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In this article, the author studies the determinants of both new product introduction and incumbent response strategies in a single integrated framework. Building on previous research in strategic management, industrial organization, and marketing, the author conceptually identifies the factors that potentially influence these strategies, develops hypotheses about the impact of the key factors on these strategies, and focuses on the interrelationship between new product introduction and incumbent response strategies and on the role of multimarket contact in these strategies. To test these hypotheses, the author formulates models of introduction and response strategies, including an anticipated incumbent reaction formation model. The results of the empirical analysis show that new product introduction strategy is influenced significantly by incumbent reaction strategy, and vice versa. The relationship of a new product's marketing spending to the anticipated incumbent reaction is different for incumbents of different sizes. The analysis shows that higher spending by a new brand results in incumbent response that is significantly lower in magnitude. The results also show that multimarket contact leads to both lower introduction spending and milder incumbent response. The author discusses the managerial implications of these results.

New Product Introduction and Incumbent Response Strategies: Their Interrelationship and the Role of Multimarket Contact

Firms constantly are engaged in either introducing new products or reacting to new entries in their markets. For example, according to its chief executive officer, Hewlett-Packard formulates entry and reaction strategies that focus on rivals such as IBM on an ongoing basis (*Bloomberg Business News* 1995). New product introduction strategies and incumbents' responses to new entries are of strategic importance to firms in today's increasingly competitive environment (Green, Barclay, and Ryans 1995; Shankar 1998; Weitz 1985). Of particular importance are introduction and incumbent response strategies that involve marketing spending variables, such as advertising, promotion, and sales force, that have direct implications for the use of a firm's financial resources.

In this article, I study the determinants of both new product introduction and incumbent response strategies in marketing spending variables in a single integrated framework. Building on previous research in strategic management, industrial organization, and marketing, I first conceptually identify the factors that potentially influence these strategies, then I develop hypotheses regarding the impact of the key factors on them. I focus on the interrelationship between the strategies and the role of multimarket contact. I then formulate models to test the hypotheses and estimate the models using cross-sectional and time-series data comprising 23 new product entries and the responses of 59 incumbents to these entries in six leading pharmaceutical markets.

New product introduction and incumbent strategies may depend on a variety of factors under the broad umbrellas of

"entrant," "incumbent," and "market/industry environment" characteristics (Gatignon and Bansal 1990). Prior empirical research (Gatignon, Weitz, and Bansal 1990) shows that a market characteristic, such as market size, is the major determinant of a new brand's sales force strategy. Prior research has not examined, however, the influence of incumbent characteristics, such as the anticipated responses of the incumbents, or of a market characteristic, namely, multimarket contact, on a new brand's spending in sales force or advertising. These can be important. For example, American Express downplayed its Optima credit card at the time of launch for fear of aggressive reactions by the large incumbents, MasterCard and Visa (*Advertising Age* 1987). When does a new brand enter more aggressively? When it anticipates aggressive reaction, mild reaction, or no reaction? From large or small incumbents? Does multimarket contact with the incumbent(s) lead to greater or smaller introductory spending? The answers to these questions can help an incumbent formulate a better reaction strategy.

Research on incumbent reactions in marketing spending variables provides important insights into determinants of the direction of response, in terms of accommodation (decrease in spending), retaliation (increase in spending), or no reaction (no change in spending). In addition to direction, the magnitude, or intensity, of response in key marketing mix variables can be managerially important. For example, in the market for angiotensin converting enzyme inhibitor drugs, Bristol Myer Squibb's Capoten retaliated against the entry of Merck's Vasotec through advertising, but the change in Capoten's advertising spending was less intense than the change in its sales force spending (*BusinessWeek* 1988). Similarly, Kodak accommodated the entry of Fuji in the film market with regard to advertising, but the reduction in its advertising levels was not of a high magnitude (*LNA Report* 1979–90). Robinson (1988, p. 383), in his study of incumbent reactions to entries, observes that "only the direction and not the importance or even the magnitude of incumbent reactions is examined. The latter factors can be very important because a single reaction can damage an otherwise successful strategy."

More important, the influence of a new brand's introduction strategy and of multimarket contact on an incumbent's response to that entry have not been explored by prior research. How different is the intensity of an incumbent's reaction if a new brand enters with an aggressive marketing campaign compared with a low profile one? Does an incumbent respond aggressively if it competes with the entering firm in other market(s)? The answers to these questions can help entrants formulate better introduction strategies. This article seeks to address these and the other interesting questions raised previously.

The analysis extends prior analyses in important ways. First, unlike other studies (e.g., Bowman and Gatignon 1995; Gatignon, Anderson, and Helsen 1989; Gatignon, Weitz, and Bansal 1990; Robinson 1988; Shankar 1997), I examine the determinants of both new brand introduction and incumbent response strategies in the same framework. An important part of the integrated framework is an anticipated incumbent reaction model that has not been examined by prior research. I study introduction strategy in advertising and total marketing, in addition to the sales force strategy examined by prior research (Gatignon, Weitz, and Bansal 1990), and include the impact of incumbent characteristics.

Second, I examine the role of multimarket contact, a factor that has not been explored in the new product introduction and incumbent response setting. Third, I focus on both the magnitude and direction of incumbent response, whereas prior research has focused on direction alone (e.g., Robinson 1988).

Fourth, I explore introduction and response strategies in each marketing mix variable separately, as well as in combination in an oligopoly. In contrast, prior studies have examined introduction strategy in one variable (Gatignon, Weitz, and Bansal 1990) and reaction strategy in terms of a composite reaction index across all marketing mix variables (Robinson 1988), in one marketing mix variable (Gatignon, Anderson, and Helsen 1989), and in many variables in a duopoly (Shankar 1997). In this way, this study extends Ramaswamy, Gatignon, and Reibstein's (1994) analysis of general competitive behavior to new product introduction.

Fifth, I include all incumbents and entrants, not just a selection of firms considered, as has been the case in other studies (e.g., Robinson 1988; Shankar 1997). Sixth, I include a more comprehensive set of factors than has been used previously.[1] The factors examined by previous studies also differ across studies. For example, Gatignon, Anderson, and Helsen (1989) consider the elasticity of an incumbent's marketing mix variable the primary determinant of incumbent response in that variable, whereas Robinson (1988) does not include incumbent elasticity. Conversely, Robinson (1988) considers scale of entry as a determinant, whereas Gatignon, Anderson, and Helsen (1989) do not. Note, however, that Robinson (1988) attempts to explain differences in reactions across industries, whereas Gatignon, Anderson, and Helsen (1989) try to explain differences within an industry. These differences are summarized in Table 1.

The findings presented here have important implications for brand introduction and reaction strategies. By assuming that these strategies are unrelated, previous research suggests that new products take into account factors such as market size and that incumbents consider factors such as scale of entry, incumbent elasticity, and market growth in formulating their strategies. This study's results, however, show that managers may need to consider additional factors, most notably, the impact of new brand introduction and incumbent response strategies on each other and the effect of multimarket contact.

CONCEPTUAL FRAMEWORK AND HYPOTHESES

I begin with a conceptual framework that identifies potential determinants of new product introduction and incumbent response strategies and the associated relationships. This framework appears in Figure 1. I develop hypotheses only for the factors not explored by prior research; those factors are treated as control variables in this analysis. I subsequently test the hypotheses and predictions using data from the U.S. pharmaceutical industry. I discuss first the determinants of new product introduction strategy and then those of incumbent response strategy. For each of introduction strategy and response strategy sections, the hypotheses are presented first and the control variables next.

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[1]Note that most of the factors considered by prior research are included, plus some additional factors. However, factors such as product complexity and stability, which are considered by Bowman and Gatignon (1995), are not included because they do not vary much in these data.

Table 1

COMPARISON OF EMPIRICAL ANALYSES OF ENTRANT STRATEGIES AND INCUMBENT RESPONSES

Analysis	Problem Studied	Inclusion of Introduction Strategy as a Potential Determinant of Incumbent Response or Vice Versa	Separate Analysis of Reactions in Each Marketing Variable	Focus of Responses	Entrants/Incumbents Studied	Factors Considered	Data Type (Industry)
Bowman and Gatignon (1995)	Incumbent response strategy	No	No	Speed	Top three incumbents	Entrant size, product complexity, stability, market growth, competitive structure	Self-reported (PIMS)
Gatignon, Anderson, and Helsen (1989)	Incumbent response strategy	No	Yes	Direction	Last entrant, all incumbents	Incumbent elasticity	Market behavior (airlines, an over-the-counter product)
Gatignon, Weitz, and Bansal (1990)	Brand introduction strategy	No	No	Not relevant	All entrants	Entrant size, entrant quality, market experience, market size, market growth	Market behavior (ethical drugs)
Robinson (1988)	Incumbent response strategy	No	No	Direction	Top three incumbents	Scale of entry, product advantage, acquisition entry, incumbent stake, concentration, market growth	Self-reported (PIMS)
Shankar (1997)	Incumbent response strategy	No	Yes	Direction	Single incumbent, single entrant	Incumbent elasticity, margin, incumbent leadership, market growth	Market behavior (ethical drugs)
This analysis (1999)	Brand introduction and incumbent response strategies	Yes	Yes	Direction and magnitude	All entrants, all incumbents	Entrant size, quality, leadership, market experience; **Incumbent reaction**; Market size, growth; Scale of entry, **entrant spending**; Incumbent dominance, incumbent elasticity, **multimarket contact**	Market behavior (pharmaceuticals)

*Notes: Bold factors indicate new variables that are not found in previous research.

Figure 1
CONCEPTUAL/HYPOTHESIZED MODEL OF DETERMINANTS OF NEW PRODUCT INTRODUCTION AND INCUMBENT
RESPONSE STRATEGIES
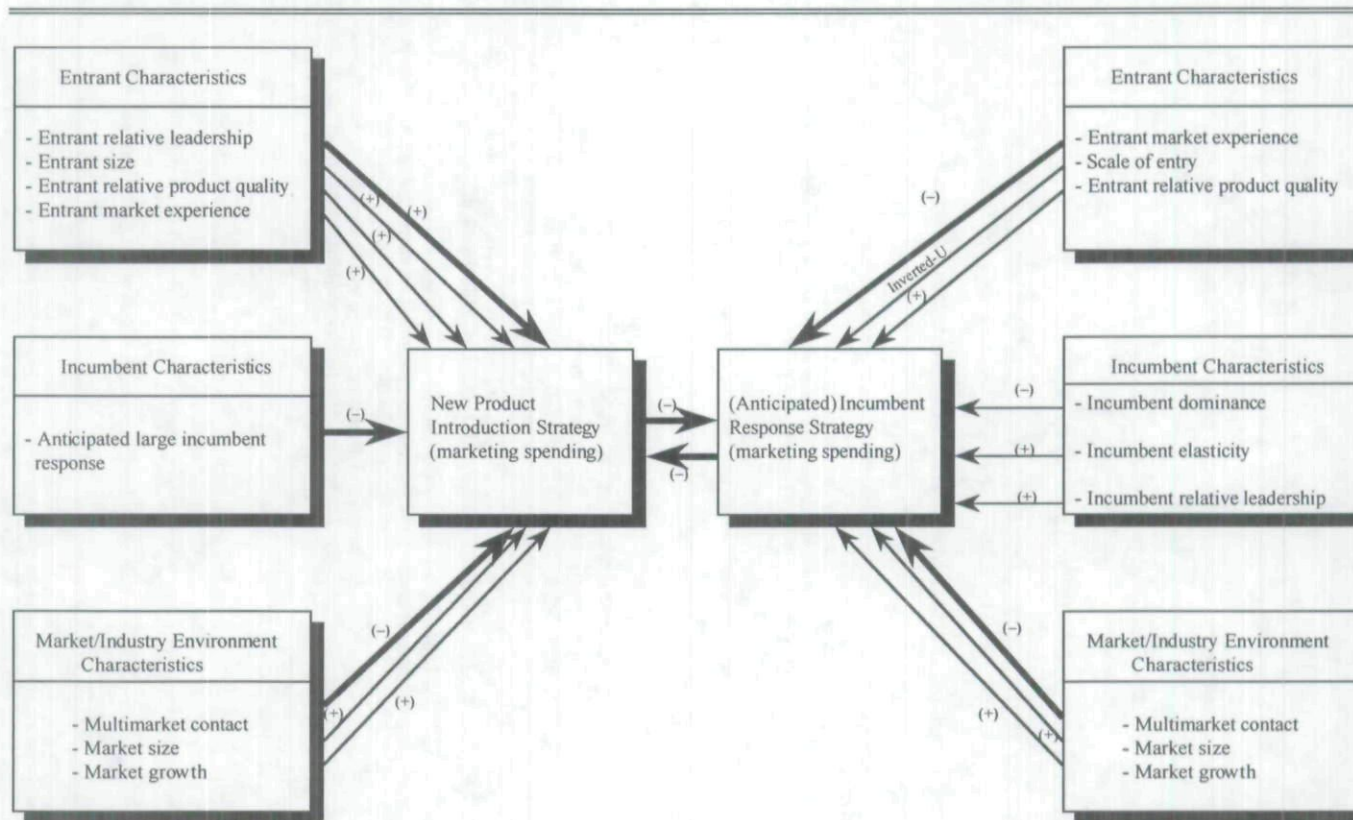
Notes: Bold arrows represent hypotheses tested.

New Product Introduction Strategy

Among entrant characteristics, relative leadership of an entrant in marketing mix variables, its size, its relative product quality, and its market experience are the probable primary influences on brand introduction strategy (Urban and Hauser 1993). Among incumbent characteristics, anticipated reactions of the incumbents are likely to be an important factor. Finally, among market/industry characteristics, multimarket contact, market size, and market growth are the likely key factors (Baum and Korn 1996; Gatignon, Weitz, and Bansal 1990).

Entrant characteristics. Although not explored by previous research, an entrant firm's leadership relative to its competitors in a marketing mix variable may be an important factor that determines its spending in that variable. Some firms are regarded as industry leaders in advertising; that is, they have a reputation for trend-setting advertising campaigns, which typically are imitated by their competitors, the followers. For example, Philip Morris is well known for its advertising leadership in the cigarette industry. Merck and IBM are acknowledged leaders in sales forces in the pharmaceutical and computing industries, respectively. A leader in a marketing mix variable is likely to act aggressively in that variable (Eliashberg and Robertson 1988). Aggressive spending in a marketing mix variable in which a firm leads its competitors is typically more effective for the leader. In the context of new product introduction, a leader in adver-

tising (sales force) will likely spend heavily in advertising (sales force) at the time of launch, which suggests H_1.

H_1: If the entering firm is a leader in a marketing mix variable relative to other firms in the market, it will spend more on that variable.

Incumbent characteristics. Anticipated reactions of incumbents are potentially an important determinant of a new product's strategy (Lynn 1987). Although an entrant may be inaccurate in conjecturing the reaction of each incumbent (Clark and Montgomery 1996; Moore and Urbany 1994), it may formulate its introduction strategy differently, according to the expected reactions of groups of large and small incumbents (Aaker 1994; Porter 1980). Size (large or small) confers on an incumbent the ability to react and may be viewed as a necessary condition for responding, but willingness to react is also important in predicting the incumbent's reaction.

Consider first large incumbents. The relationship between a new brand's marketing spending and the anticipated response of large incumbents may be either negative or positive, depending on the willingness of the incumbents to respond. In support of a negative link are the following arguments: Some large incumbents are known to act passively toward aggressive new entries. If this is the case, an entrant may use an aggressive marketing campaign to establish its new product quickly (Bensoussan, Bultez, and Naert

1978). Conversely, fear of aggressive retaliation by a large incumbent may result in more modest introduction spending. If the incumbents are relatively large or concentrated, the entrant may spend less, knowing that it may not be able to match the incumbents' marketing resources, which create effective barriers to entry (Scherer and Ross 1990). In such a case, the probability of successful entry associated with heavy spending may not justify the cost of surmounting these barriers. It may be preferable for new products to practice "judo" economics, that is, to enter with little spending and hope to capitalize on the large incumbents' size and inertia (Gelman and Salop 1983).

In support of a positive relationship, an entrant actually may increase its spending to counter or discourage the prospect of aggressive retaliation by a large incumbent (Lynn 1987). Sometimes high introductory spending can neutralize a planned retaliatory attack by a large incumbent. An aggressive spending strategy also may make the new product more noticeable to its target audience if the large incumbents react strongly to the entry. The firms in the U.S. pharmaceutical industry are typically multinational firms whose deep pockets enable them to retaliate aggressively. I therefore expect a negative link in the data.[2]

Consider next small incumbents. Small incumbents may not be viewed as threats, so their anticipated reactions may not affect a new product's spending. Overall, the following hypotheses may be developed:

H_{2a}: A new product's introductory spending is likely to be lower if strong reactions are expected from large incumbents.

H_{2b}: A new product's introductory spending is not likely to be related to the reactions of small incumbents.

Market/industry characteristics. A new brand's introductory spending also may depend on whether the entering firm already competes with one or more of the incumbents in other market(s), that is, whether it has multimarket contact with the incumbents (for a detailed review, see Baum and Korn 1996). Two contrasting perspectives exist in the strategic management literature. One view is that multimarket contact increases competitive rivalry (Porter 1980). The other view is that multimarket exposure leads to greater mutual forbearance, dampening rivalrous practices (Bernheim and Whinston 1990; Feinberg 1984). According to this view, firms may hesitate to spend vigorously because the prospect of an advantage must be weighted against the danger of retaliatory attacks in other markets (Edwards 1955). The concept of multimarket contact is similar to Chen's (1996) market commonality concept, which suggests that a firm that shares markets with another firm is less likely to initiate attacks against that rival. Because the firms in this study are predominantly multinational firms that have high profit stakes in many shared markets, I expect that a new product will avoid inciting rivalry through aggressive introductory spending.

H_3: A brand's introductory marketing spending is lower if the entering firm has multimarket contact with the incumbent(s).

Control variables. Firm size will likely affect a brand's marketing spending, particularly at the time of introduction (Woodruff 1976; Yip 1982). A firm that is large relative to its competitors, because of its superior resources, is likely to have more marketing activities targeted at potential customers (Robertson and Gatignon 1986), which leads to higher introductory spending.

A firm's marketing effort is high when it has a true relative product competitive advantage (Porter 1985).[3] This argument is also consistent with the research findings using the PIMS database (Buzzell, Gale, and Sultan 1975), suggesting that firms with products of higher relative quality spend more at the time of launch.

New product introduction strategy may be influenced by the experience of the entrant in the industry (Gatignon, Weitz, and Bansal 1990). Greater experience or knowledge can lower uncertainty about the effectiveness of marketing mix variables. When there is less uncertainty about marketing variables' effectiveness, entrants tend to spend more.

Market size is an important determinant of an entrant's introduction strategy. A larger market may indicate the need for higher marketing spending to achieve greater penetration (Gatignon, Weitz, and Bansal 1990).

A new entrant is likely to spend more on its marketing activities in a rapidly growing market than in a modestly growing one (Fogg 1974). Growing markets offer increased scope for market penetration, which offers free-rider advantages (Lieberman and Montgomery 1988). Because they are also attractive for many more new entrants, a new product may have to spend more to preempt these potential competitors.

Incumbent Response Strategy

Previous empirical research on incumbent responses has addressed the speed of responses (Bowman and Gatignon 1995; Shomberg, Grimm, and Smith 1994), the accuracy of perceived reactions (Clark and Montgomery 1996; Moore and Urbany 1994), possible managerial biases in reaction decisions (Deshpandé and Gatignon 1994), and responses in marketing spending variables (e.g., Cubbin and Domberger 1988; Gatignon, Anderson, and Helsen 1989; Robinson 1988; Shankar 1997).

Incumbent responses in marketing spending variables also may depend on entrant, incumbent, and market factors. Among entrant characteristics, entrant market experience, its introductory marketing spending, the scale of its entry, and its relative product quality will likely influence incumbent responses (Scherer and Ross 1990). Among incumbent characteristics, incumbent dominance, elasticity, and leadership in a marketing mix variable may affect its response (Shankar 1997). Among market/industry characteristics, multimarket contact, market size, and growth are factors that potentially can affect incumbent response (Baum and Korn 1996; Gruca, Kumar, and Sudharshan 1992; Kumar and Sudharshan 1988). The predicted impacts of these factors also appear in Figure 1.

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[2]There is also a possibility that the impact of anticipated large incumbent reaction on new product spending follows an inverted-U pattern, because an entrant may perceive that low anticipated reaction would require low spending but a high reaction would be impossible to match. There is not, however, prior evidence for this pattern. In addition, a squared term for anticipated large incumbent spending was not significant in subsequent estimation of a model with this term in the data.

[3]Product advantage can be derived from positioning superiority, and thus, product quality also can reflect positioning, which is an important consideration in some cases (Hauser and Shugan 1983).

Entrant characteristics. A firm's reaction to a new entry may be influenced by the experience of the entrant in the market/industry. Although previous research has not considered this factor, two possibilities exist. If the entrant is a newcomer to the market, an incumbent may react strongly in a bid to drive it out of the market. If, however, the entrant has considerable experience in the market, primarily through previous brands, the incumbent may react modestly. It is also possible that incumbents may not consider the introduction of a new product by an entrant a threat, and therefore, they may have little or no reaction, whereas an entrant with significant experience may provoke a strong reaction. This argument is consistent with literature that shows few reactions to entries by start-up businesses (Biggadike 1979; Robinson 1988) but strong reactions to new product introductions in general (Bowman and Gatignon 1995). In this setting, the incumbents, for the most part established players in the pharmaceutical industry, should react strongly to newcomers to a market but soften their response to firms that already have a presence in that market. This leads to H_4:

H$_4$: The greater the market experience of the entering firm, the weaker the incumbent reaction is.

An incumbent's response to a new entry also may depend on the new brand's marketing strategy. An aggressive new entrant can bring about either a strong or a mild response from an incumbent. On the one hand, an incumbent may retaliate strongly to an aggressive new brand to discourage a potentially strong player out of competitive contention or to force the new brand to shout louder to be noticed or heard. On the other hand, an incumbent may respond modestly or not react at all if it perceives that a strong retaliation to an aggressive entrant will only escalate a war of attrition or help draw unwanted attention to the new brand. Thus, the impact of a new brand's strategy on an incumbent's response can be either positive or negative. In this competitive context, however, incumbents, which are typically highly profitable firms, are likely to be more wary of escalating rivalry because that might hurt the higher-than-average profit margins that prevail in the industry. Therefore, I expect the impact of a new brand's spending to be negative, which leads to H_5:

H$_5$: The higher the new product's marketing spending, the lower the incumbent spending is.

Market/industry characteristics. As in the case of new product introduction, multimarket contact can influence incumbent response in two ways. However, consistent with the hypothesis on the impact of multimarket contact on new brand spending, I posit that multimarket contact leads to milder incumbent reactions in this context:

H$_6$: An incumbent's marketing spending is lower if it has multimarket contact with the new entrant.

Control variables. A firm's reaction may be influenced by the perceived threat posed by the entering firm (Chen, Smith, and Grimm 1992; Smith et al. 1989). This perceived threat typically is indicated by the scale of entry. A smaller scale entry may evoke mild or even no response from an incumbent, whereas a larger scale entry is likely to elicit a

stronger response, suggesting an inverted-U relationship (Robinson 1988).

Arguments can be made for both strong and modest reactions to an entrant with high relative product quality. The case for a strong response stems from the premise that, if the new product advantage is high, as in the case of innovative entries, an incumbent may have to react strongly to neutralize this advantage. Indeed, innovative entries have been shown to reduce the marketing mix effectiveness of the incumbent (Shankar, Carpenter, and Krishnamurthi 1998). Conversely, support for a weak response arises from the belief that it may be better to react mildly to a new brand with higher product quality because any efforts to counter it may enhance the perception of the new brand as being of higher quality (Carpenter and Nakamoto 1989).

An incumbent's reaction also may depend on its market dominance, which reflects the strategic importance (Phillips, Chang, and Buzzell 1983; Robinson 1988) or the centrality (Chen and Miller 1994) of the market to the firm. Shankar (1997) shows theoretically and empirically that even a dominant incumbent should accommodate a new entrant when its profit margin is reduced substantially.

An incumbent's response in a marketing mix variable also may be dictated by the strength of its marketing variable. Gatignon, Anderson, and Helsen (1989) show that an incumbent is likely to accommodate a new entrant with its low elasticity variable and retaliate with its high elasticity variable. Shankar (1997) extends this finding to demonstrate that, in a general case, an incumbent accommodates (retaliates) with its competitively low (high) elasticity variable. A competitively low (high) elasticity variable is one whose elasticity is reduced (increased) substantially after a new entry.

As in introduction strategy, an incumbent's leadership in a marketing variable also may influence that incumbent's response. Generally speaking, an incumbent will accommodate (retaliate) in a marketing mix variable if it is a follower (leader) in that variable (Shankar 1997). This finding can be extended to the intensity of responses, so a stronger response from a leader is expected.

Large markets provide a greater potential for sales revenues and profits and, therefore, a greater incentive for the incumbents to respond more strongly to new entries, sparking their competitive instinct (Porter 1980, p. 343).

Market growth also may be an important determinant of an incumbent's response (Ramaswamy, Gatignon, and Reibstein 1994). Empirical results on the direction of the impact of market growth (Cubbin and Domberger 1988; Robinson 1988) are mixed. Using theoretical and empirical analyses, Shankar (1997) shows that, generally, an incumbent should retaliate in growing markets but that its response also depends on other important factors, such as leadership in a marketing variable and post-entry elasticity.[4]

MODEL FORMULATION

To test the hypotheses, I first develop models that link the factors to new product introduction and reaction strategies. I assume these strategies are sequential; that is, a new product first decides its introduction strategy, and the incumbent

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[4]I subsequently examine if there is a possible interaction between incumbent dominance and market growth in the empirical analysis.

response follows. This assumption is reasonable for several reasons. First, when the regulatory authority in this context approves a new product, an entrant has discretion over its launch date and strategy, giving it the ability to move first. Second, by first observing the new product's introduction strategy and then reacting, incumbents can minimize the uncertainty associated with predicting the launch strategy of a new product if they choose to move first in their response strategies before the launch date. Third, even if incumbents are able to anticipate the launch date and speculate on the launch strategy, it is relatively inexpensive for them to alter their spending after observing the launch strategy. I present the new brand strategy model and the incumbent response model. The new brand strategy model is as follows:

$$(1) \quad MV_{ijt} = \alpha_{0j} + \alpha_{1j}L_{ij} + \alpha_{2j}FS_i + \alpha_{3j}PQ_i + \alpha_{4j}ME_i + \alpha_{5j}ALIR_{ijt}$$
$$+ \alpha_{6j}ASIR_{ijt} + \alpha_{7j}MMC_i + \alpha_{8j}MS_i + \alpha_{9j}MG_{it} + \varepsilon_{ijt},$$

where MV_{ijt} is the expenditure of new brand i on marketing mix variable j at time t after launch (t is the number of months following entry, so that $t \in \{1, 2, ..., 6\}$ for a short-term introduction and $t \in \{7, 8, ..., 12\}$ for a medium-term introduction); L_{ij} is a dummy variable that denotes whether entrant i is a leader or a follower in marketing mix variable j; FS_i is the size of entrant i in the market of entry; PQ_i is the relative quality of new brand i; ME_i is the market experience of entrant i; $ALIR_{ijt}$ and $ASIR_{ijt}$ are the anticipated reactions, or marketing spending in variable j, of large and small incumbent firms, respectively, at time t after brand i's entry; MMC_i represents the multimarket contact of brand i with incumbent firms during entry; MS_i is the size of the market at the time of brand i's entry; and MG_{it} is the market growth rate at time t after brand i's entry. Also, $MV_{ijt} \in \{A_{it}, D_{it}\}$, where A_{it} and D_{it} are the advertising and sales force spending, respectively, of brand i at time t after the launch;[5] ε_{ijt} is an error term assumed to be normal and independent with mean 0; and $\alpha_{0j}-\alpha_{9j}$ are the parameters. In addition, Equation 1 can be applied to total marketing spending as the dependent variable.

Anticipated Incumbent Reactions

Because the anticipated incumbent reactions are unobservable, a model in which they can be replaced by observable variables must be used. Following Muth (1961), I begin by modeling anticipated incumbent response, using the theory of rational expectations. New product entry and incumbent reaction are assumed to be sequential. This approach has been used by marketing researchers to model reference price formation (Kalwani et al. 1990; Winer 1986). According to this theory, economic agents (firms, in this case) use all available information in forming expectations. These expectations should be unbiased estimates of the true values because "expectations, since they are informed predictions of future events, are essentially the same as the predictions of the relevant economic theory" (Muth 1961, p. 316). In this context, this implies the following equations:

$$(2) \quad LIR_{ijt} = ALIR_{ijt} + \zeta_{ijt},$$

and

$$SIR_{ijt} = ASIR_{ijt} + \xi_{ijt},$$

where LIR_{ijt} and SIR_{ijt} are the actual spending levels in marketing mix variable j of large and small incumbents, respectively, at time t after the entry of brand i; and ζ_{ijt} and ξ_{ijt} are error terms assumed to be normal i.i.d. with mean 0 and uncorrelated with each other.

Following Winer (1986), I formulate a parsimonious model of how anticipated incumbent reactions are formed based on incumbent responses to previous entries, as follows:[6]

$$(3) \quad ALIR_{ijt} = \gamma_{0j} + \gamma_{1j}LIR_{j(t-1)} + \tau_{ijt},$$

and

$$ASIR_{ijt} = \delta_{0j} + \delta_{1j}SIR_{j(t-1)} + v_{ijt},$$

where $LIR_{j(t-1)}$ and $SIR_{j(t-1)}$ are the actual spending levels in marketing mix variable j of large and small incumbents, respectively, on the previous occasion (previous time period for the same entrant for all periods except the first period, for which the previous occasion is the corresponding time period for the previous entrant); τ_{ijt} and v_{ijt} are error terms assumed to be normal i.i.d. with mean 0 and uncorrelated; and γ_{0j}, γ_{1j}, δ_{0j}, and δ_{1j} are parameters. Substituting Equation 3 into Equation 2 provides Equation 4. This is essentially an approach based on extrapolative expectations.[7]

$$(4) \quad LIR_{ijt} = \gamma_{0j} + \gamma_{1j}LIR_{j(t-1)} + \zeta_{ijt} + \tau_{ijt},$$

and

$$SIR_{ijt} = \delta_{0j} + \delta_{1j}SIR_{j(t-1)} + \xi_{ijt} + v_{ijt}.$$

Because the combined disturbance term in Equation 4 has a 0 mean, is serially uncorrelated, and is homoscedastic by assumption, it can be estimated using ordinary least squares, consistent with Winer (1986).[8] This approach is consistent with the logic that a rational firm would not want to repeat any mistakes in anticipating incumbent reactions and therefore would try to minimize prediction errors. By using the predicted values of the anticipated reactions from Equation 4 in Equation 1, Equation 1 can be estimated.

The incumbent response model is given by:

$$(5) \quad RM_{kijt} = \beta_{0j} + \beta_{1j}ME_i + \beta_{2j}MV_{ijt} + \beta_{3j}SE_i + \beta_{4j}SE_i^2$$
$$+ \beta_{5j}PQ_i + \beta_{6j}ID_{ki} + \beta_{7j}IE_{kij} + \beta_{8j}L_{kj}$$
$$+ \beta_{9j}MMC_{ki} + \beta_{10j}MS_i + \beta_{11j}MG_{it} + \mu_{kijt},$$

where RM_{kijt} is incumbent k's ratio of spending in marketing variable j at time periods t after and before the entry of

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[5]I chose advertising and sales force because they are the important variables in the markets studied in the empirical analysis. The model can be extended to other marketing mix variables, such as price.

[6]I do not include a term for trend in this model because it was not significant when included in a subsequent estimation and because of model parsimony.

[7]I also could use a more general adaptive expectations approach, which involves a weighted combination of all prior reactions (Nerlove 1958). This approach is more cumbersome, and the properties of estimators are weak (Kalwani et al. 1990). Even so, I estimated this model, but the results did not provide any new insights, so they are not reported.

[8]I tested Equation 4 for serial correlation and heteroscedasticity but did not find evidence for them.

brand i, SE_i is the scale of entry of brand i, ID_{ki} is the brand dominance of incumbent k at the time of entry of brand i, IE_{kij} is the estimated elasticity of incumbent k in variable j after entry of brand i, and the rest of the terms are as defined in Equation 1.[9] μ_{kijt} is an error term assumed to be normal i.i.d. with mean 0 and independent of ε_{ijt}, and $\beta_{0j}-\beta_{11j}$ are parameters associated with the independent variables. As in the case of new product strategy, Equation 5 can be applied to incumbent response in total marketing spending as the dependent variable with the same set of independent variables, including elasticity and leadership in both advertising and sales force and a total new product marketing spending variable that replaces MV_{ijt}. The inclusion of scale of entry squared (SE_i^2) as an independent variable enables examination of a potentially nonlinear (quadratic) relationship between incumbent response and scale of entry, as discussed previously (Robinson 1988). Following previous studies (Gatignon, Weitz, and Bansal 1990; Phillips, Chang, and Buzzell 1983; Robinson 1988), this uses a linear functional form in Equations 1 and 5.[10]

To obtain the incumbent elasticities, IE_{kij}, I estimate a brand sales model for each brand, consistent with prior research (e.g., Farley and Lehmann 1986; Shankar, Carpenter, and Krishnamurthi 1999). The sales response model is given by:

$$(6) \qquad S_{it} = e^{\alpha_i - \phi_i/T_{it}} e^{\varphi_i CS_{i(t-1)}} PQ_{it}^{\eta_i} A_{it}^{\theta_i} D_{it}^{\lambda_i} CM_{it}^{\rho_i} e^{\omega_{it}},$$

where S_{it} is the sales of brand i at time t, T_{it} is the time in market of brand i at time t, $CS_{i(t-1)}$ is brand i's total cumulative competitor sales until time $(t-1)$, PQ_{it} is the relative product quality of brand i at time t, A_{it} is the advertising spending of brand i at time t, D_{it} is the sales force/promotion spending of brand i at time t, and CM_{it} is the total marketing spending of brand i's competitors at time t. ω_{it} is an error term assumed to be normal i.i.d. with mean 0 and variance σ_ω^2. a_i, ϕ_i, φ_i, η_i, θ_i, λ_i, and ρ_i are parameters. Consistent with prior research, the term with T captures own diffusion (Kalyanaram and Urban 1992); the term with CS captures the impact of competitor diffusion (Parker and Gatignon 1996; Shankar, Carpenter, and Krishnamurthi 1998); and the terms with PQ, A, D, and CM reflect the effect of product quality, advertising, sales force, and competitor spending, respectively. Because an entrant may shift an incumbent's elasticities (Gatignon, Anderson, and Helsen 1989) and the shift in elasticities is an important determinant of incumbent response (Shankar 1997), the elasticities are allowed to be a linear function of new entries. Thus, post-entry elasticities of incumbents are obtained after each entry.

To study the direction of incumbent response separately, I also formulate two models, a logistic regression and a discriminant analysis, in which the dependent variable is the direction of incumbent response and the independent variables

are the same as in Equation 5.[11] I classify the incumbent response in a marketing variable into two categories in terms of its direction: as accommodating when its spending does not increase and as retaliatory when its spending increases, consistent with the literature (Gatignon, Anderson, and Helsen 1989; Shankar 1997).[12]

DATA AND MODEL ESTIMATION

Data

The hypotheses are tested using data from the U.S. prescription drug industry. Using data from a single industry is advantageous because it is not necessary to include a wide array of cross-industry factors to control for heterogeneity of estimates, as when multi-industry studies are undertaken (Bass, Cattin, and Wittink 1978). The data include twenty-three entries and fifty-nine incumbent responses from six U.S. prescription drug markets, primarily from the 1970s and 1980s. The number of incumbents for each entry ranged from one to seven. Six entrants faced one incumbent, another six faced two incumbents, and another six encountered three incumbents. The data comprise monthly sales, advertising, and sales force expenditures in each category, starting from the introduction of the pioneering brand until market maturity.[13] The data span from 8 to 13 years in these categories. Eight out of sixteen firms had multimarket contact with at least one other firm.

I measure sales using the total number of prescriptions. I measure product quality on the basis of a survey of 38 physicians who were asked to evaluate each drug on four dimensions, namely, efficacy, dosage, side effects, and range of indications, consistent with Gatignon, Weitz, and Bansal (1990) and Hahn and colleagues (1994). On each dimension, physician perceptions of product quality of each brand were measured on a five-point scale ranging from "Very Good" to "Very Poor." An overall product quality measure was computed by averaging across the dimensions. On the basis of this composite measure, I constructed a relative product quality measure in which product quality of a brand is the ratio of the quality of that brand to the average quality of all available brands at the time of that brand's entry. For related measures, see Gatignon, Weitz, and Bansal (1990) and Robinson and Fornell (1985). To identify which of the firms are regarded as leaders in advertising or sales force, I interviewed a panel of 15 experts who were involved in the management of most of the products in the database. Although none of the firms was considered a leader in advertising relative to the other firms, three firms were perceived as sales force leaders in their respective markets. These perceptions were remarkably consistent across all the

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[9] I use estimated elasticity and not true elasticity because an incumbent may be able to react to only measured values instead of true values, similar to many economic situations (Johnston 1984, p. 430). Nonetheless, I subsequently estimated a model with true elasticity but did not find any significant difference in the results. The estimation details of elasticities are provided in the "Data and Model Estimation" section.

[10] I subsequently examined different functional forms, such as log-log and semi-log forms. The results were consistent with those from the linear model. Because the linear form is simpler, I retain this model.

[11] Because the expenditures in advertising and sales force stem from marketing resource allocation, they may be related. To explore this issue, I estimated introduction and response models for each marketing variable by including the spending on the other variable as an additional explanatory variable but did not find the additional variable significant. I therefore do not include it in the model.

[12] I also could classify responses into three categories, namely, accommodation, retaliation, and no reaction. I examined responses in three categories using multinomial logit and multiple discriminant analyses but found that the results were not different from those obtained using two categories.

[13] I cannot disclose the names and product details of the brands and categories for proprietary reasons.

experts. On the basis of assets, revenues, and profits in the pharmaceutical industry, eight firms were viewed as "large" firms, and the remaining eight were considered "small" by the experts.

Price and distribution were not important marketing variables in explaining sales across brands and over time. The markets for ethical drugs during the period of data collection generally were considered price inelastic, consistent with other studies (e.g., Gatignon, Anderson, and Helsen 1989; Gatignon, Weitz, and Bansal 1990; Shankar, Carpenter, and Krishnamurthi 1998). The companies that produced and marketed the brands employed essentially the same distribution channels, so distribution was not a differentiating factor.

New product introduction and incumbent response strategies in the marketing variables, advertising and sales force, were measured over the short term (six-month period) and the medium term (twelve-month period).[14] In terms of incumbent reaction RM, a spending ratio less than 1 indicates an accommodating response, whereas a ratio greater than 1 reflects a retaliatory response. More important, this measure better reflects the magnitude of incumbent response on a continuum. For example, a response of 1.25 is stronger than

one of 1.10, though both responses are retaliatory in nature. The operationalization of all the variables appears in Table 2.

A summary of the new product introduction strategies and incumbent responses appears in Table 3. The average monthly sales force spending of a new brand is nearly twice the advertising spending, consistent with prior research in this industry (Shankar 1997). The medium-term average spending of new brands is slightly less than short-term average spending, which reflects the high amount of spending in the initial months after a new product's launch. Approximately 63% (48%) of the incumbent reactions in advertising are retaliatory, and 37% (52%) are accommodating for the short-term (medium-term) period. Approximately 58% (61%) of the reactions in sales force are retaliatory, whereas the remaining 42% (39%) are accommodating in the short term (medium term). The key research questions are as follows: What are the determinants of the observed new brand and incumbent response strategies? How can the impact of the determinants on these strategies be explained?

Estimation

I estimate the introduction strategy model in two steps. In the first step, I estimate the anticipated reaction model, and in the next step, I use the predicted values of the anticipated responses of large and small incumbents in estimating

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[14]Based on consensus views of leading executives in the pharmaceutical industry.

Table 2
OPERATIONALIZATION OF VARIABLES USED IN EMPIRICAL ANALYSIS

Variable	*Operationalization*
Marketing spending of entrant (MV)	Average monthly expenditures of the entrant after introduction*
Incumbent response (RM)	Ratio of average monthly spending of the incumbent after and before entry*
Entrant firm size (FS)	Average monthly sales of the entrant
Entrant relative product quality (PQ)	Ratio of entrant product quality to the average quality of all available brands at the time of entry
Entrant relative leadership (L)	Dummy variable indicating if the entrant is perceived as a leader in the marketing variable
Entrant market experience (ME)	Dummy variable representing if the entrant has any previous brands in the market
Large incumbent reaction (LIR)	Average combined monthly spending of large incumbents after entry*
Small incumbent reaction (SIR)	Average combined monthly spending of small incumbents after entry*
Market size (MS)	Maximum monthly sales of the category/market
Market growth (MG)	Dummy variable representing either the growth or the mature stage of the market**
Multimarket contact for entrant (MMC)	Dummy variable indicating if the new entrant competes with any incumbent in other market(s) at entry
Scale of entry (SE)	Average monthly revenues of the entering firm
Incumbent dominance (ID)	Average monthly sales of the incumbent until the time of entry
Incumbent elasticity (IE)	Estimated incumbent elasticity in a marketing mix variable as determined from a sales response model
Incumbent relative leadership (L)	Dummy variable indicating if the incumbent is perceived as a leader in the marketing variable
Multimarket contact for incumbent (MMC)	Dummy variable indicating if the incumbent competes with the new entrant in other market(s) at entry

*Short-term spending is measured by average spending over a six-month period. Medium-term spending is measured by average spending over a twelve-month period.

**The transition from growth to mature stage of a market is determined by estimating a logistic regression model of category sales and identifying the inflection point.

Notes: Variables in bold represent hypotheses tested.

Table 3
SUMMARY OF NEW PRODUCT INTRODUCTION STRATEGIES AND INCUMBENT RESPONSES IN THE DATA*

Item	*Short Term*	*Medium Term*
Average monthly introductory advertising spending ($ '000)	788	620
Average monthly introductory sales force spending ($ '000)	1501	1365
Ratio of average advertising spending after and before entry	1.37	1.19
Ratio of average sales force spending before and after entry	1.09	1.12
Percentage of retaliatory advertising responses	62.7	47.5
Percentage of retaliatory sales force responses	57.6	61.0

*Used with the expressed written permission of IMS America.

Equation 1. Each introduction strategy model has 138 data points and a maximum of 10 parameters. I also estimate the incumbent response model in two steps. First, I estimate Equation 6, the sales response equation, for each brand. Second, using the estimated elasticities from Equation 6, I estimate Equation 5.[15] In estimating the models, I test for multicollinearity, autocorrelation, and heteroscedasticity.[16] Each incumbent response model has 354 data points and a maximum of 13 parameters. The likelihood ratio test of heteroscedasticity (Greene 1993, p. 395) rejects equal error variances in all the models. Therefore, I use generalized least squares estimation.[17]

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[15]Although Equations 1 and 5 appear simultaneous, note that the system is recursive. The dependent variable in Equation 1 is an independent variable in Equation 5, but not vice versa. Therefore, these equations can be estimated independently (Dhrymes 1974; Gatignon, Weitz, and Bansal 1990).

[16]In addition, tests of homogeneity of all coefficients across the markets could be performed, given sufficient sample sizes in each market. The sample sizes available in some markets in the data, however, were insufficient to perform such tests, similar to Gatignon, Weitz, and Bansal's (1990) study.

[17]As noted in footnote 9, I also estimated Equation 5 with true elasticity using an instrumental variable approach to correct for measurement error in elasticity (Johnston 1984). The results were not significantly different.

RESULTS

New Product Introduction Strategy

The results of estimation of Equation 1 for advertising spending appear in Table 4. The results show that both short- and medium-term spending decrease with large incumbent anticipated advertising reaction ($p < .001$) and multimarket contact ($p < .001$), in support of H_{2a} and H_3, respectively. New product advertising spending is unrelated to anticipated small incumbent reaction, as predicted by H_{2b}. With regard to control variables, advertising spending increases with entrant size ($p < .001$) and the relative quality of the new brand ($p < .01$). However, it decreases with market size ($p < .001$), contrary to previous research findings.

The results for a new brand's sales force spending appear in Table 5. Short-term spending increases with the entrant's leadership in sales force ($p < .001$), in support of H_1. Short-term sales force spending decreases with large incumbent anticipated reaction ($p < .001$) and multimarket contact ($p < .001$), in support of H_{2a} and H_3, respectively. The impact of the anticipated reactions from small incumbents is also insignificant, consistent with H_{2b}. In addition, short-term sales force spending increases with the control variables entrant

Table 4

NEW PRODUCT ADVERTISING SPENDING MODEL RESULTS

Variable (Parameter)	Short-Term Spending Parameter (Standard Error)	Medium-Term Spending Parameter (Standard Error)
Intercept (α_0)	2309.22 (479.96)**	2352.09 (299.02)**
Entrant size (α_2)	.67 (.12)**	.75 (.09)**
Entrant relative product quality (α_3)	893.89 (341.28)*	712.10 (251.69)*
Entrant market experience (α_4)	24.07 (16.00)	42.08 (74.13)
Anticipated large incumbent response (α_5)	−.06 (.01)**	−.08 (.01)**
Anticipated small incumbent response (α_6)	.10 (.07)	.08 (.06)
Multimarket contact (α_7)	−303.41 (68.93)**	−354.80 (33.32)**
Market size (α_8)	−.37 (.08)**	−.42 (.03)**
Market growth (α_9)	118.70 (72.50)	140.67 (146.18)
Correlation of actual and predicted values	.58	.71

*Significant at .01 level.
**Significant at .001 level.
Notes: Sample size = 138. Variables and parameters in bold represent hypotheses tested.

Table 5

NEW PRODUCT SALES FORCE SPENDING MODEL RESULTS

Variable (Parameter)	Short-Term Spending Parameter (Standard Error)	Medium-Term Spending Parameter (Standard Error)
Intercept (α_0)	−1986.60 (1008.86)	−875.95 (678.58)
Leadership of entrant in sales force (α_1)	1018.91 (179.52)**	643.20 (121.41)**
Entrant size (α_2)	1.81 (.24)**	1.85 (.19)**
Entrant relative product quality (α_3)	423.43 (815.77)	680.13 (602.81)
Entrant market experience (α_4)	1036.24 (195.41)**	705.28 (115.60)**
Anticipated large incumbent response (α_5)	−.24 (.02)**	−.35 (.02)**
Anticipated small incumbent response (α_6)	−.08 (.07)	−.13 (.08)
Multimarket contact (α_7)	−640.74 (121.79)**	−530.01 (74.34)*
Market size (α_8)	.39 (.26)	.13 (.09)
Market growth (α_9)	197.68 (190.29)	104.00 (116.11)
Correlation of actual and predicted values	.60	.75

*Significant at .01 level.
**Significant at .001 level.
Notes: Sample size = 138. Variables and parameters in bold represent hypotheses tested.

size ($p < .001$) and entrant market experience ($p < .001$). The results for medium-term sales force spending are similar.

Table 6 shows the results for total introductory marketing spending. The results reveal that leadership in sales force is related positively to spending ($p < .001$), in support of H_1. Large incumbent response ($p < .001$) and multimarket contact ($p < .001$) are related negatively to short-term spending, in support of H_{2a} and H_3, respectively. Small incumbent response does not influence new brand total marketing spending, as predicted by H_{2b}. Furthermore, the control variables, entrant size ($p < .001$) and entrant market experience ($p < .001$), are related positively to sales force spending.

Summary. Combined, the results on new product introduction strategy from Tables 4, 5, and 6 support H_1–H_3; that is, a new brand spends more if it is a leader in sales force, anticipates smaller reactions from large incumbents, and does not have multimarket contact with one or more incumbents. Its spending also is unrelated to anticipated reactions from small incumbents. In addition, a new brand spends more on both advertising and sales force if it is bigger. It advertises more if its product quality is higher and the market is smaller and spends more on sales force if it has greater market experience. Thus, in addition to entrant and market/industry factors, incumbent factors such as anticipated response of the incumbents and market factors such as multimarket contact significantly influence a new brand's introduction strategy.

Incumbent Response Strategy

Table 7 shows the results of Equation 5 for response in advertising. Entrant market experience is related negatively to short-term incumbent reaction ($p < .001$), consistent with H_4. Entrant marketing spending also negatively influences incumbents' short-term response ($p < .001$), in support of H_5. Multimarket contact decreases advertising response ($p < .001$), consistent with H_6. In terms of control variables, the relationship between response in advertising and scale of entry is negative ($p < .001$), contrary to previous findings that posit an inverted-U shape. Incumbent dominance is related negatively to incumbent advertising response ($p < .001$). Entrant relative quality ($p < .01$), incumbent advertising elasticity ($p < .001$), market size ($p < .001$), and market growth ($p < .001$) significantly increase the incumbent's short-term reaction. The results for the incumbents' medium-term response are similar, except that scale of entry and entrant relative product quality are not significant.

The results of incumbent short- and medium-term response in sales force appear in Table 8. In the medium-term

Table 6
NEW PRODUCT TOTAL MARKETING SPENDING MODEL RESULTS

Variable (Parameter)	Short-Term Spending Parameter (Standard Error)		Medium-Term Spending Parameter (Standard Error)	
Intercept (α_0)	2972.52	(1241.55)*	1647.61	(854.92)
Leadership of entrant in sales force (α_1)	1089.43	(293.87)**	574.94	(165.59)**
Entrant size (α_2)	2.06	(.38)**	2.39	(.26)**
Entrant relative product quality (α_3)	570.98	(1029.91)	560.07	(772.74)
Entrant market experience (α_4)	1110.22	(299.24)**	814.54	(164.54)**
Anticipated large incumbent response (α_5)	−.26	(.03)**	−.39	(.03)**
Anticipated small incumbent response (α_6)	−.04	(.11)	−.08	(.05)
Multimarket contact (α_7)	−1225.84	(190.62)**	−773.97	(107.59)**
Market size (α_8)	.55	(.31)	−.41	(.33)
Market growth (α_9)	14.47	(276.74)	132.96	(169.20)
Correlation of actual and predicted values	.60		.71	

*Significant at .05 level.
**Significant at .001 level.
Notes: Sample size = 138. Variables and parameters in bold represent hypotheses tested.

Table 7
INCUMBENT ADVERTISING SPENDING MODEL RESULTS

Variable (Parameter)	Short-Term Spending Parameter (Standard Error)		Medium-Term Spending Parameter (Standard Error)	
Intercept (β_0)	.20	(.40)	.04	(.43)
Entrant market experience (β_1)	−1.27	(.14)**	−.71	(.11)**
Marketing spending of entrant (β_2)	-6.1×10^{-5}	(1.6×10^{-5})**	-1.5×10^{-4}	(1.3×10^{-5})**
Scale of entry (β_3)	−2.38	(.68)**	−.26	(.23)
Square of scale of entry (β_4)	−10.60	(1.80)**	−.02	(.06)
Entrant relative product quality (β_5)	.69	(.31)*	.36	(.25)
Incumbent dominance (β_6)	-2.6×10^{-4}	(4.7×10^{-5})**	-6.8×10^{-4}	(4.1×10^{-5})**
Incumbent advertising elasticity (β_7)	1.61 (.11)**	1.44 (.11)**		
Multimarket contact (β_9)	−.18 (.03)**	−.35 (.02)**		
Market size (β_{10})	1.6×10^{-4}	(4.5×10^{-5})**	6.8×10^{-4}	(4.1×10^{-5})**
Market growth (β_{11})	1.07 (.08) ***	1.02 (.07)**		
Correlation of actual and predicted values	.54		.61	

*Significant at .05 level.
**Significant at .001 level.
Notes: Sample size = 358. Variables and parameters in bold represent hypotheses tested.

Table 8
INCUMBENT SALES FORCE SPENDING MODEL RESULTS

Variable (Parameter)	Short-Term Spending Parameter (Standard Error)		Medium-Term Spending Parameter (Standard Error)	
Intercept (β_0)	−1.01	(.15)***	−.15	(.18)
Entrant market experience (β_1)	−.07	(.05)	−.19	(.06)***
Marketing spending of entrant (β_2)	-1.9×10^{-5}	(7.3×10^{-6})**	-9.9×10^{-5}	(9.4×10^{-6})***
Scale of entry (β_3)	−1.03	(.27)***	−.78	(.26)**
Square of scale of entry (β_4)	−5.48	(.86)***	−6.71	(.77)***
Entrant relative product quality (β_5)	.92	(.11)***	1.82	(.15)***
Incumbent dominance (β_6)	-1.0×10^{-4}	(2.4×10^{-5})***	-2.6×10^{-4}	(2.6×10^{-5})***
Incumbent sales force elasticity (β_7)	.05	(.06)	.66	(.07)***
Incumbent leadership in sales force (β_8)	.05	(.02)*	.13	(.02)***
Multimarket contact (β_9)	−.03	(.01)*	−.13	(.02)***
Market size (β_{10})	2.8×10^{-4}	(2.3×10^{-5})***	8.2×10^{-6}	(1.7×10^{-5})
Market growth (β_{11})	.17	(.03)***	.31	(.03)***
Correlation of actual and predicted values	.53		.55	

*Significant at .05 level.
**Significant at .01 level.
***Significant at .001 level.
Notes: Sample size = 358. Variables and parameters in bold represent hypotheses tested.

response equation, entrant market experience reduces the incumbent's sales force expenditures ($p < .001$), in support of H_4. New brand marketing spending reduces the incumbent's short- and medium-term sales force response ($p \leq .01$), in support of H_5. In addition, multimarket contact is related negatively to response ($p \leq .05$) for both short- and medium-term responses, in support of H_6. With regard to control variables, market size and market growth are related positively to spending ($p < .001$). Incumbent dominance ($p < .001$) significantly reduces incumbents' short-term sales force response. Entrant's relative product quality ($p < .001$) and leadership in sales force ($p \leq .05$) significantly increase the incumbents' sales force response. As in advertising response, the relationship of scale of entry to incumbent sales force response, however, is negative ($p < .01$) and not an inverted-U shape as was predicted by prior research.

Finally, Table 9 shows the results of the equation for incumbents' total marketing spending. Entrant market experience is related negatively to incumbent's total marketing

spending, consistent with H_4. New brand marketing spending ($p < .001$) and multimarket contact ($p < .05$) are related significantly negatively to an incumbent's medium-term total marketing response, consistent with H_5 and H_6, respectively. Among the control variables, scale of entry is related negatively to incumbent total marketing spending ($p < .001$), whereas entrant product quality is associated positively with total spending ($p \leq .05$). Incumbent leadership in sales force ($p \leq .05$) significantly affects incumbent response positively, and market growth ($p < .001$) increases incumbent response ($p < 0.001$). Incumbent dominance is related negatively to short-term incumbent response ($p < .01$), and incumbent sales force elasticity ($p < .001$) is related positively to medium-term total spending.

Summary. Taken together, the results on incumbent responses in Tables 7, 8, and 9 support H_4–H_6 for advertising, sales force, and total spending. In other words, they show that an incumbent reacts more aggressively when the entrant's market experience is lower, the entrant's introducto-

Table 9
INCUMBENT TOTAL MARKETING SPENDING MODEL RESULTS

Variable (Parameter)	Short-Term Spending Parameter (Standard Error)		Medium-Term Spending Parameter (Standard Error)	
Intercept (β_0)	−.06	(.16)	.52	(.13)***
Entrant market experience (β_1)	−.34	(.05)***	−.26	(.04)***
Marketing spending of entrant (β_2)	-6.6×10^{-7}	(6.8×10^{-6})	-1.2×10^{-4}	(9.8×10^{-6})***
Scale of entry (β_3)	−1.11	(.28)***	−2.11	(.23)***
Square of scale of entry (β_4)	−4.52	(.77)***	−7.15	(.72)***
Entrant relative product quality (β_5)	.32	(.15)*	.87	(.12)***
Incumbent dominance (β_6)	-7.5×10^{-4}	(2.6×10^{-5})**	-3.0×10^{-4}	(2.9×10^{-5})***
Incumbent advertising elasticity (β_{7a})	.34	(.07)***	.14	(.08)
Incumbent sales force elasticity (β_{7b})	.09	(.06)	.67	(.05)***
Incumbent leadership in sales force (β_8)	.04	(.02)*	.06	(.02)**
Multimarket contact (β_9)	−.01	(.01)	−.10	(.02)***
Market size (β_{10})	7.5×10^{-5}	(2.6×10^{-5})**	2.4×10^{-5}	(1.7×10^{-5})
Market growth (β_{11})	.27	(.03)***	.29	(.03)***
Correlation of actual and predicted values	.51	.69		

*Significant at .05 level.
**Significant at .01 level.
***Significant at .001 level.
Notes: Sample size = 358. Variables and parameters in bold represent hypotheses tested.

ry spending is lower, and the incumbent has multimarket contact with the entrant. In addition, it responds with higher spending if the scale of entry is smaller, the entrant's relative product quality is higher, the incumbent is less dominant, the incumbent elasticity is higher, the incumbent is a leader in that marketing variable, and the market is bigger and growing quickly. In particular, the results show that incumbent response strategy is significantly determined by new brand introduction strategy and multimarket contact, in addition to the factors considered by prior research.[18]

Analysis of the relative size of the effects sheds some interesting insights. Table 10 shows the standardized coefficients for all the models of new brand introduction strategy. In the advertising spending model, entrant size, multimarket contact, market size, and the anticipated responses from

large incumbents are the most important factors. In the sales force spending model, anticipated reactions from large incumbents is the most important factor. Entrant size, entrant leadership in sales force, and multimarket contact are the next most important factors. Finally, in the total spending model, anticipated large incumbent reactions, entrant size, and multimarket contact are the most critical factors. Taken together, the focal factors in two of our hypotheses, namely, anticipated large incumbent reaction and multimarket contact, are critical factors determining new product spending.

Table 11 presents the standardized coefficients for the models of incumbent response strategy. In the advertising reaction models, market growth is the most critical factor, and scale of entry, entrant market experience, and incumbent advertising elasticity are other important factors. In the sales force reaction model, though market size and market growth are important factors, marketing spending of the new entrant and multimarket contact are also important. In the total marketing response model, entrant marketing spending is a critical factor, in addition to scale of entry. In this model, multimarket contact is important, but not as important as the other important factors identified. Combined, these standardized coefficients suggest that entrant marketing spending is a critical factor that drives an incumbent's response in advertising and sales force and that, in its response, an incumbent strongly considers multimarket contact.

[18]The results of the analysis of direction of incumbent response (logit model and discriminant analysis) are generally consistent with the results of the magnitude of response. I do not provide details of the results because of space constraints and because direction of response, in a sense, is subsumed in the magnitude of response, given the way it is operationalized here. Recall that a spending ratio less than or equal to 1 indicates an accommodating response, whereas a ratio greater than 1 reflects a retaliatory response. I also examined models that include plausible interaction variables, such as incumbent dominance and market growth, discussed previously. The interaction variables, however, were insignificant, so the original model is retained.

Table 10
STANDARDIZED COEFFICIENTS

A: NEW PRODUCT ADVERTISING		
Variable	Short-Term Spending	Medium-Term Spending
Entrant size	.40	.56
Entrant relative product quality	.12	.12
Entrant market experience	.12	.00
Large incumbent response	.29	.50
Small incumbent response	.08	.08
Multimarket contact	.28	.41
Market size	.33	.48
Market growth	.11	.16

B: NEW PRODUCT SALES FORCE SPENDING		
Variable	Short-Term Spending	Medium-Term Spending
Leadership of entrant in sales force	.42	.32
Entrant size	.54	.68
Entrant relative product quality	.03	.05
Entrant market experience	.27	.23
Large incumbent response	.59	.93
Small incumbent response	.07	.09
Multimarket contact	.30	.30
Market size	.18	.07
Market growth	.09	.06

C: NEW PRODUCT TOTAL MARKETING SPENDING		
Variable	Short-Term Spending	Medium-Term Spending
Leadership of entrant in sales force	.34	.22
Entrant size	.47	.66
Entrant relative product quality	.03	.04
Entrant market experience	.22	.20
Large incumbent response	.47	.88
Small incumbent response	.03	.07
Multimarket contact	.43	.33
Market size	.19	.17
Market growth	.01	.06

Notes: Variables and parameters in bold represent hypotheses tested.

Table 11
STANDARDIZED COEFFICIENTS

A: INCUMBENT ADVERTISING SPENDING

Variable	Short-Term Spending	Medium-Term Spending
Entrant market experience	.20	.12
Marketing spending of entrant	.07	.18
Scale of entry	.24	.03
Square of scale of entry	.38	.00
Entrant product quality	.04	.02
Incumbent dominance	.08	.21
Incumbent advertising elasticity	.18	.16
Multimarket contact	.07	.14
Market size	.06	.15
Market growth	.43	.42

B: INCUMBENT SALES FORCE SPENDING

Variable	Short-Term Spending	Medium-Term Spending
Entrant market experience	.03	.07
Marketing spending of entrant	.06	.26
Scale of entry	.31	.18
Square of scale of entry	.59	.55
Entrant product quality	.17	.26
Incumbent dominance	.03	.18
Incumbent sales force elasticity	.02	.23
Incumbent leadership in sales force	.07	.12
Multimarket contact	.14	.21
Market size	.32	.01
Market growth	.20	.28

C: INCUMBENT TOTAL MARKETING SPENDING

Variable	Short-Term Spending	Medium-Term Spending
Entrant market experience	.17	.12
Marketing spending of entrant	.02	.38
Scale of entry	.35	.58
Square of scale of entry	.51	.71
Entrant product quality	.06	.15
Incumbent dominance	.07	.25
Incumbent advertising elasticity	.12	.04
Incumbent sales force elasticity	.04	.28
Incumbent leadership in sales force	.05	.07
Multimarket contact	.04	.12
Market size	.24	.02
Market growth	.35	.32

Notes: Variables and parameters in bold represent hypotheses tested.

DISCUSSION

This analysis of 23 new brand entries and 59 incumbent responses in six different markets reveals several important determinants of new product introduction and incumbent response strategies and their associated relationships. Table 12 presents a comparison parameter signs predicted by the hypotheses and the results, together with a brief rationale for the results. Most effects are consistent with the hypotheses and generally consistent across advertising, sales force, and total marketing spending in both the short and medium term. The negative overall relationship between a new brand's marketing spending and the magnitude of incumbent response is consistent across the results from the two models.[19] Moreover, the negative impact of multimarket contact on

marketing spending is consistent across the two models. Taken together, these results suggest that the competitors in this sample practice mutual forbearance. This insight is consistent with the general perception of how most multinational firms in the U.S. pharmaceutical industry behave. Thus, by studying new brand introduction and incumbent response strategies in a single integrated framework and by including an anticipated reaction formation model and a more comprehensive set of factors, notably, multimarket contact, I demonstrate the interdependence of these strategies and identify important additional determinants of them.

With regard to new brand introduction strategy, the main findings can be explained as follows: Leadership in a marketing variable enables the entrant to use that variable

[19]To understand the interdependence of new product introduction and incumbent response strategies better, I compared the results with those from estimations of restricted versions of Equations 1 and 5 without the variables. The models showed significantly lower fits, and the differences between restricted and unrestricted models were statistically significant ($p < .001$), which suggests the importance of impact of incumbent response on new entrant strategy, and vice versa. I do not present the results in the interest of space.

Table 12
SUMMARY OF RESULTS

Factors (Hypotheses)	Predicted Signs	Results	Brief Rationale
New Product Strategy			
Entrant leadership in sales force (H$_1$)	+	+	Leadership provides an ability to spend aggressively on sales force.
Anticipated large incumbent response (H$_{2a}$)	–	–	Fear of aggressive retaliation leads to modest spending.
Anticipated small incumbent response (H$_{2b}$)	Not significant	Not significant	Small incumbent reactions are not perceived to be a threat.
Multimarket contact (H$_3$)	–	–	Prospect of attacks in other common market(s) inhibits spending.
Entrant firm size	+	+	Larger firms spend more because of superior resources.
Entrant relative product quality	+	+for advertising, not significant for sales force, total spending	The impact of advertising is higher for higher quality products
Entrant market experience	+	Not significant for advertising, + for sales force and total spending	Market experience lowers market uncertainty, leading to more spending.
Market size	+	– for advertising, not significant for sales force, total spending	Smaller markets enable development of awareness and preference more quickly, prompting greater introductory advertising.
Market growth	+	Not significant	—
Incumbent Response Strategy			
Entrant market experience (H$_4$)	–	–	It may be difficult to hurt an entrant with prior market experience through marketing spending.
Marketing spending of entrant (H$_5$)	–	–	Stronger reaction to aggressive entries can lead to a war of attrition.
Multimarket contact (H$_6$)	–	–	Prospect of attacks in other market(s) inhibits spending.
Scale of entry	Inverted-U	–	It may be unwise to react aggressively to large-scale entries in the ethical drug industry.
Entrant relative product quality	+	+	A stronger reaction may be required to neutralize any product advantage of new entrant.
Incumbent dominance	–	–	A nondominant incumbent is more threatened by new entry.
Incumbent advertising elasticity	+	+	Higher post-entry elasticity in advertising makes it a retaliatory weapon.
Incumbent sales force elasticity	+	+	Higher post-entry elasticity in sales force makes it a retaliatory weapon.
Incumbent leadership in sales force	+	+	Leadership accords an ability to be aggressive in spending.
Market size	+	+	Large markets offer greater revenue potential with increased spending.
Market growth	+	+	Stronger reaction leads to greater revenues when the market is growing.

Notes: Variables and parameters in bold represent hypotheses tested.

proactively and aggressively (Eliashberg and Robertson 1988), which results in greater introductory spending. If large incumbents are stronger and capable of erecting barriers, a new brand will be dissuaded from spending more on marketing (Scherer and Ross 1990). Thus, anticipated reactions from large incumbents lead to low spending. In contrast, anticipated reactions from small incumbents do not pose a threat to a new brand's spending. The prospect of retaliation by the incumbents in any other common market discourages a new brand from spending more on introduction (Bernheim and Whinston 1990).

The effects of the control variables are according to expectations. Larger firms with greater resources spend more on marketing (Yip 1982). Higher product quality confers a product advantage, plausibly leading to greater marketing spending (Porter 1985). Finally, greater market experience helps reduce uncertainty about the effectiveness of marketing variables and contributes to increased spending.

With respect to incumbent responses, the following explanation is offered for the results: A relatively new entrant to the market provokes a strong response from an incumbent, which may attempt to drive the entrant out of the mar-

ket (Bowman and Gatignon 1995). Modest introductory spending by the new brand enables an incumbent to react strongly to undermine the new entrant. In contrast, aggressive spending by the entrant results in a mild response from incumbents, which want to avoid a competitive spending war. Multimarket contact results in mutual forbearance and a milder response (Baum and Korn 1996).

The control variables have the expected effects. A superior quality brand tends to provoke a vigorous reaction from an incumbent that is intended to neutralize the entrant's product advantage. The results also demonstrate that a nondominant, more than a dominant, incumbent reacts aggressively to a new entry. A possible reason for this finding is that nondominant incumbents' positions could be threatened more severely by a new entrant (a new entrant may be able to steal greater share from nondominant incumbents than from well-entrenched dominant ones), so their responses could be more intense than those of dominant incumbents. A dominant incumbent also may stand to lose its margin with new entries, so spending more upon entry may be suboptimal (Shankar 1997). A high level of post-entry elasticity provides a strong competitive weapon for an incumbent, enabling it to react aggressively (Shankar 1997). Similarly, leadership in a marketing mix variable confers a preemptive advantage for the incumbent, which leads to a strong response in that variable. Bigger and fast growing markets offer high potential revenues and increased importance for an incumbent, encouraging it to respond more aggressively to a new entry (Porter 1980; Robinson 1988).

Some results from the sample, however, are contrary to the predictions. Although the rationale for these results is not straightforward, I can provide some plausible explanations. In terms of the determinants of a new brand strategy, the results are contrary to the expectation that market size positively affects an entrant's introductory advertising spending. A possible explanation is that smaller markets enable a new brand to develop full awareness and preference through advertising more quickly than in larger markets. By spending more on advertising during entry in small markets, a new brand has a high probability of achieving maximum awareness in a relatively short time, so that it is not at a disadvantage with respect to the established brands.

In terms of the determinants of incumbent responses, the relationship between scale of entry and the magnitude of incumbent response appears to be monotonic, contrary to the predicted inverted-U pattern. There are at least two explanations for this finding. The first is data related. It is possible that the data include only large scale entries, so only less intense responses to these entries can be observed, precluding analysis of reactions to medium-scale entries. The second explanation is that because many of the new entrants are established firms in the pharmaceutical industry, an incumbent may find it unwise to react intensely (Biggadike 1979).

There are some differences between short- and medium-term results for incumbent responses, but not for new product spending. In terms of incumbent response, some factors appear to be considered by the incumbents only in the short term, whereas a few others are important only in the medium term. For example, in the advertising reaction model, scale of entry is significant in the short term but not in the medium term. A possible reason is that, in the short term, an incumbent may use the scale of entry as a primary indicator of the threat posed by the new brand in basing its decision on creating or maintaining awareness. In the medium term, however, an incumbent may not need to rely on scale of entry as the main indicator of the threat of the new brand. This is because the other factors might be better predictors, based on the behavior of the new brand in the short term. Similarly, incumbent sales force elasticity is significant in the medium-term reaction but not in the short-term reaction. An incumbent might have to wait in the short term to assess its post-entry elasticity before considering it in its response.

Implications Relative to Prior Findings

Most of the findings significantly extend previous research, though others are consistent with prior research. First, the findings demonstrate that new product introduction strategy is influenced significantly by anticipated incumbent reactions, whereas incumbent reactions are affected significantly by introduction strategy. This is demonstrated by capturing anticipated incumbent reactions through an expectation formation model. Prior research has assumed that these strategies are unrelated and has not modeled the impact of anticipated reactions. Second, the relationship of new product introduction strategy with incumbent response is shown to be asymmetric with respect to the size of incumbents. It is related negatively to the anticipated reactions of large incumbents but is unrelated to those of small incumbents. Prior research has not explored this issue. Third, the results show that both new product introduction and incumbent response strategies are affected significantly by the multimarket contact that exists between the entrant and the incumbent firms. Prior research has not examined the role of multimarket contact in the context of new product introduction. Fourth, prior research shows that market size is the significant determinant of a brand's introductory efforts (Gatignon, Weitz, and Bansal 1990). This analysis shows that, in addition to market size, entrant characteristics such as size, relative product quality, market experience, and relative leadership in a marketing mix variable; incumbent characteristics such as incumbent size and anticipated incumbent reaction; and market characteristics such as multimarket contact are key factors that affect new entrant strategy. Fifth, previous analyses show that the direction of incumbent response is determined by scale of entry, incumbent dominance, incumbent elasticity, incumbent leadership, market size, and market growth (Gatignon, Anderson, and Helsen 1989; Robinson 1988; Shankar 1997).

This analysis extends the importance of these factors to the magnitude of response and reveals new key determinants, namely, entrant relative product quality, entrant market experience, new product introduction strategy, and multimarket contact. The results show that an incumbent responds less severely as the scale of entry is higher, contrary to Robinson's (1988) finding on the direction of response. These differing results, however, can be reconciled. Robinson's (1988) results pertain to a composite marketing reaction index that includes nonmarketing spending variables such as product and price. Response in individual marketing spending variables could be monotonic, whereas the composite reaction could well be nonmonotonic. Furthermore, the relationship between incumbent dominance and the magnitude of incumbent response is negative, consistent with Shankar (1997). In summary, this research provides an integrated framework of new product introduction and in-

cumbent response strategies that involves the impact of a comprehensive set of factors. It integrates previous research on the separate issues of new product introduction strategy and incumbent response strategy and identifies new determinants of these strategies.

MANAGERIAL IMPLICATIONS, LIMITATIONS, AND FURTHER RESEARCH

The results provide a clear profile of the most aggressive and passive entrants and incumbents for practitioners. The most aggressive entrants are large firms that expect mild reactions from large incumbents and that have no multimarket contact with the incumbent firms. In addition, they tend to be leaders in marketing mix variables, have higher relative quality, and already have some experience in the market. The most passive entrants are the opposite. The most aggressive incumbents are those that encounter entrants with little market experience and little introductory market spending and those that have no multimarket contact with the entrants. They also tend to be dominant in their markets, are effective competitors, and are leaders in marketing mix variables. They have a greater propensity to be aggressive toward new products with higher relative quality that are entering on a small scale in large, growing markets. The most passive incumbents exhibit the opposite characteristics.

The results also provide useful guidelines for managers. Managers should be able to understand the drivers of new product introduction and incumbent response strategies better. Entrants can plan their introduction strategies better. If entrants want to minimize responses from large incumbents in a market, they may want to enter on a large scale with substantial marketing spending and also enter multiple markets. Entering multiple markets increases the likelihood of contact with a prospective entrant, which leads to lower anticipated response from the incumbents.

The findings can help incumbents respond to new entries better. In particular, by understanding the linkage between new product introduction strategy and incumbent response strategy, an incumbent can make well-planned decisions about its marketing mix variables. By understanding that new product decisions can be different with respect to the reactions of large and small incumbents, these incumbents can formulate their strategies better. If large incumbents wish to discourage heavy spending by new products, they can retaliate against a new entrant strongly so that they deter future entrants. They also can deploy products of high relative quality, rendering the entrant's relative product quality low. They also can increase their presence in multiple markets. In formulating their response strategies, managers may want to reconsider the role of factors such as scale of entry, because their influence may not be what prior research has suggested.

The results also offer implications for competitive interactions. Although a large incumbent may spend heavily in response to a new entry to signal dissuasion of big spending by future new brands, it may be rational for potential new entrants to ignore this signal. This is because the findings also show that high new product introduction spending results in reduced response from large incumbents. Nevertheless, the results show that new brands enter with reduced spending when they anticipate strong reactions from large incumbents. These findings imply that the signaling by large incumbents, though not very credible, is effective in discouraging heavy spending by new brands.

This research has limitations that could offer interesting opportunities for further research. First, the results are from a specific industry, namely, the pharmaceutical industry. To examine the generalizability of the results, this study could be replicated in other industries with the availability of additional relevant data. Second, the sample size for new product entries was limited. Although it is difficult to obtain a complete set of time-series data for new product entries and incumbent responses in multiple markets, additional research could aim to collect and analyze more data. Third, analysis of incumbent responses could be extended to include responses to market exits. Fourth, analysis of responses in product and pricing could be added where relevant. Fifth, there could be differences in the impact of advertising and sales force for other product markets. Investigation of this issue could be another useful avenue for further research. Sixth, this study could be extended to examine optimal entry and response strategies. These extensions could provide valuable additional insights into the formulation of effective competitive strategies.

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