ORDER-OF-ENTRY AND THE DIFFUSION OF TRIALS IN A NEW CATEGORY

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Abstract

This paper builds on the recent literature on order-of-entry effects which indicates that it is critical to model the diffusion phenomenon of a new brand in order to estimate marketing mix elasticities and order-of-entry effects. More specifically we test hypotheses regarding the role of order-of-entry on the brand level trial process within a category. Consistent with these research hypotheses, the results demonstrate that a brand's trials and its pricing and advertising elasticities vary systematically as a function of competitive entry. Competitive influences (which are negative) increase as order of entry is delayed. Short-term price elasticities are found to be an inverted U relationship with the order of entry, whereby early followers have the highest elasticities, as compared to the pioneer and to the later followers. Advertising elasticities decline as the number of competitors increases.

Order of Entry and The Diffusion of Trials in a New Category

The critical importance of brand-level trials or first purchase in attaining long-run product acceptance has been noted by brand management researchers and especially in new product development research. (Lilien, Kotler and Moorty 1990, Rogers 1983, Dolan and Jeuland 1981). A number of product acceptance models have isolated the trial process as a factor driving new product success. For example, the NEWs model conditions sales of a new product on trials (Pringle, Wilson and Brody 1982). Indeed, lacking first purchases, repeat purchases can not be forthcoming). In categories where trials play this crucial role, marketing efforts focus on trial generation. Trials play the role of a gate-keeping function for long-run diffusion.

In this paper we focus on the role of order-of-entry on the brand-level diffusion of trials. A number of studies have focussed on pioneering strategies and their impact on long-run market share or competitive advantage (see Schnaars 1994 for a review)[1]. In general, these studies analyse a broad range of product categories in which only two or three entries occur within a category. In addition, these cross-sectional studies consider established brands several years after the category concerned has been launched and/or reached maturity, and then correlate measures of success (i.e., market share) with entry order, among other variables. While launching strategies ultimately affect long-run success (Gatignon, Weitz and Bansal 1990), there is sparse evidence showing the extent to which order of entry actually mediates the contemporaneous trial process for an individual brand over time. Kalyanaram and Urban (1992) demonstrate that late entrants have a lower market share potential than early entrants, although they reach that potential faster. Their analysis based on 8 product categories having two or three entrants each is the only one, to our knowledge, to show the existence of these effects. However, the diffusion of trials is not explicitly modeled[2]. Building on this finding, we explicitly model the impact of order of entry on the diffusion of trials. Managers facing the "pioneer or not pioneer" question must consider the likely trial diffusion process for the pioneer, as compared to the second, third, or fourth entrant. A related issue concerns the dynamic nature of the efficacy of the marketing mix variables. Does the efficacy of the marketing mix systematically change from one entrant to another as the category matures, entry is delayed, or the number of competitors increases? These two issues, diffusion and effectiveness of marketing mix variables, are interrelated because estimating marketing elasticities without modeling the diffusion process can lead to erroneous results (Parker 1992a). For example, advertising elasticities might appear to be negative early in the life cycle given that advertising levels are high when trials are low, while advertising

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1 Other studies consider strategies of new brands which enter into established categories (e.g. Gatignon, Anderson and Helsen 1989; Robinson 1988; Carpenter and Nakamoto 1990; Gatignon, Weitz and Bansal 1990).

2 The growth of sales is only a function of time.

levels are lower when sales are high later in the life cycle.[3] Understanding the actual effects of entry order on brand-level penetration will clearly help managers evaluate the costs and benefits of entering a market at a particular moment in time, and design the most appropriate marketing strategy given that an entry order is known.

Diffusion research has typically been concerned with acceptance of and penetration within a population of durable goods at the aggregate product category level. Recently, competitive effects within the diffusion process have been analyzed in normative models of marketing mix decisions over the product life cycle (as reviewed in Mahajan, Muller and Bass (1990). Empirical evidence as to the brand level diffusion is, however, limited (Parker and Gatignon 1994). In addition to providing an empirical analysis of such diffusion processes at the brand level, our research investigates the trial of new frequently purchased products. As pointed out earlier trial rates are a key determinant of the success of a new product and, therefore, represent a strategic dimension for the marketing of new frequently purchased products. Trials of new products follow an adoption process which has been distinguished from repeat purchase and which is subject to a diffusion process (Dolan and Jeuland 1981, Parker and Gatignon 1994).

This paper is a first attempt to address these issues by explicitly considering the diffusion process in assessing the impact of entry order on brand-level product trial and on the efficacy of the marketing mix. The integration of diffusion analysis into the study of order-of-entry effects is a natural extension of the strategy literature. Inherent to pioneering, the first entrant creates a category which undergoes a diffusion process. In doing so, the first entrant faces the greatest uncertainty and risks typical of all centralized (monopolistic) new product diffusion processes (Rogers 1983). In return for its risk taking, the pioneer is given the opportunity to gain advantages typical of monopolies before decentralized diffusion starts and competitive products enter the market. These advantages include gaining customer loyalty, preempting scarce shelf space, and setting category standards, among others (Lieberman and Montgomery, 1988). Later entrants, in theory, have lower potential gain, but at a relatively lower level of risk. The lower risk is often seen as a free rider effect. For example, the pioneer must devote substantial resources in generating both category and brand-level awareness and acceptance while a "me too" follower need only focus on brand-level awareness.

Specifically, we consider the case where category diffusion consists of a pioneer brand which is followed by "me too" products; all brands follow individual diffusion processes. "Me too" brands are defined as brands which are differentiated from the pioneer only by their brand names and marketing strategies, and less so the physical products themselves. The success of a particular brand in gaining penetration is proposed to be a function of its entry order (pioneer versus later entrant), and the number of competing brands (the competitive "wake"). The relative benefits of pioneering a category, versus waiting

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3 Indeed, sales and marketing activities are often negatively correlated during the introduction period of a brand.

to enter after category-level uncertainty is reduced, is manifest in each brand's market potential, its rate of trial diffusion, and the market response to its marketing mix (price and advertising). In the next section we develop hypotheses as to the expected effects of entry order on brand-level diffusion. An econometric model of brand trials is then proposed to test the hypotheses using scanner data collected from a frequently purchased product category where a much larger number of entries occurred than in past data bases which have been reported in the literature. Our empirical analysis generates a number of original insights on competitive diffusion processes, discussed in the conclusions of the paper.

RESEARCH HYPOTHESES

We begin our discussion by defining the environment in which new products enter into competition as a new category is launched and matures. Consistent with Rogers (1983), the marketing literature has focussed on the impact of interpersonal influence on the diffusion of new products. In particular, three interpersonal influences are identified by Peterson and Mahajan (1978) which affect the rate at which a brand i penetrates within its given market potential: (1) extra-category influences; (2) brand-specific influences and (3) competitive influences. Extra-category influence is defined as those which do not directly result from the purchase experience of any particular brand in the category. In essence, all new categories, and brands within a category, face consumer resistance. The higher the extra-category influences, the lower the resistance level to the innovation and the faster a category, or brand takes off. Brand-specific interpersonal influence reflects the influence (direct and/or indirect) of adopters of a particular brand on non-adopters. Competitive influence reflects the contact between the adopter of brand j and the potential adopters of brand i. This influence is typically negative (Peterson and Mahajan 1978). In oligopolistic markets, competitive influences may be a function of more than one brand. When the costs of trial, or first adoption, are low, as in frequently purchased products, consumers may try multiple brands and base their future purchase decisions on the resulting experience. Given this environment, we will focus on the order of entry for each brand, i, and the level of competition that exists after the brand has entered the market, or its competitive wake. Specifically, we estimate the impact of these two factors on: (1) brand-level diffusion (first purchase or trial) dynamics, (2) brand-level price elasticity dynamics, and (3) brand-level advertising elasticity dynamics.

Diffusion Dynamics

Given the pioneer's ability to preempt scarce resources, and develop some first-mover advantage, previous research in strategy has found that the earlier the entry, the higher the probability of long-run product success (Bond and Lean 1977; Whitten 1979; Biggadike 1976). In the diffusion literature, Gatignon and Robertson (1985, p.855) propose that "the adoption of an innovation depends on its fit within the existing consumption system and its ability to compete for scarce resources in order to achieve a position in the consumer's priority acquisition pattern." Given the monopoly period enjoyed by the pioneer, the quality reputation of this first entrant should enable it to attract the largest number of first-time buyers. This pioneering advantage may also carry over to the ability of a brand to obtain premium shelf space, the allocation of which is likely to be a function of entry order (Montgomery 1975). For these reasons, if entry order is delayed, then the nth "me too" brand will have extreme difficulty in achieving a position in the consumer's priority acquisition pattern. Porter (1985) notes that loyalty to pioneering brands may be strong even for low cost "convenience goods" since the benefits of "me too" brands are likely to be insufficient to overcome switching costs. Though questions have been raised over survivor biases (Golder and Tellis 1994), substantial empirical evidence suggests that such pioneering advantages lead to higher long-run market shares in both industrial and, especially, consumer categories (Schnaars 1994, and Roberson and Fornell 1985). More specifically, Kalyanaram and Urban (1992) show that potential market shares decline with the order-of-entry.

Taken alone, this finding would lead one to conclude that firms should always be pioneers of new product categories. There are, however, costs in being first which result in a slower rate of reaching the potential market share (Kalyanaram and Urban 1992). One such cost is overcoming the high level of uncertainty faced by consumers. As consumers generally resist discontinuous change, the diffusion process can be slow to "take-off". We would expect the pioneer to face greatest category-level resistance and, therefore, a slower take-off than later entrants; this would be reflected in low levels of extra-category (or external) influence, for the pioneer. Gatignon and Robertson (1985) propose that diffusion patterns are more likely to be exponential in shape when uncertainty is low, there are low switching costs, or where there is low levels of involvement. This is consistent with later brands entering into a category enjoying faster diffusion rates (extra-category influences), but, again, with reduced market potentials. On the other hand, the pioneer is, by virtue of being a monopolist for some period of time, less affected by competitive influences which are likely to be negative (Peterson and Mahajan 1978) for brands of similar quality. As consumers form loyalties to brands launched earliest in the category life cycle, competitive influences will be higher, in absolute value, for later entrants. The likely dynamics of extra-category influence, and competitive influences imply a relative decline in brand-specific influences. For the pioneer, brand-specific influences will be high relative to extra-category influences and to competitive influences (in absolute value). This is a natural result of consumers being less resistant to the category over time (a "free rider" effect) and relying more on cross-brand information as the number of available alternatives increases. Such influences can be expected to decrease when new similar products are introduced as general category knowledge makes it less necessary for consumers to have brand-specific knowledge[4]. We would expect

4 If the products are of substantially different quality, one can hypothesize that such influences will increase across entrants, because consumers will require higher levels of brand-specific information as the number of previously launched brands increase.

the relative importance of brand-specific influence to decline, therefore, as a function of entry order. Therefore

H1: **Extra-category influences increases with order of entry.**
H2: **Competitive influences negatively affect the diffusion of a brand and decreases (in absolute value) with order of entry.**
H3: **Brand-specific influences decreases with order of entry.**

Price Elasticity Dynamics

Consistent with economic theories, research in marketing has generally concluded that brand-level price elasticities, hereafter referred to in absolute value, generally increase as the number of close substitutes increases (e.g. Liu and Hanssens 1981; Nagel 1988, Tellis 1988). We would therefore expect, for a given entrant *i*, that elasticities increase as the number of "me too" competitors increase.

H4: **For a given entrant, price elasticities increase as the number of competitive substitutes increases.**

Not all brands, however, will start with the same elasticities since the category will be undergoing a diffusion process. Rogers finds that the earliest adopters are venturesome, risk seekers, and have high incomes. Similar conclusions have been made in the marketing literature (Robertson 1971, Gatignon and Robertson 1985). The pioneering brand is destined to sell to these early adopters who are relatively insensitive to price changes. Brands immediately following the pioneer face more price sensitive consumers; elasticities then increase as a function of entry order. As the market becomes crowded with various brands, brands which enter late in the life cycle may find it difficult to compete based on price (as previous brands have built reputation, or filled price elastic segments of the market). Consumers are more price sensitive due to the level of competition, but the late entrant may have to cut price even more than its competitors in order to obtain an effect on sales that an earlier entrant could obtain with a lower price cut. This implies lower price elasticities for late entrant. This conclusion that late followers have lower price elasticities is consistent with Bond and Lean (1977) and Carpenter and Nakamoto (1989) who find that later entrants often fail to gain market share even with substantial price cuts. In addition to lower market potentials, this loss in ability to use price as an entry vehicle can be seen as a cost to introducing a "me too" brand too late into the category diffusion process. Initial price elasticities vary, therefore, as an inverted U function of entry order.[5]

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[5] Only a segment of this curve might be revealed when price elasticities simply increase by order of entry. Such dynamics might occur if loyalties to earlier brands are low and switching costs are low (e.g. for a commodity-type category), and consumers actively seek comparative price information. The more general hypothesis is considered as it generalizes both outcomes:

H5: Initial price elasticities, in absolute value, across entrants vary as an inverted U function of entry order; elasticities are low for the pioneer, higher for brands which immediately follow, and lower for the later entrants.

Advertising Elasticity Dynamics

The marketing literature has long recognized the time varying nature of advertising elasticities. In general, advertising elasticities are found to decline over time over the product/brand life cycle (Arora 1979; Kotler 1971; Parsons 1975). Similarly, the diffusion literature has noted that marketing variables affect the diffusion process with decreasing returns to scale (Gatignon and Robertson 1985). Elasticities may decline due to general wear-out effects, and competitive advertising which will intensify as the category matures. For a given entrant, advertising elasticities decline, therefore, as the number of competitive substitutes increases:

H6: For a given entrant, advertising elasticities decline as the number of competitive substitutes increases .

Regarding asymmetries of advertising elasticities across entrants, the literature provides less guidance. Rogers (1983) notes that innovations often must overcome perceived risks of category acceptance, via mass communication. The strategy literature concurs by finding that pioneering brands often must bear the expense of category development, the benefits of which are reaped by following brands. Under such conditions, initial elasticities for the pioneer are likely to be lower than for following brands who enjoy a free rider effect. . The diffusion theory literature argues that advertising has its greatest impact when there is less cognitive processing (Gatignon and Robertson 1985). Cognitive processing is likely to be high for the pioneer's brand due to high category uncertainty and lower for early followers. However, as the market becomes saturated with "me too" brands which might have high cognitive switching costs (due to loyalties to earlier brands), advertising's role as a communication factor becomes minimal. Then, lower advertising effectiveness for late "me too" entrants will be reflected in lower elasticities.[6]

H7: Advertising elasticities are an inverted U function of the order of entry; the pioneer has lower elasticities than early followers, who in turn have higher elasticities than later entrants;[7]

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6 This hypothesis would not be justified for differentiated entries where communication plays a key role.

7 In the absence of free-rider effects, we would expect initial advertising elasticities to simply decline as a function of entry order. This special case of the general hypothesis would be consistent with Roger's finding that mass communication is most effective with innovators, or the adopter segment targeted by the pioneer. Should the pioneer be able to develop brand preference, or set a category standard, even immediate "me too" followers will find it difficult to generate advertising-based interest.

In the next section we propose a model to test the various hypotheses empirically. The model is estimated using trial data from a new product category.

AN EMPIRICAL TEST OF THE HYPOTHESES

Model Development

In order to model diffusion and elasticity dynamics across entrants, as conceived above, we specify a brand-level model based on the Bass model (1969, 1980) for first purchase diffusion similar to the one proposed by Peterson and Mahajan (1978):

$$f_i(t) = \left(a_i + b_i \frac{F_i(t)}{M_i} + c_i \frac{F_j(t)}{M_j(t)}\right)(M_i - F_i(t)) \tag{1}$$

where:
$f_i(t)$ = first purchases of brand i at time t,
$F_i(t)$ = cumulative first purchases up to time t,
a_i = the coefficient of external (extra-category) influence for brand i,
b_i = the coefficient of brand-specific internal influence for brand i.
c_i measures influences from the j competing brands on brand i.

The model assumes that the diffusion of a brand (trials in the case of frequently purchased goods) is a function of external influence, a_i, internal influences (word-of-mouth, visual display), b_i, and each brand's market potential M_i. Equation (1) represents the diffusion of a new product or concept where internal influence pays a role. This role has been demonstrated in durable goods as well as with the first purchases or trials of packaged goods which are highly influenced by word-of-mouth or interpersonal influence (e.g. Feick, Price and Higie 1986). Consistent with this literature, the trial model proposed by Fourt and Woodlock (1960), which excludes the b_i parameter, is statistically rejected by a likelihood ratio test in favor of Equation (1) in the empirical analysis reported in the next section.

The only difference between this specification and the Bass model is due to incorporating interpersonal influences from competing brands.

$M_j(t)$ measures the combined market potentials of competing brands, which is dynamic as more brands enter the market. Here again, we assume that each brand penetrates a market potential specific to each brand. While one might wish to specifically model influences from multiple brand adoptions, or influences associated with each competing brand, we combine all such adoptions into one measure, $F_j(t)$, as all brands studied are of similar quality to the pioneer (i.e, "me too" brands). As suggested in Hypothesis 2, competitive influences are hypothesized to be negative ($c_i<0$). Pooling across brands, we can formulate a_i, b_i and c_i as linear functions of order of entry which leads to:

(2) $$f_i(t) = \left[(a_0 + a_1 i) + (b_0 + b_1 i)\frac{F_i(t)}{M_i} + (c_0 + c_1 i)\frac{F_j(t)}{M_j(t)}\right](M_i - F_i(t))$$

where a_0, b_0 and c_0 are intercept values of the three diffusion influences, and a_1, b_1 and c_1 measure the order of entry effects on these influences (e.g. the coefficient of external influence varies as a function of entry order i). We hypothesize that $a_0 \geq 0, a_1 > 0, b_0 \geq 0, c_0 \leq 0$, and $c_1 < 0$.

We incorporate the marketing mix using a general response function with multiplicative effects, $R_i(t)$, with varying short-term elasticity parameters for price, $P_i(t)$, and advertising, $A_i(t)$; elasticities are hypothesized to vary according to the order of entry and the number of competitors in the market, $C(t)$. Because of the nonlinear hypotheses, initial elasticities are specified to be a quadratic function of order-of-entry, i, and as a function of the number of competitive substitutes, $C(t)$.

(3) $$R_i(t) = P_i^{\eta_0+\eta_1 i+\eta_2 i^2+\eta_3 C(t)} A_i^{\delta_0+\delta_1 i+\delta_2 i^2+\delta_3 C(t)}$$

where η_0, η_1, η_2, η_3, δ_0, δ_1, δ_2 and δ_3 are elasticity parameters to be estimated. We hypothesize that price elasticities are negative and increase in absolute value as the number of competitors increase $\eta_3<0$; initial price elasticities are hypothesized to increase then decrease, or simply increase as a function of entry order as captured in η_0,η_1 and η_2. Advertising elasticities are hypothesized to be positive, but should decline as $C(t)$ increases ($\delta_3<0$); initial elasticities across brands are hypothesized to be low for early entrants, higher for mid-cycle entrants, and lower for later entrants or simply decrease by order of entry. The marketing mix response is modeled using the separable formulation:

(4) $$f(t) = f_i(t)\, R_i(t)$$

The form used in equation 4 allows to directly interpret the estimated parameters as elasticities. Nonseparable formulations of equation (4) were considered but did not provide better fits to the data.

Data

In order to test the hypotheses, the data analyzed must have a reasonably large number of entrants and include, from the first day of the category's existence, the first purchases (trials), prices and advertising expenditures of all existing brands. The product category defined as "hair styling mousses" was the only category which met these criteria (with no seasonality) among hundreds of categories screened among consumer electronics and frequently purchased products[8]. This category was pioneered by L'Oreal in February 1984 and was followed by nine "me too" brands by February 1985. The follower brands included in this study were only differentiated from the pioneer by their individual umbrella brand names. Across the nine brands considered, only the sixth entrant, "Suave" has a known reputation to be a "follower" which consistently offers "me too" products across all hair care products labeled with this brand name. All brands were launched nationally; only trials are analyzed in this study as marketing efforts, at this stage of the category's life cycle, were concentrated on encouraging trial demand (which is common for frequently purchased products). After the first nine entrants (or two and a half years), category segmentation led to a proliferation of an additional forty brands by 1988; these later brands differentiated themselves on various attributes including fragrances, flavours, colors, metallic glitter content, alcohol content, and hair treatment ability (strong hold, weak hold). Advertising and pricing data, were also collected for each brand.[9] Advertising is defined as a share to competitive advertising, and price is relative to competitive prices.[10] Both price and advertising are standardized about their means to avoid scaling biases in the diffusion parameters estimates.

Estimation Procedure

The parameters of the model are estimated using nonlinear least squares (NLS). The NLS procedure has the advantage of providing estimates of the standard errors of individual parameters in diffusion models, and is, therefore, best suited to testing specific hypotheses (Srinivasan and Mason 1986). Since equation (4) does not have closed form solution when expressed as a continuous differential equation, we directly estimate the parameters on the discrete form with an additive error term. While using the discrete form may lead to time-interval biases which might affect the forecasting ability of models estimated on only a few observations (Schmittlein and Mahajan 1982), Mahajan, Muller and Bass (1990) report that for model testing and comparison across products, the different estimation procedures often yield similar parameter

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8 Data on trials were provided by Information Resources Inc. across a static sample of some 6,000 households; television advertising expenditures provided by Broadcast Advertising Reports generally consists of national advertising; print media advertising provided by Leading National Advertisers covers all major magazines, newspaper and newspaper inserts.

9 The monthly advertising data were adjusted for the trial data covering four-week periods which do not correspond exactly to calendar months.

10 Since brands 6 and 8 did not advertise, a multiplicative dummy variable was introduced into equation 4 which set the advertising elasticity to zero for these brands. The estimated elasticity dynamics are with respect to those brands which advertised. Models using absolute measures of the marketing mix are not reported as they yield similar results. An examination of residual variances reveals that the pooling across brands does not introduce significant heteroscedasticity which may have lead to inefficient parameter estimates, and biased variance estimates of the parameters. Similarly, the reduction of the pooled brands to smaller subsets does not lead to reversals in the substantive conclusions.

estimates. In our case, these biases are minimized since we examine the entire diffusion (trial) process of each brand (from introduction to decline) leading to over 20 observations per brand, or 212 observations when pooled in the general model.

Empirical Results

First, the finding by Kalyanaram and Urban (1992) that market potentials (or shares of trials) decline as a function of order of entry is also supported by our analysis. By estimating the Bass model for each brand, one obtains estimates of the market potential. This procedure is used because all brands had, after 24 months, reached their trial peak and declined to near negligible levels; i.e. the market potential was directly observable for each brand prior to or coinciding with the 24-month window considered. Across the nine brands, there is a significant negative correlation between entry order and the estimated market potential, M_i ($r=-.58$, significant at $p\text{-}value<.0001$ level). The pioneer, L'Oreal, had the highest level of trials after two years (over 520 households among the 6,000 in the panel), while the ninth brand was only able to reach about 30 trials. This finding is consistent with previous studies which have found a significant negative correlation between order of entry and long-run market share. As high repeat sales can only occur after a high level of trials, this data would suggest that one factor driving this result is the negative correlation between trial penetration and order of entry. One notable exception is Brand 6 which was able to receive substantial trials which we might attribute to its successful use of an umbrella image of being an inexpensive "me too" brand (Wernerfelt 1987). High trial levels achieved by followers may reflect, therefore, brand equity associated with successful extensions within a related category (from traditional hair care products to hair styling mousses). Despite the possible equity associated with such umbrella brand name extensions, there is nevertheless a significant negative correlation between entry order and market potential.

To directly test the research hypotheses, we estimated the full model, equation (4), which pools across all brands (labelled Model 1 in Table 1). As indicated by the significance levels, a number of the parameters have large standard errors and are not statistically different from zero. In order to evaluate parameter stability and to generate powerful tests from which the hypotheses can be evaluated, all relevant models nested in Model 1 were estimated. Using likelihood ratio tests, these models were compared to Model 1. We report the results using Model 2 (in Table 1) which represents the most parsimonious model not statistically different ($p\text{-}value<.01$) from the full model (Model 1). In addition to the chi-squared distributed likelihood ratio test statistic, which gauges the statistical difference between Models 1 and 2 (Judge *et al.* 1985), asymptotic adjusted R-squared statistic and the sum-of-squared errors are also reported for both models. In general, alternative nested models reveal a strong stability in the diffusion and elasticity parameters which have, however, higher standard errors.

We begin by discussing order-of-entry effects on brand-level diffusion (H1, H2, H3). The results provide strong support for the first three hypotheses. Supporting the first hypothesis (H1), extra-category influences are estimated to vary as a positive function of the order of entry, as seen in the positive and highly significant value of a_1 (*p-value* < .01). The pioneer faces the greatest extra-category resistance. All other influences held constant across brands, the more entry is delayed, the less resistance is experienced for "me-too products" and the faster their take-off. This faster take-off is mitigated, however, by the diffusion of competitive brands. With respect to the second hypotheses (H2), the results indicate that competitive influences negatively affect the diffusion of a brand and vary as a negative function of the order of entry; c_1 is estimated to be significantly less than zero (*p-value* < .01). The pioneer is found to face the lowest levels of competitive influence, reflecting some degree of invulnerability to "me-too" followers. The more entry is delayed for a me-too brand, however, the more negative the competitive interpersonal influence (generated, presumably, from greater levels of brand comparisons and loyalties formed to the earlier entrants which offer products of similar quality). The combined dynamics suggested by the first two hypotheses, and the lack of significant order-of-entry effects on brand-specific influences, b_1, lends support to the third hypothesis (H3) that the relative importance of brand-specific influences is a negative function of the order-of-entry. As entry is delayed, competitive influences increase, while brand-specific influences remain constant and, hence, decline in a relative sense. Me-too followers are less able to rely on the positive word of mouth generated from their products as these diminish in relation to competitive effects.

The next two hypotheses test whether price elasticities are affected by intensity of competition, or the competitive wake, and the entry order (H4 and H5). Regarding the influence of competitive substitution on elasticities (H4), the parameter estimates indicate that as the number of substitutes increase (*C(t)*), the price elasticities also increase for each brand. This effect, however, is not strongly supported as seen in the low levels of significance for the estimates of η_3 (*p-value* ≥ .10). The dynamics of initial elasticities by entry order (H5) are tested via the quadratic parameters in the price elasticity function: η_0, η_1 and η_2. We hypothesized that initial price elasticities, in absolute value, will either vary as an inverted U function of entry order (H5 whereby elasticities are low for the pioneers, higher for brands which immediately follow, and lower for the later entrants). As shown in Model 2, the dynamics hypothesized in H5 are revealed in the statistically significant parameters η_1 and η_2 (*p-value* < .01). The pioneer is estimated to have an initial elasticity of -1.02. Elasticities reach their maximum for brand 3, -1.68, and thereafter decline toward zero. Models imposing either linear, or constant elasticities do not perform as well in explaining the diffusion process across brands. This conclusion is born out by likelihood ratio tests indicating a substantially worse fit than the full model; χ^2 = 16.62 (*p-value*>.05) for the linear elasticity function, and χ^2 = 22.3 (*p-value*>.10) for the constant elasticity function.

With respect to advertising elasticities, the data generally support Hypothesis 6 that, for each entrant, advertising elasticities decline as the number of competitive substitutes, C(t), increases. This effect is supported by the *p-value* (<.01) for δ_3 , in Model 2. Since later brands entered the category when it already