Branded Variants: A Retail Perspective

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Manufacturers frequently offer myriad variations of a branded product. In many cases, manufacturers have tens to hundreds of models. Seiko wrist watches, for example, may come with different bands, chimes, and special features. The authors call these variations *branded variants* and suggest that manufacturers offer branded variants for the benefit of their most direct customers—retailers. With branded variants, a consumer must remember, evaluate, and process a wider variety of product features to make comparisons across variants and retail outlets. The authors suggest that as branded variants increase, some consumers experience an increased cost of shopping for a branded product across retail stores. Consequently, fewer consumers shop across retail stores. This reduced shopping translates into reduced competition across retail stores, which encourages (1) more retailers to carry a branded product and (2) retailers to supply that branded product with more retail service support. The authors use data from three retailers across 14 product categories to demonstrate that a branded product with more variants often has greater retail availability and higher levels of retail service.

# Branded Variants: A Retail Perspective

Manufacturers frequently offer numerous variations of branded products. We call these variations *branded variants* (Shugan 1989). It is virtually impossible to avoid branded variants. They permeate most durable and semidurable goods, including alarm clocks, answering machines, appliances, baby items, binoculars, dishwashers, luggage, mattresses, microwaves, sports equipment, stereos, televisions, tools, watches, and many others.

Manufacturers create branded variants in many ways, such as changing color, design, flavor, options, style, stain, motif, features, and layout (Shugan 1989). Imagine shopping for a Seiko watch. Although many stores carry Seiko watches, each store often carries more than 40 variants. Seiko watches come with different colored bands; in digital or analogue; with large, small, or luminous hands; and with a myriad of other features (see Figure 1). Oster blenders offer another example. Four of the many variants made by Oster and available at one store are shown in Figure 2. Two blenders each have 10 speeds (7 continuous), the other blenders have 14 and 16 speeds, respectively. They all differ in weight, appearance, and many other minor features. One blender includes a cookbook. Sealy mattresses provide another example. Sealy offers a wide variety of mattresses that vary along numerous dimensions, including durability, firmness, padding, number of springs, color, and covering style.

The major reason suggested by existing marketing literature for manufacturers offering these product variations is heterogeneous consumer tastes. The literature uses the term *product assortment* to describe these variations and suggests that product assortment is a way for manufacturers to reach different market segments (Kotler 1991; Stern and El-Ansary 1992, p. 51). Consequently, manufacturers produce different products with the same brand name, because brand names are a way to build brand loyalty (Wernerfelt 1991).

Figure 1
SEIKO WATCHES VARIANTS
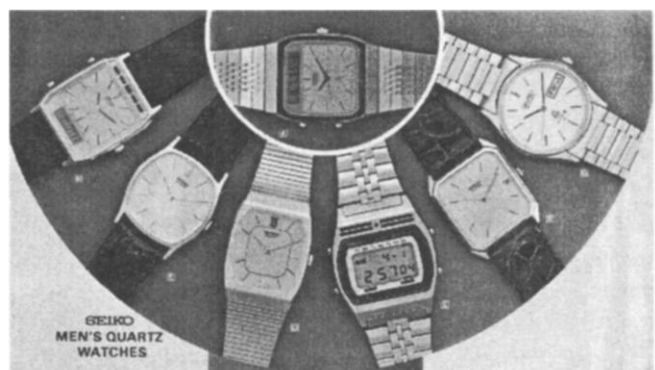
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Figure 2
BRANDED VARIANTS IN BLENDERS

Clearly, heterogeneous consumer tastes is an important reason for offering product variation.

We suggest another important reason for using branded variants—to influence the manufacturer's direct customer—the retailer. We offer a formal model to study the implications of branded variants on retail stores. In our model, as branded variants increase, some consumers experience an increase in the cost of shopping across retail stores for a particular product. Thus, fewer consumers choose to shop across retail stores.

For example, for Seiko watches, a consumer must remember, evaluate, and process a larger variety of product features, as well as the price, to make valid product comparisons. The greater the variety of Seiko watches, the more costly it is for some consumers to make these comparisons across retail stores. It is nearly impossible, for example, to shop across retailers to find a particular model at the best price, because each retailer may carry different models. It is often easier to select an item from one particular retailer. Although many consumers continue to shop across retailers, this shopping requires a far more complex and costly search strategy. Consequently, more variants cause some consumers to choose to shop less across retail stores. This decreased shopping reduces competition across retail stores, thereby making manufacturers' variants more attractive to retail stores.

We formally show that this increased attractiveness makes it profitable (1) for more retailers to carry the branded product and (2) for these retailers to provide greater con-

sumer service for the branded product. Thus, variation in branded products can be viewed as a mechanism to encourage retailers to undertake greater levels of channel activities, specifically product service and availability.

To test the two retail implications of our model, we collected and analyzed retail-level price and assortment data. We analyze data from three major catalog showroom retailers in southwest Chicago. For completeness, our data include all the major retailers of this type in this geographic area. For comparability, our data include stores that provide an almost identical shopping environment and range of product categories. In collecting our data, we pursued a situation that directly parallels the context of our model.

Consistent with the findings of our model, we demonstrate that as the manufacturer of a product offers more branded variants (1) a greater number of retail stores carry the product and (2) these stores offer higher levels of retail service for the product.

We present our formal model of retail demand: Retailers make decisions about whether to enter the market, the price of the branded product, and their level of service for the product. We then discuss the role and implications of branded variants and argue that an increased number of branded variants increases shopping costs and, thereby, decreases the number of consumers who shop. We next prove two theorems. First, increases in branded variants increase retail service. Second, increases in branded variants increase retail distribution for the branded product. Then we discuss retail implications by formulating two hypotheses related to our two theorems. Following that we discuss manufacturer and consumer implications and show that branded variants help manufacturers gain distribution but increase manufacturing costs. We show that the higher prices caused by branded variants hurt consumers, but increased availability may help consumers. Our empirical analysis supports our hypotheses. We conclude by discussing how branded variants provide retailers with the ability to differentiate while still carrying nationally branded products.

MODEL

Aggregate Demand

We assume that the market consists of M consumers who may or may not buy a branded product (e.g., a Sharp cordless telephone). Before one of these consumers buys a product, we assume that four events must occur. First, the consumer must be in the market. Second, the price must be sufficiently low. Third, there must be sufficient retail service to allow a sale. Fourth, the consumer must be aware of and enter the retail outlet. Multiplying the market size by the latter three effects (i.e., probabilities) yields:

$$(1) \qquad D_i = M\, P_{pri}\, P_{si}\, P_n,$$

where

D_i = the demand for retailer i = $D_i(p,s,n,r,M)$,
M = number of consumers,
P_{pri} = the effect of retail price = $P_{pri}(p,r)$,
P_{si} = the effect of retail service = $P_{si}(s)$,
P_n = the effect of the number of retail outlets = $P_n(n)$,
p = vector of retail prices, $[p_1, p_2, ..., p_n]$,

s = vector of retail expenditures on retail service, $[s_1, s_2, ..., s_n]$,

n = the number of retail stores carrying the branded product, and

r = the fraction of nonshoppers, $0 < r < 1$.

This multiplicative expression is common for choice models (see, for example, Mahajan and Venkatesh 1993; Urban and Hauser 1980).

Equation 1 provides the demand for a branded product as a function of three retail decisions: (1) the number of retail stores carrying the branded product (n), (2) the service level provided by each store (s), and (3) the retail price (p). We now discuss each retail decision in Equation 1.

The Number of Retail Stores

The first retail decision is whether to enter the market by carrying the product. As more retailers enter the market, product availability increases. Hence, this decision is key to understanding the effects of variants on product availability.

We study availability under the condition of free entry of retail stores. Entry occurs when a store adopts the branded product. We assume that adoptions occur when they are profitable for the retailer. Retailers continue to enter as long as they expect strictly positive profits. Negative profits cause retailers to exit. We believe that branded variants are more likely to exist when the free entry condition holds.

We determine the number of retailers who choose to carry the manufacturer's products with and without branded variants. Our treatment of free entry is consistent with a long history in the academic literature on entry (Mathewson and Winter 1984; Salop 1979; Tirole 1989). As the number of stores (n) enter the market, they divide the aggregate demand between them. Hence, selective demand, D_i, decreases as entry occurs, according to P_n.

Despite these decreases, we suspect that additional stores might slightly increase aggregate demand. A larger number of stores, for example, might generate higher levels of awareness, more word-of-mouth for the branded product, and increased brand publicity.

The function P_n captures both increases and decreases on selective demand caused by changes in the number of retailers (n) offering the brand. Eventually, P_n must decrease as n increases so that the number of retailers does not grow without bound. However, it may decrease slower than $1/n$. With no availability, no sales occur. In summary, $P_n \geq 0$, $dP_n/dn < 0$, $dP_n^2/dn^2 \geq 0$.

Retail Service

The second retail decision is retail service (s). Consider P_{si} for a Nikon 35 millimeter camera. Retail services include making the purchase simple (e.g., checkout clerks near the camera), providing demonstrations for the Nikon, providing persuasive explanations about the Nikon's features, determining which Nikon camera to buy (Gerstner and Hess 1990), and determining the general sales effort.

We assume that retailers choose service levels (s) that maximize their own profit. We assume that more service by a retailer increases retail demand at a decreasing rate. Hence, increasing service levels, increases the consumer demand for a Nikon camera. Our assumption might be a bad

approximation for situations when consumers find retail services irritating.

We also assume that some service (at least a checkout clerk) is necessary. Hence, no service is insufficient to generate sales. Finally, we assume that the effect of a retailer's own service on its own sales is larger than the effect of competitor's service.

In summary, for all i,

$$P_{si} \geq 0, \frac{\partial P_{si}}{\partial s_i} > 0, \frac{\partial P_{si}^2}{\partial s_i^2} \leq 0, \sum_{j=1}^{n} \frac{\partial^2 P_{si}}{\partial s_i \partial s_j} < 0,$$

Also, for all $i \neq j$,

$$\frac{\partial P_{si}}{\partial s_j} \leq 0.$$

The Retail Price

The last retail decision is the retail price (p). Demand requires that the price p_i be sufficiently low for a purchase at a retailer (i.e., P_{pri}). We let retailers set the retail price to maximize their own profits. When modeling price, we allow heterogeneity among consumers by considering consumer willingness to undertake the shopping task. The function P_{pri} explicitly recognizes this willingness.

Marketing literature is replete with examples of groups of consumers who possess different willingness or ability to undertake shopping tasks. For example Boyd and Walker (1990, p. 113) introduce their section on consumer behavior by creating two groups of consumers: one group willing or able to shop extensively and the other group much less willing to shop. Different groups of consumers with different shopping abilities are also common assumptions in many models (Blattberg and Neslin 1990, pp. 92–95; Tellis and Wernerfelt 1987). Consider shopping for a Sharp cordless telephone. Some people have the interest, time, or ability to make detailed comparisons between telephones and retail stores, whereas others lack the interest, time, or ability, and thereby undertake a much more limited shopping experience.

For analytical convenience, we assume that people fall into one of two groups:[1] nonshoppers, rM, and shoppers, $(1 - r)M$. Nonshoppers have higher search costs and, consequently, prefer to shop at one or a small number of stores. Shoppers have lower search costs and, consequently, shop at more retailers while looking for the best price or value. A nonshopper, for example, may visit only K mart. If K mart's price is sufficiently low, the nonshopper may buy at K mart. A shopper, in contrast, may visit several discount stores looking for the best value.

We allow shoppers and nonshoppers to exhibit different sensitivities toward price. We expect nonshoppers to be less price sensitive because they shop at few retail stores. Their higher search costs make them less willing to forgo a purchase. Nonshoppers simply have higher opportunity costs and, hence, are willing to pay somewhat more than shoppers.

Consider, for example, a shopper and a nonshopper evaluating a particular price for a Nikon 35 millimeter camera. Each consumer must decide whether the price is sufficient-

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[1]Our model easily generalizes to more than two groups ordered in terms of their willingness to shop. Adding more groups of consumers complicates the mathematics without adding insights.

ly low. Although the price is very reasonable, a shopper may have a lower purchase probability because he or she believes shopping may reveal a slightly lower price at another store. The nonshopper, however, has a higher cost of shopping. The nonshopper, therefore, is less likely to risk an unproductive search, and more likely to accept this price. This reasoning is consistent with the literature. It suggests that consumers who shop more are better informed about prices and more sensitive to price (Blattberg and Neslin 1990, pp. 92–95; Tellis and Wernerfelt 1987).

Equation 2 defines P_{pri} as a weighted average of shoppers' and nonshoppers' purchase likelihood and their price sensitivity.

$$(2) \qquad P_{pri} = r\, P_{1i} + (1 - r)\, P_{2i,}$$

where

P_{1i} = the purchase likelihood of nonshoppers = $P_{1i}(p)$ and
P_{2i} = the purchase likelihood of shoppers = $P_{2i}(p)$.

We assume the traditional downward sloping demand curve. As a retailer increases price, that retailer's demand decreases at a nondecreasing rate. This assumption may be a bad approximation when extreme price-quality effects exists. Because we argue that shoppers are more willing to search, we assume that they are more reactive to a retailer's price changes. At any given price, fewer shoppers buy the branded product than do nonshoppers. Finally, we assume that a retailer's own price changes have a greater influence on that retailer's sales than do competitive prices. In summary, we assume that for all i,

$$P_{ti} \geq 0, \frac{\partial P_{ti}}{\partial p_i} < 0, \frac{\partial P^2_{ti}}{\partial p^2_i} \geq 0, \frac{\partial P_{1i}}{\partial p_i} > \frac{\partial P_{2i}}{\partial p_i}, \sum_{j=1}^{n} \frac{\partial^2 P_{pri}}{\partial p_i \partial p_j} < 0;$$

for all i ≠ j, t∈{1,2},

$$\frac{\partial P_{ti}}{\partial p_j} > 0;$$

and finally,

$$\frac{\partial P_{pri}}{\partial r} = P_{1i} - P_{2i} > 0.$$

Retail Prices and Levels of Retail Service

Retailers that carry this branded product set both the retail price and the level of retail-service expenditures. Retailer costs include these expenditures, a wholesale price (w), and a cost of carrying this manufacturer's product (f_i), which may include restocking, rearranging shelves, changes in book-keeping, or additional training for salespeople.

Retailers sell simultaneously to both shopping and non-shopping consumers and are assumed to set one price[2] and one service level for this manufacturer's product. Thus, we look at retailers with posted prices that are not negotiated and whose type of service is primarily informational. The kinds of service provided may include demonstrating the product and explaining the value of certain product features. The retailer provides service (s_i) to all consumers who enter

the store (i.e., M P_n), regardless of whether they buy the product. Our assumptions are consistent with the empirical work presented subsequently.

The retailer finds a price and service level that maximizes retail profit and allows for other retailers' prices (p), service levels (s), and number of retailers (n).

$$(3) \qquad \pi_i = (p_i - w)\, D_i - s_i\, M\, P_n - f_{i,}$$

where

$\pi_i = \pi_i(p,s,n,r,M)$, which is the retailer's profit, given p,s,n,r,M,
w = the wholesale price, and
f_i = the fixed cost associated with the brand.

With any n retailers, equations 4 and 5 provide first-order conditions for the optimal prices p* and service expenditures s*. See the Appendix for sufficient conditions.

$$(4) \qquad D_i + (p_i - w)\,\frac{\partial D_i}{\partial p_i}\bigg|_{p_i = p_i^*} = 0 \quad \text{for } i = 1,2,\ldots,n$$

and

$$(5) \qquad (p_i - w)\,\frac{\partial D_i}{\partial s_i}\bigg|_{p_i = p_i^*, s_i = s_i^*} = M\, P_n \quad \text{for } i = 1,2,\ldots,n.$$

For notational simplicity, we assume that all subsequent derivatives and functions are evaluated at p = p* and s = s*. Equations 6 and 7 provide the optimal prices, p_i^*, and optimal service levels, s_i^*, for i = 1,2,...,n.

$$(6) \qquad p_i^* = w + \frac{-P_{pri}}{\partial P_{pri}/\partial p_i} \quad \text{for } i = 1,2,\ldots,n$$

and

$$(7) \qquad s_i^* = \phi^{-1}\left(\frac{1}{(p_i^* - w)\, P_{pri}}\right) \quad \text{for } i = 1,2,\ldots,n,$$

where

$$\phi_i(s) = \frac{\partial P_{si}}{\partial s_i} \quad \text{for } i = 1,2,\ldots,n.$$

We consider only the single price, single service equilibrium solution p*, s*, where $p_i^* = p_j^*$, $s_i^* = s_j^*$, for i,j = 1,2,...,n.

The Number of Retailers

With free entry, retailers carry the branded product if it provides a profit.[3] We allow retailers to have foresight. Hence, entry occurs until profits equal zero, where p* and s* are foreseen by the retailer. We solve for the number of retailers in equilibrium, n*, by finding the number of retailers that clear the market.

Solving equations 6 and 7 yields the optimal symmetric prices, p*, and service level, s*. Substituting p* and s* into Equation 3, and setting profits equal to zero yields:

$$(8) \qquad n^* = P_n^{-1}\left[\frac{f_i}{(p^* - w)\, M\, P_{pri} P_{si} - Ms^*}\right]$$

In Equation 8, all quantities are evaluated at p* and s*.

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[2]Our results generalize when we allow price discrimination between these segments.

[3]Retailers choose p and s given n. Retailers do not collude to control n.

BRANDED VARIANTS

We now consider the effect of branded variants on the shopper's problem. With branded variants, each variant of the branded product provides a different combination of a multitude of potentially valuable features. With variants, shopping requires many complex comparisons beyond remembering a simple price. Moreover, when one store carries many variants, the increased assortment could also decrease the benefit of shopping.

Consider a shopping trip for an Oster blender. After entering a retail store, consumers are presented with many variants of Oster blenders. The blenders vary by weight, size, appearance, ease-of-control, number of speeds, ability to break ice, and many other features. These variants create comparison costs. Shoppers must inspect the brands, read branded product descriptions, evaluate myriad features, ponder salesperson information, and make price compromises. To be able to decide among the variants, shoppers require a sufficient amount of deliberation. Empirical observation suggests that different consumers choose different variants at different prices.[4]

Branded variants substantially increase the cost of shopping across stores. Shopping requires remembering many blenders and their features. The task is made more difficult when consumers must sequentially visit different stores. This makes direct comparison between these Oster blenders across retail stores an even more daunting task. Although some consumers may still shop across stores, with variants, fewer consumers choose to do so.

Even variants with superficial differences decrease shopping, because they create doubts in the minds of the consumers about the "non-retailer-specific brand name capital" (Snyder 1992, p. 12) and thus make direct comparison across retail stores almost impossible. Shugan (1989) also suggests that branded variants make it difficult for consumers to make simple product comparisons across retail stores. In summary, as the number of Oster blender variants increases, the cost of shopping increases, which makes it rational for fewer consumers to shop for this product across retail stores.

Remember that shoppers visit multiple stores because they expect the benefits from their search to exceed its costs. For some shoppers, benefits vastly exceed costs. For other, more marginal shoppers, benefits hardly exceed costs. Were the costs of the search to increase somewhat, the marginal shoppers would become nonshoppers who visit fewer stores. Hence, any factor that tends to increase search costs increases the fraction of nonshoppers, r. Shopping less is consistent with prior research that suggests that when the cost of shopping increases, fewer consumers are willing or able to shop as exhaustively as when the cost of shopping is less (Blattberg and Neslin 1990; Tellis and Wernerfelt 1987).

Within our model, branded variants increase search costs by making the search process multidimensional and, therefore, more complex. An increased number of variants suggests that branded variants move some consumers from being shoppers to nonshoppers. Hence, branded variants increase the fraction of nonshoppers, r.

FORMAL ANALYSIS OF THE RETAIL IMPLICATIONS OF BRANDED VARIANTS

We find the impact of branded variants on retailers by examining how r affects s^* and n^*. We show that, as a manufacturer uses more branded variants, there should be (1) increases in the level of service (s) provided by retailers for the manufacturer's variants and (2) increases in the number of retailers (n) carrying the manufacturer's variants. Theorem 1 proves[5] that as r increases, so does s_i^*.

Service Level

Theorem 1. As r increases, s_i^* increases for each retailer i.

Proof: Equation 7 implies $(p_i - w) \, P_{pri} \, \partial P_{si}/\partial s_i = 1$. Taking the full derivative with respect to r yields $h_1 + h_2 + h_3 = 0$,

where

$$h_1 = \frac{\partial P_{si}}{\partial s_i} \left[P_{pri} + (p_i^* - w) \frac{\partial P_{pri}}{\partial p_i} \right] \frac{dp_i}{dr},$$

$$h_2 = \left\{ \sum_{j \neq i} \left[(p_i^* - w) \frac{\partial P_{pri}}{\partial p_j} \frac{\partial P_{si}}{\partial s_i} \right] \frac{dp_j}{dr} \right\}$$

$$+ \left[(p_i^* - w) \frac{\partial P_{pri}}{\partial r} \frac{\partial P_{si}}{\partial s_i} \right], \text{ and}$$

$$h_3 = \sum_{j=i}^{n} \left[(p_i^* - w) \, P_{pri} \frac{\partial^2 P_{si}}{\partial s_i \partial s_j} \right] \frac{ds_j}{dr}.$$

Equation 6 implies $h_1 = 0$. Every term in h_2 is positive, so $h_2 > 0$. (Note $dp_i/dr > 0$ for all i; see Lemma 2 and the Appendix.) Hence, $h_3 < 0$, because $h_1 + h_2 + h_3 = 0$. At a single price equilibrium $ds_i/dr = ds_j/dr$ for all i, j, because at equilibrium, $s_i = s_j$ for all r. To prove $ds_i/dr > 0$, we need only show that the bracketed term in h_3 is negative, because $h_3 < 0$. By assumption, $\sum_{j=1}^{n} \partial^2 P_s/\partial s_i \, \partial s_j < 0$, so the bracketed term is negative.

Number of Retailers

Theorem 2: As r increases, n^* increases.

Proof: Equation 8 implies $P_n (p_i - w) \, M \, P_{pri} \, P_{si} - P_n \, M \, s_i = f_i$. Taking the full derivative with respect to r yields $g_1 + g_2 + g_3 + g_4 = 0$, where

$$g_1 = M \, P_{si} \, P_n \left[P_{pri} + (p_i^* - w) \frac{\partial P_{pri}}{\partial p_i} \right] \frac{dp_i}{dr},$$

$$g_2 = \left[P_n (p_i^* - w) \, M \, P_{si} \sum_{j \neq i} \left(\frac{\partial P_{pri}}{\partial p_j} \right) \frac{dp_j}{dr} \right]$$

$$+ \left[P_n (p_i^* - w) \, M \, \frac{\partial P_{pri}}{\partial r} \, P_{si} \right],$$

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[4]Consumers seem to consider these features, because retailers report sales for both high and low priced variants.

[5]We use the implicit function theorem. See, for example, Montgomery and Wernerfelt (1992).

$$g_3 = P_n M \left[(p_i^* - w) \ P_{pri} \left(\sum_{j=i}^{n} \frac{\partial P_{si}}{\partial s_j} \frac{ds_j}{dr} \right) - \frac{ds_i}{dr} \right], \text{ and}$$

$$g_4 = M \left[(p_i^* - w) P_{pri} P_{si} - s_i^* \right] \frac{\partial p_n}{\partial r} \frac{dn}{dr}.$$

Equation 6 implies $g_1 = 0$. Every term in g_2 is positive, so $g_2 > 0$. Equation 7 implies that

$$g_3 = P_n M \left[(p_i^* - w) \ P_{pri} \left(\sum_{j \neq i} \frac{\partial P_{si}}{\partial s_j} \frac{ds_j}{dr} \right) \right].$$

Hence, $g_3 > 0$. Therefore, $g_4 < 0$, because $g_1 + g_2 + g_3 + g_4 = 0$. It follows that $dn/dr > 0$, because $\partial P_n/\partial n < 0$ and the bracketed term in g_4 is positive according to Equation 8.

DISCUSSION OF RETAIL IMPLICATIONS OF BRANDED VARIANTS

Our two theorems concerning service levels and retail distribution yield two testable hypotheses. We now test each hypothesis with data for branded variants across retail stores.

H_1: As manufacturers offer more branded variants, the retail service level for the variants increases.

H_1 follows directly from Theorem 1. Note the intuition underlying the hypothesis. As manufacturers offer more branded variants, consumers face additional shopping costs. Some consumers are willing to pay a higher retail price. The market becomes less price sensitive, and retail price competition diminishes. Retailers find it optimal to raise prices, and higher prices confer greater retail margins. As the per unit profit increases, retailers increase sales effort. Consequently, optimal service levels increase. This is in agreement with Wernerfelt (1994), who argues that wider product lines require additional sales assistance.

We could assume that retail services are subject to free riding.[6] If they are, then offering branded variants leads to further service enhancement. Branded variants can reduce service spill-overs between retailers by making comparison more difficult. Here, variants keep the consumer from getting service at one retailer, but buying from another.

H_2: As manufacturers offer more branded variants, the number of stores carrying the variants increases.

H_2 follows directly from Theorem 2. The intuition underlying the hypothesis is simple. As manufacturers offer more branded variants, consumers face additional shopping costs. Some consumers are willing to pay a higher retail price to avoid shopping. The market becomes less price sensitive. Retail price competition diminishes, and, hence, retailers enjoy greater prices and profits. Decreased competition between retailers and greater profits encourage more retailers to carry the branded product.[7]

These hypotheses suggest that branded variants are an interesting tool that provides positive incentives to retailers. The extant literature suggests many, often more restrictive, mechanisms for coordination that increase retail incentives for providing service and product availability. These include the use of exclusive territories, resale price maintenance (Dutta, Bergen, and John 1994; Gould and Preston 1965; Mathewson and Winter 1984; Perry and Porter 1990), nonlinear pricing (Jeuland and Shugan 1983), or franchising (Lal 1990). We show how using branded variants—a much less regulated or visibly restrictive mechanism—can increase both retail service levels (s) and the number of retailers (n) carrying their brands. That branded variants can create incentives for the retail service provision and distribution is new to this literature.

MANUFACTURER AND CONSUMER IMPLICATIONS

Before testing our hypotheses, we consider how branded variants affect manufacturers and consumers.

Manufacturers

Manufacturers elect whether to offer branded variants. Manufacturers may benefit from offering branded variants—more retailers carry their brands and these retailers provide more service for the branded product. Finally, price sensitivity (i.e., $|\partial P_{pri}/\partial p_i|$) decreases as the number of branded variants increases. (See Lemma 1.) These benefits tend to increase sales.

Lemma 1: $\partial^2 P_{pri}/\partial p_i \partial r > 0$ (for proof, see Appendix).

Branded variants can hurt manufacturers, because retail prices increase. Moreover, there are direct costs to creating branded variants, such as new equipment, new production processes, more training, and additional complexity. We expect these costs to diminish as flexible manufacturing systems lower lead times (Stalk 1988).

Manufacturers offer branded variants when the benefits exceed the drawbacks. This situation occurs when the advantages of increased distribution and service overcome the higher retail price and production costs. Otherwise, manufacturers avoid variants. Hence, variants are more desirable when availability and service are more important. Thus, manufacturer choices depend on the size of these opposing factors.

Consumers

Branded variants impose direct shopping costs on consumers. Consumers are also hurt by higher retail prices. (See Lemma 2.)

Lemma 2: $dp_i/dr > 0$ (for proof, see Appendix).

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[6]We thank an anonymous reviewer for this insight.

[7]Thus, our theory suggests that when a manufacturer with one item offers a second item (a variant of the first), the first item's distribution actually improves. This implication partially distinguishes our branded variants arguments from traditional segmentation arguments. For example, a manufacturer offers item A, but is considering offering item B, which is a variant of item A. Segmentation seems to imply that though item B may cause more retailers to carry the manufacturer's brand (item A or B) and sales of

the manufacturer's brand (items A and B) increase, fewer retailers may actually carry item A. Some retailers will drop item A and adopt item B—these retailers may be in locations in which their consumers have a stronger preference for item B. Basically, product variation for segmentation purposes may cause cannibalism within a manufacturer's line. In contrast, our explanation, by focusing on the value to retailers, suggests that introducing item B can actually increase the acceptance of item A.

Branded variants, despite their drawbacks, can benefit consumers. Without branded variants, retail competition can lessen service (Sheffet and Scammon 1985). Branded variants increase retail availability and retail service levels (s) for those brands. Without variants, decreased availability deprives consumers of choices, because many stores may not carry the branded product. Without variants, decreased retail service may prevent other consumes from buying the branded product, because stores may not offer sufficient information for consumers to make wise decisions. Consequently, consumers also face both costs and benefits associated with branded variants.

Further research might discover when benefits eclipse costs. When shopping costs and higher prices vastly reduce consumer welfare, branded variants hurt consumers. When availability and service vastly increase consumer welfare, branded variants help consumers. The relative importance of these costs and benefits determines the net effect of branded variants and depends on the importance of retail service and availability for a product. These are the same conditions that make variants valuable for manufacturers. Perhaps, branded variants help consumers only when they help manufacturers. Conceivably, branded variants could help all channel members, including the consumer.

EMPIRICAL ANALYSIS

Testable Implications

Our model produces two testable hypotheses at the retail level. H_1: As manufacturers of brands offer more variants, the retail service level for the variants increases. H_2: As manufactureres of brands offer more variants, the number of stores carrying their variants increases.

Data Collection

The two hypotheses are at the level of individual products. Therefore, testing our theory requires obtaining an exhaustive inventory of all products in a category for a particular manufacturer across competing retail stores in a specific geographic area. In practice, collecting the necessary data is an arduous task. Obtaining price and inventory lists is difficult for several reasons.

First, gathering detailed product descriptions is inconceivably time consuming. A single product category in a single store can take hours to describe. Model numbers are often hidden, and when they are visible, they often vary by year or production run. Some products, such as expandable attachés, are difficult to describe in words. Differences in some product categories, such as boxing gloves, are discernible only by feel. Products such as cordless telephones vary on hidden attributes, for example, battery life (e.g., the battery life for AT&T telephones can vary from 5 to 21 days). Other products, such as stereos, have hundreds of potential features relating to remote control, power output, input devices (e.g., compact dics, cassettes), proprietary circuits (e.g., Dolby), reception capabilities, the number and quality of speakers, surround-sound capabilities, graphic equalizers, karaoke features, physical controls, and many other components.

Second, retailers are reluctant to cooperate. Taking stock of products behind a service counter requires prolonged cooperation of retail clerks. Store managers frown on efforts to inventory their stores. In a study of product assortment and price, Shugan (1988, p. 302) suggests, "the most notable problem was the reluctance of small retailers to provide extensive information for all of their products. We often require multiple comparisons between outlets before affirming the equivalence of two products carried by different retailers."

Third, there is a difficulty in retailers' presentation of products. Many retailers frustrate data collection by using methods to discourage cross-store comparisons. Displays, packaging, bundling, promotions, and clerks all inhibit easy comparisons. In summary, our model is difficult to test in the world of wide variance in retailer types, trading areas, and product categories. Consumers face a daunting shopping task.

Fortunately, we have complete product data for three discount showrooms in one geographic area in southwest Chicago. In that location, when we collected our data, only these three discount showrooms existed: Service Merchandise, W. Bell and Company, and McDade and Company. Each store provided an almost identical shopping environment and range of product categories. Our database, therefore, enabled us to perform an exhaustive inventory of direct product comparisons across stores sharing similar characteristics.

To study branded variants, stores must also carry products manufactured by well-known firms in each product category. Kaufmann and Salmon (1985) suggest that discount showrooms tend to carry the required brand-name merchandise. This was true for our three discount showrooms.

Testing our hypothesis about service levels (H_1) requires retailers to provide measurable in-store service for their consumers. Although these showrooms do not offer the highest service levels of all retail stores, they do provide a considerable amount of service. Stores such as W. Bell & Company have followed a strategy of "...upscale showrooms and providing strong sales help" (Kaufmann and Salmon 1985, p. 543). Showrooms such as Service Merchandise have also added in-store sales help and renovated their stores (Kotler 1991, p. 539). These chains emphasize service by having training programs, management guidelines, and even "Hidden Shoppers" who visit individual stores to rate them on their in-store sales help. Stores with high ratings get corporate recognition (Service Merchandise 1993). The guidelines for store managers at Service Merchandise specifically mention training programs for their in-store sales personnel, which include instructions on friendliness, information provision, and facilitation of the order process (Service Merchandise 1993).

Testing our model also requires that in-store service vary across different product categories. Our discount showrooms met this requirement. Kaufmann and Salmon (1985) state that the level of service in catalog showrooms varies according to the product category. Showroom stores, such as Service Merchandise, besides having general in-store salesperson training programs, also have special in-store staff training programs for specific product categories—for

Table 1
PRODUCT CATEGORIES

Category	Number of Variants
Foot Baths	9
Blenders	13
35 millimeter Cameras	37
Movie Cameras	14
Pocket Camera	14
Clocks	119
Coffee Makers	22
Cribs	12
Hair Dryers	38
Popcorn Makers	7
Play Pens	12
Sleeping Bags	40
Televisions	62
Umbrellas	47

example, electronics leisure and entertainment products (Service Merchandise 1993). Finally, consistent with our model, these retail stores all used posted prices. Traditionally, prices were not negotiated at these stores.

Method of Analysis

We selected 15 product categories at random (see Table 1). We excluded one ill-defined category,[8] which left 14 categories providing data for 446 variants. In the excluded category, products classified in a single category by one retailer were spread across many different categories by a competitive retailer. Other categories, fortunately, were well-defined across retailers.

Independent Variables

Branded Variants. We define the number of branded variants as the number of nonidentical models or items of a particular manufacturer's branded product within a product category.

Merchandise catalogs, at each store, provided detailed descriptions and pictures for every product. Three judges independently examined each description and picture to identify each unique product. For each product category, the judges decided which of a manufacturer's products were identical on the basis of these detailed product descriptions and pictures for each variant at each store. After classifying most variants, several variants remained. Although two stores seemed to carry products with almost identical pictures and descriptions, the stores provided different weights for the product. Taking a conservative approach, we assumed the products were identical and not variants.

Despite our conservative approach, we found numerous branded variants for all product categories. We found 446 different variants from a total of 14 categories across all three retail stores. We provide the product categories and number of variants in Table 1.

The many hours required by the judges to examine these pictures and descriptions reveal the great difficulty faced by

actual shoppers. Actual shoppers often get this product information sequentially as they shop across stores. Thus, an individual shopper, attempting to compare the manufacturer's product across retail stores without the benefit of these pictures and descriptions, would face an even more daunting task.

Control Variables

We included two control variables in our study: category price and physical size.

Average Category Price. Product category prices may influence retailer acceptance of the category and the associated level of retail service support. To capture this possible influence of category price levels, we used a control variable derived from the average price in each of the 14 categories across the three retail stores. The product categories were put into low, medium, and high price levels, depending on the average category price.[9]

Physical Size. The level of in-store service can be confounded by the size of the product. Some products are kept behind a counter for security reasons—often their small size makes them easy to steal.[10] These products require an in-store salesperson's help when a consumer wants to see them. To account for this phenomena, we include a variable to reflect the size of each product category. We classified the product categories into three sizes—small, medium, and large.[11]

Dependent Variables

Number of Stores. This variable equals the number of stores—either one, two, or three—carrying a branded variant (i.e., one item). Of the 446 variants, 315 are unique and carried at only one store, 84 are carried at two stores, and only 47 variants are carried by all three retailers.

Service. We define this variable using multiple measures. We gathered information from one of these retail stores regarding the level of service (s) that was provided for each product. We also had independent judges classify service levels for each product as being either high or low. We used these classifications only when the judges agreed[12] and found that among our randomly selected products, these stores supplied more service for electronics leisure and entertainment products and jewelry (Service Merchandise 1993). Thus, among the categories in our sample, television sets and the three categories of cameras are products for which these stores tend to provide additional in-store help. We used both these sources of evidence to classify products categories as high and low service. We classified product categories as high service only when there was a consensus across both our sources—independent judges and store-

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[8]The ill-defined category was candy dishes. Although Service Merchandise classifies them as a separate category, others retailers divide them among categories such as serving dishes, silver-plated services, crystal, and china giftware.

[9]The average category price was classified as follows: *low* for below $30 (e.g., clocks, hair dryers, blenders, umbrellas, and popcorn machines); *medium* for between $30 and $100 (e.g., play pens, sleeping bags, coffee makers, foot baths, and pocket cameras); and *high* for above $100 (e.g., cribs, televisions, 35 millimeter cameras, and movie cameras).

[10]We thank Barton A. Weitz for this insight.

[11]Sizes classifications were as follows: *small* for pocket cameras, 35 millimeter cameras, and clocks; *large* for television sets, sleeping bags, cribs, and play pens; and *medium* for all others.

[12]Independent judges concluded that, among our randomly selected 14 categories, the following were high service: sleeping bags, foot baths, pocket cameras, 35 millimeter cameras, movie cameras, and television sets.

Table 2

CHECKING H₁

Dependent Variable: Level of Service Log-Likelihood: -212.995			
	Coefficient	T-Ratio	P-Value
Variants	.05	2.789	.005
Category price level	1.503	7.846	0.0
Category size level	-1.667	-8.637	0.0

Correct classification rate of the model 78.9%, proportional classification rate 64.8%. Degrees of freedom 443.

Table 3

CHECKING H₂

Dependent Variable: Number of Stores Carrying Product Log-Likelihood: -275.740			
Analysis	Coefficient	T-Ratio	P-Value
Variants	.0528	3.364	.0008
Category price level	.1884	2.523	.0111

Correct classification rate of the model 70.63%, proportional classification rate 53.9%. Degrees of freedom 444.

level information on service provision for product categories. Based on this consensus across multiple sources, we classified television sets and the three categories of cameras as products requiring high levels of service, whereas others were classified as needing low levels of service. Of the 446 variants, 127 were classified as high service, and the remaining were classified as low service.[13] Our theory predicts that retailers should offer more service as variants increase.[14]

Empirical Results

To examine H_1, we regressed our measure of service on the number of branded variants. We obtained Logit estimates for a multinomial Logit model.[15] The dependent variable was a high or low service level. The independent variables were the number of variants and the category-level price and size. We provide the results in Table 2.

The service measure provides support for H_1. We find evidence of a positive correlation between the number of variants offered by the manufacturer and the level of service provided by retailers. Our result is consistent with our model, because increases in branded variants lead to greater

service for the product. We also find that the level of service provided increases with the average category price, but decreases with average category size.

To examine H_2, we regressed the number of variants and the category-level price on the number of retailers (n) carrying the product (i.e., the product's distribution). We again employed multinomial and ordered Logit, because our measure of distribution (e.g., stores carrying the product) was a qualitative dependent variable.

The dependent variable was the number of stores carrying the product. The results[16] support H_2 (see Table 3). The distribution of a product is positively correlated with the number of branded variants offered by the manufacturer. Our empirical result is consistent with our model, because increases in variants lead to greater retail acceptance of the product. We also find that the number of stores carrying the product increases with the average category price.

CONCLUSIONS AND FURTHER RESEARCH

Manufacturers offer brands varying in many characteristics, including color, design, flavor, options, style, stain, motif, features, and layout. We call these variations *branded variants*. With branded variants, retailers can still enjoy the umbrella effect of nationally branded products (Montgomery and Wernerfelt, 1992), but branded variants reduce retail competition and price sensitivity. Branded variants, consequently, encourage more retailers to carry and provide more service support for the manufacturer's product. This suggests that product variation can be used by manufacturers to create retailer incentives to carry the product and provide additional service. This perspective adds to the traditional segmentation rationale for new products and product variation. Empirically, we provide some support for the two retail-level implications of our model. We find that as the number of branded variants increases, the manufacturer's product is carried by more retailers and retailers offer more service for the manufacturer's product. We hope our arguments provide evidence for a new perspective on these forms. We believe branded variants are a notable benefit that manufacturers can provide to their direct customers—retailers.

We consider this study an initial attempt to study branded variants. For example, we focus on one dimension of branded variants—how they effect retail acceptance and retail service levels. Additional theoretical research could study other dimensions of branded variants. For example, Shugan (1989) suggests that branded variants help smaller retailers compete with the private labels of larger retailers. Researchers could also examine the impact of branded variants on productivity (Ratchford and Brown 1985).

Other channel arrangements, such as exclusive territories, exclusive dealerships, resale price maintenance, nonlinear pricing (Jeuland and Shugan 1983), franchising (Lal 1990), or the ability of the manufacturer to vertically integrate (Coughlan 1985), could also be considered as alternative ways for manufacturers to accomplish the goals of product acceptance and service provision. Further research could develop the relationship between different forms of exclu-

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[13]We used another objective criterion to evaluate which categories required service, namely, whether item stocking was behind the service counter. Here, a retail clerk always assists in examining the item. By definition, these items involve more service. Unfortunately, retailers sometimes stock items behind the counter solely for security reasons. We, thus, controlled for category size and price, which serve as proxies for security concerns. Our independent judges found that of the 446 items, 295 were behind the counter. The results for this objective measure are significant and in the expected direction after controlling for category size and price. If we classified items as high service according to our independent judges, the results were also significant and in the right direction.

[14]We also expect manufacturers to offer more variants when the product benefits from more service.

[15]We also ran ordered Logit. The direction and significance of our results were the same as those we report in the article.

[16]The multinomial and ordered Logit produced identical results to two significant digits.

sive territories, resale price maintenance, and branded variants and attempt to provide an empirical relationship between the manufacturer provision of branded variants and the assignment of exclusive territories or franchising. Another interesting research question is the impact of branded variants on consumer welfare in terms of other channel arrangements, such as exclusive territories and resale price maintenance.

Likewise, further research could study alternate retail choices that minimize the need for branded variants by creating more cooperative retail pricing environments. For example, Hess and Gerstner (1991) show how retail price matching can lead to more cooperative pricing outcomes than competitive pricing.

Furthermore, the impact of manufacturer competition on these results could be studied. Some researchers have suggested that product proliferation can be used by an incumbent manufacturer to deter other manufacturers from entering the market (Schmalensee 1978). In our framework, branded variants, because they can increase retail acceptance, can be an extremely important competitive weapon for manufacturers. Yet, if multiple manufacturers adopt this strategy, it may lead to product proliferation and problems with limited retail shelf space and consumer disutility. Recent moves by Black and Decker, General Electric, and other durable goods manufacturers to rationalize their assortments reflect this latter pressure.[17]

Our empirical work also has limitations. There are a variety of intervening variables for which we have little information, such as the cost of producing variants for the branded product and the sales volume for that branded product. Furthermore, the manufacturers' offering of branded variants is often intertwined with other product characteristics, such as product newness and complexity, and additional empirical work should attempt to disentangle these constructs. Clearly, such work is exceedingly important. Additional research should also obtain more direct measures of the importance of retail service and increased retailer acceptance by surveying manufacturers or retailers. Finally, further research should study how branded variants work to increase retailer differentiation by incorporating psychological theories of consumer shopping behavior and, perhaps, should test these theories in a laboratory setting.

APPENDIX

Sufficient Conditions

At $p = p^*$ and $s = s^*$, Equation 6 indicates

$$\frac{\partial^2 \pi_i(p,s,n,r,M)}{\partial p_i \partial s_i} = 0.$$

so

$$\frac{\partial^2 D_i(p,s,n,r,M)}{\partial p_i \partial s_i} = 0,$$

Hence, equations A1 and A2 are sufficient second-order conditions to maximize $\pi_i(p,s,n,r,M)$.

(A1) $$\frac{\partial^2 \pi_i(p,s,n,r,M)}{\partial p_i^2} < 0$$

(A2) $$\frac{\partial^2 \pi_i(p,s,n,r,M)}{\partial s_i^2} < 0$$

Equations 1 and 3 imply

$$\frac{\partial^2 \pi_i(p,s,n,r,M)}{\partial p_i^2} = \frac{2\partial P_{pri}}{\partial p_i} + (p_i - w) \frac{\partial^2 P_{pri}}{\partial p_i^2}$$

at $p = p^*$ and $s = s^*$. Hence, we require

$$\frac{2\partial P_{pri}}{\partial p_i} + (p_i - w) \frac{\partial^2 P_{pri}}{\partial p_i^2} < 0$$

to obtain Equation A1.

Equations 1 and 3 imply

$$\frac{\partial^2 \pi_i(p,s,n,r,M)}{\partial s_i^2} = (p_i - w) M P_{pri} \frac{\partial^2 P_{si}}{\partial s_i^2} P_n$$

at $p = p^*$ and $s = s^*$. Now, $\partial P_{si}^2/\partial s_i^2 < 0$ implies

$$(p_i - w) M P_{pri} \frac{\partial^2 P_{si}}{\partial s_i^2} P_n < 0.$$

Without further assumptions, Equation A2 follows.

Proof of Lemmas

Lemma 1: $\partial^2 P_{pri}/\partial p_i \partial r > 0$

Proof: Equation 2 implies

$$\frac{\partial^2 P_{pri}}{\partial p_i \partial r} = \frac{\partial P_{1i}}{\partial p_i} - \frac{\partial P_{2i}}{\partial p_i}.$$

The Lemma follows.

Lemma 2: $dp_i/dr > 0$

Proof: Taking the derivative of Equation 6 with respect to r yields $g_5 + g_6 \, dpi/dr = 0$, where

$$g_5 = \frac{\partial P_{pri}}{\partial r} = (p_i^* - w) \frac{\partial^2 P_{pri}}{\partial p_i \partial r}$$

and

$$g_6 = \frac{\partial P_{pri}}{\partial p_i} + \sum_{j=1}^{n} \frac{\partial P_{pri}}{\partial p_j} + (p_i^* - w) \sum_{j=1}^{n} \frac{\partial P_{pri}^2}{\partial p_i \partial p_j},$$

because $dp_i/dr = dp_j/dr$ for all i,j. Remember, at equilibrium, $p_i = p_j$ for all r. Lemma 1 implies $g_1 > 0$. Each of the three terms in g_2 is negative. Hence, $g_2 < 0$. Hence, $dp_i/dr > 0$.[18]

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