration. Our framework predicts increased competition at the retail price level as a result of increased de facto integration or coordination in the surviving channels.

Notes

1. An example of this approach is Montgomery [1975].
2. Rewriting equation (1) as \( q_1 = a - (b + \gamma)p_1 + \gamma(p_1 - p_t) = a - b(p_1 + \gamma(p_1 - p_t)) \) shows that \( \gamma \) measures the effect on the product's demand of the price differential with the other products.
3. Equations (2) and (3) assume that marginal costs for the manufacturer are zero. This simplifying assumption is made because it will not change the nature of our results. Otherwise, if the manufacturer's marginal cost is \( C \), equation (2) becomes \( \Pi = (w_1 - C)q_1 = M_1q_1 \) where \( M_1 \) denotes manufacturer margin.
4. With nonzero marginal cost for the reseller, \( c, \) equation (4) becomes \( p_t = w_t + m_t + c. \)
5. The symbol | x in equations (5) and (6) means "given x."
6. Coughlan [1985] argues that equilibrium channel profits can be higher when marketing middlemen are used by all sellers than with marketing integration. However, she does not address the stability of this de facto collusion (i.e., both channel members implicitly agreeing to use middlemen).
7. The subscript \( M \) means "maximum" since maximum profits are achieved when the two channels collude.
8. A single firm usually does not have expertise and resources to manage effectively both manufacturing and distribution.