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Small market-share brands are known to suffer from two specific disadvantages compared with high-share brands: they tend to have fewer buyers than high-share brands, and they also tend to be bought less often (Ehrenberg, Goodhardt, and Barwise 1990). The authors consider a third important advantage for high-share brands: *unusually high behavioral loyalty* (e.g., degree of repeat purchasing). We show, across many product-markets in both Japan and the U.S., that high-share brands have significantly greater loyalty than the levels that would be expected on the basis of a popular consumer purchase model (the Dirichlet model). Several possible causes for this effect are examined, including four key assumptions that underlie the Dirichlet model. The most likely source appears to be the existence of distinct consumer segments, which may emerge through the distribution strategies pursued by both large brands and small retailers. The authors discuss other possible causes of this market-share premium as well as several of its managerial implications.

Excess Behavioral Loyalty for High-Share Brands: Deviations from the Dirichlet Model for Repeat Purchasing

Brands with high market shares tend to exhibit greater levels of repeat purchasing behavior than do small share brands. This basic principle should come as no surprise. Though niche brands (Kahn, Kalwani, and Morrison 1988) might provide occasional counterexamples to this notion, they account for a small portion of purchasing across most product categories. For the majority of brands there is ample evidence that correlates high repeat purchasing with high market share.

Two questions concerning the market share/repeat purchase relationship are more subtle and, we believe, more important. First, what is the expected or natural "repeat purchasing premium" that large brands should enjoy, and how does it vary with changes in market share? We will answer this question with a simple yet powerful and well-established model of consumer purchasing.

Second, what repeat purchase premium for large-share brands do we typically observe? How does the empirical relationship between repeat purchasing and market share compare with the expected level? The central conclusion of our study is that high-share brands experience more behavioral loyalty, i.e., repeat purchasing, than previous observations and models would lead one to expect. Such a premium for high-share brands, if it exists, has implications for many areas in marketing. We briefly describe several examples.

In the domain of marketing strategy, a finding that high-share brands receive extra repeat purchase loyalty will have two implications. First, it represents a new source of "jeopardy" for low-share brands, building on the notion of "double jeopardy" (Ehrenberg, Goodhardt, and Barwise 1990), which we discuss further in the next section. Second, our finding will shed some light on the prevalence—or at least success—of market niche strategies. Indeed, though such a strategy has been advised for certain market conditions (Day 1990; Kotler 1991)

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we find, among a wide array of consumer packaged goods, that small-share brands have a tendency *away from,* rather than toward, a niche positioning.

Another area affected by a repeat purchase/market share link is market segmentation on the basis of consumer behavior. Such segmentation requires an assessment of how different consumers really are, and we will show that excess repeat purchasing for high-share brands leads to an overestimate of such consumer differences. Finally, the excess loyalty finding will have implications for models predicting consumer purchases. In particular, it will affect the use of certain popular heterogeneity measures used in conjunction with full-scale choice models such as multinomial logit (e.g., Fader 1993, Kalwani, Meyer, and Morrison 1992).

All these implications hold no matter what might cause extra behavioral loyalty for high-share brands. Nevertheless, an assessment of the potential causes can be interesting in its own right and enhance the implications just listed. We show that the extra repeat purchasing cannot reasonably be explained either by the emphasis various brands are seen to place on advertising, promotion or price or by the market responsiveness to such instruments (i.e., increasing or decreasing returns to scale). We also show that the most common enhancements to simple consumer behavior models—i.e., the incorporation of nonstationary choices, inertia, and variety seeking—still are not able to account for this market share premium. Finally, we identify how three other factors may cause this extra behavioral loyalty for high-share brands: (1) consumer segmentation, (2) structured submarkets of brands, and (3) the distribution level for larger brands (and the corresponding strategies adopted by smaller retailers). We also show that factor 3 is essentially a special case of factor 1. We discuss empirical evidence related to each of these three potential causes of the market share premium.

In short, we offer three things to those interested in firms' marketing actions and their consequences. First, we show how the extensive experience with consumer purchasing patterns to date leads to a certain expected level of behavioral loyalty (that level depending on the brand's market share). Second, we show, for a large number (67) of different product categories in two different countries (Japan and the United States), that high-share brands tend to benefit from an *extra* loyalty not anticipated in current models. When included with the double jeopardy already known to assail small-share brands, this represents a third threat to the success of such brands. Third, we develop explanations for the presence of such a repeat-purchase premium for high-share brands.

As noted earlier, much of the motivation for this study is drawn from the concept of *double jeopardy,* which we discuss in the next section. We briefly explain this phenomenon as well as a possible exception to it, namely excessive repeat purchasing for high-share brands. We then examine the presence and size of this market share premium in two ways. Our first analysis uses data drawn from a periodic market summary report prepared by the Distribution Economics Institute of Japan (1990). We examine repeat-buying behavior across 39 different categories, comparing actual levels of the market share premium to those predicted by a well-accepted descriptive model.

To compare with (and extend) these results, we perform a second analysis using data from the *Marketing Factbook,* a report published annually by Information Resources, Inc. (IRI), for the U.S. market. To test whether the market share premium occurs for other measures of brand loyalty besides repeat purchasing, in this data set we analyze *share of category requirements* (SCR), a different measure of a brand's ability to retain buyers. That is, we compare a brand's observed SCR with the SCR expected given its market share for 28 product categories. After completing these empirical inquiries, we consider possible explanations for this market share premium. We close by summarizing the implications of our findings for both researchers and managers.

DOUBLE JEOPARDY

The link between market share and repeat purchasing behavior is closely tied to an "empirical law" known as *double jeopardy*. For nearly 30 years, researchers have observed and modeled this phenomenon. The basic idea is that popular (i.e., high market share) brands enjoy two distinct benefits when compared to small brands: (1) high-share brands have more buyers than less popular brands, and (2) buyers of high-share brands purchase these brands more often than buyers of a small brand purchase those small brands. In other words, high share brands benefit from both greater market penetration *and* higher purchase frequency. Ehrenberg and his colleagues have reported extensive evidence of double jeopardy across a wide variety of product categories (Ehrenberg 1988).

Double jeopardy has important implications for marketing managers. For example, it offers useful growth targets for the introduction of new brands (Ehrenberg 1991). It also suggests that managers will have difficulty creating a true "niche" brand, i.e., a brand with relatively few buyers (low penetration) but whose users purchase it often (high purchase frequency). The relationship observed between penetration and purchase frequency in double jeopardy makes it hard to increase one without affecting the other.

Delineation of niche brands as deviations from double jeopardy has been proposed by Kahn, Kalwani, and Morrison (1988). They also discuss the "opposite" deviation from double jeopardy, in what they term *change-of-pace* brands. Such a brand would have purchase frequency that is low, relative to the brand's level of market penetration. Unlike the niche brand concept, the strategy literature cited earlier does not seem to endorse pursuit of a "change-of-pace brand strategy." Accordingly, this brief discussion of previous research leads to two prop-

ositions regarding the prevalence of niche and change-of-pace brands:

1. Double jeopardy implies that both niche and change-of-pace brands should be observed only rarely and with about equal frequency.
2. The strategy literature suggests that marketing programs pursued by firms may lead to a deviation from double jeopardy, in finding relatively more niche (and fewer change-of-pace) brands than would be expected.

The main empirical results here will in fact run counter to both of these propositions.

Our purpose is not to further prove or disprove double jeopardy in any way. Instead, we focus on a particular departure from double jeopardy that has been mentioned from time to time in the literature. Ehrenberg, Goodhardt, and Barwise (1990) acknowledge several possible exceptions that have been observed over the years, but suggest that most of these apparent irregularities can be successfully reconciled with double jeopardy. However, one general exception is not fully accounted for (p. 90):

> An occasional deviation seems to occur for major market leaders. In our consulting experience, some leaders have a somewhat higher-than-expected level of repeat buying (i.e., they behave like an even bigger brand than they already are), but this deviation does not occur universally.

This deviation, if and when it exists, would be a *third* advantage in favor of successful brands. Though this effect might not occur universally, it may be quite common; to this point its frequency has been an open question. Furthermore, in cases in which it does indeed exist, its impact might be quite significant. If this market share premium exists for large-share brands, it could substantially affect inferences commonly made about repeat purchasing and about consumer heterogeneity.

We will explore this deviation in a systematic manner. Our primary goal is to answer the question; How pervasive are these market share premiums? In addition, we will address two related questions: Why do they occur, and what are their implications for managers? As mentioned earlier, we will perform two analyses to measure the extent of market share premiums. Though they will use different data sets and measures of repeat purchasing, both use the Dirichlet model as an underlying structure. In the next section we briefly introduce this model and discuss how it will be used in the subsequent analyses.

THE DIRICHLET MODEL AND MEASURES OF REPEAT PURCHASING

In reviewing behavioral theories that support the notion of double jeopardy, Ehrenberg, Goodhardt, and Barwise (1990) and other researchers often use the *Dirichlet model* as a well-accepted quantitative model that can generate the double jeopardy effect. The applicability of the Dirichlet model extends well beyond double jeopardy: It has been used by numerous researchers to explain choice patterns made by heterogeneous decision makers. The Dirichlet model offers a robust, parsimonious method to summarize and predict repeated choices. It also offers a variety of diagnostic statistics with useful managerial implications (Fader 1993; Goodhardt, Ehrenberg, and Chatfield 1984).

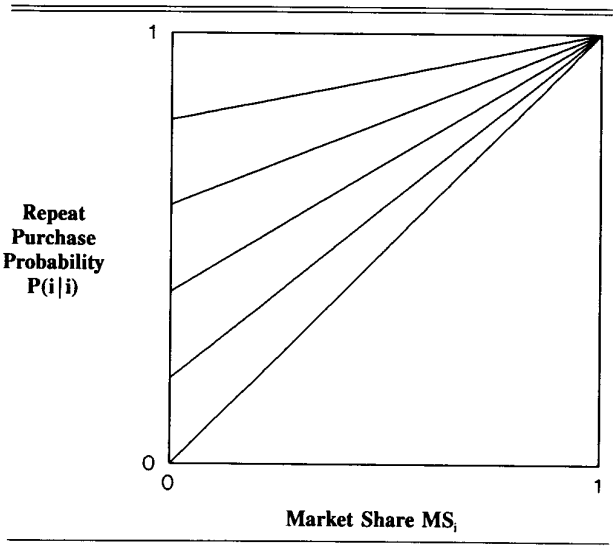
For our purposes the Dirichlet model will be useful in two respects. First, since it captures the dynamics of consumer purchasing with conceptual appeal and empirical effectiveness, it is a natural baseline for evaluating the existence of a repeat purchasing premium for high-share brands. That is, we use the Dirichlet model to calculate how, within a product category, repeat purchase loyalty should vary with the brands' market shares. Our assessment of the premiums are thus calculated relative to this benchmark. Second, since the Dirichlet model accounts for double jeopardy, our examination of Dirichlet model deviations to establish excess loyalty for high-share brands is conceptually distinct from double jeopardy. In other words, double jeopardy (as reflected in the Dirichlet model) is already consistent with repeat-purchase rates that increase with market shares. But, as we will show empirically, the actual degree of the relationship between market share and behavioral loyalty is not consistent with the double jeopardy/Dirichlet model view of consumer purchase patterns. High-share brands get more loyalty than the Dirichlet (and hence double jeopardy) would allow.

The Dirichlet Model as a Natural Baseline

We will not repeat the multiple theoretical and empirical arguments of authors (cited earlier) in favor of the Dirichlet model as a natural baseline. But since we are focusing on repeat purchasing, one qualitative feature of the model may help illustrate its appeal. At the outset we suggested that the tendency to repeat-purchase *ought* to be related to a brand's market share. What, intuitively, should be the nature of this relationship?

Here, we offer three axioms. Their acceptance leads almost inexorably to the Dirichlet model. First, consider the conditional probability of repeat purchase of a brand i, $P(i|i)$. (This is the probability that brand i is bought on the current purchase occasion by a household that purchased this same brand i last time.) In the limit, for a brand with very high market share (MS_i approaching 1.0), what must the repeat purchase probability $P(i|i)$ be? A little reflection shows that, if brand i is to sustain a high-share MS_i, then consumers must continue to repurchase the brand, so $P(i|i)$ must also be high. Indeed, as MS_i goes to 1, $P(i|i)$ must also go to 1. Second, how is $P(i|i)$ related to MS_i for very low-share brands? Again, a bit of reflection suggests that a low-share brand may, conceptually, have either a very high repeat purchase probability (if it is a niche brand) or a very low value for $P(i|i)$ (if it is a change-of-pace brand). So as market share decreases toward 0, $P(i|i)$ can be anywhere from 0 to 1. Thus far, we have concluded that $P(i|i)$ can "start" anywhere on the y-axis of Figure 1 (between 0 and 1)

Figure 1
POSSIBLE RELATIONSHIPS BETWEEN MARKET SHARE AND REPEAT-PURCHASE PROBABILITY IN THE DIRICHLET MODEL



for $MS_i = 0$, and must (as market share increases) terminate at the point (1,1) in the figure. Our third axiom simply states that this progression is monotonic; i.e., that the repeat purchase probability increases continuously with market share. Unlike our previous two axioms, this one need not be true mathematically; but it seems to us logical that high-share brands would also get a high share of repeat purchases.

Finally, if we take our third axiom's monotonic relationship and make it linear as well, as is sketched in Figure 1, we must (as will be shown later) conclude that purchasing follows the Dirichlet model. Though other (and more compelling) rationales leading to this model also exist, we hope that this discussion shows how the Dirichlet model captures repeat purchase behavior in a way that is simple, elegant, and conceptually appealing.

Measures of Repeat Purchasing

We do not wish to dwell on the mathematics of the Dirichlet model any more than necessary, and for more detail we refer the reader to the comprehensive paper by Goodhardt, Ehrenberg, and Chatfield (1984). We will, however, need a few of its functional characteristics and begin by stating the general form for the Dirichlet choice probabilities. The likelihood that a randomly chosen consumer will choose brand i, conditional on a category purchase at time t is

$$(1) \qquad P(i) = \frac{\alpha_i + n_{it}}{\Sigma_j(\alpha_j + n_{jt})}$$

where the denominator is summed over all brands in the market (and available to the consumer). α_i represents the brand-specific Dirichlet parameter for brand i, and n_{it} is the number of purchases the consumer has made of brand i up to (but not including) purchase occasion t.

Consider the case in which we have no prior information about the consumer's past purchasing history, i.e., $n_{it} = 0$ for all brands. In this situation,

$$(2) \qquad P(i) = \frac{\alpha_i}{\Sigma_j\alpha_j} = \text{Market share for brand } i.$$

Intuitively, if we know nothing about a consumer's past choices, our best guess is to assume that choice probabilities are proportional to market shares. Now consider the probability of choosing brand i conditional on a previous purchase of the same brand:

$$(3) \qquad P(i|i) = \frac{\alpha_i + 1}{\Sigma_j\alpha_j + 1}$$

$$= \frac{1}{\Sigma_j\alpha_j + 1} + \frac{\alpha_i}{\Sigma_j\alpha_j}\frac{\Sigma_j\alpha_j}{\Sigma_j\alpha_j + 1}.$$

Let $\phi = 1/(\Sigma_j\alpha_j + 1)$. Note that this quantity ϕ does not depend on the brand i in question. Equation 3 can be rewritten as

$$(4) \qquad P(i|i) = \phi + (1 - \phi)MS_i$$

where MS_i represents the market share of brand i, as in equation 2.

Equation 4 shows that repeat purchasing and market shares are linked by a simple linear relationship (as illustrated in Figure 1). This relationship will be the basis of our first empirical analysis. It is worth noting that ϕ is itself meaningful in Dirichlet analyses as the "reliability" or "polarization" index (e.g., Jeuland, Bass, and Wright, 1980; Sabavala and Morrison 1977), indicating the level of consumer heterogeneity in the market. It can range between zero and one, where zero indicates pure homogeneity in consumer choice (i.e., all consumers have the same brand choice probabilities), and one indicates maximal heterogeneity among consumers (i.e., each consumer always buys only his/her favorite brand). We will examine this statistic more closely later.

The Dirichlet model parameters can generate a variety of other statistics, such as brand penetration, the proportion of buyers who buy only one brand, and each brand's SCR. This latter measure of behavioral loyalty is commonly used by market researchers (e.g., Information Resources, Inc. 1989, Johnson 1984), and will be the focus of our second empirical analysis. SCR is defined as each brand's market share among triers. In other words, of all consumers who purchase a particular brand at least once within a given time period, SCR is the percentage of their total purchases allocated to that brand. SCR and repeat purchasing ($P(i|i)$) are clearly related since both can be derived from the Dirichlet model parameters (see Goodhardt, Ehrenberg, and Chatfield 1984 for the SCR formula). The link between the two is quite

complex, however, and there is no simple relationship between SCR and market share as there is between $P(i|i)$ and market share. Assessing market share premiums using SCR requires four steps:

1. Estimate the parameters of the Dirichlet model,
2. Compute the Dirichlet model-based expected SCR for each brand i, denoted $SCR_i^{(e)}$,
3. Calculate the deviation d_i between actual SCR (denoted $SCR_i^{(a)}$) and expected SCR for brand i; i.e., $d_i = SCR_i^{(a)} - SCR_i^{(e)}$, and
4. See if these deviations d_i are related to market share MS_i.

Here, a positive influence of MS_i on d_i is indicative of a market share premium.

If we see these positive effects consistently with both measures ($P(i|i)$ and SCR) each having a distinct assessment methodology, it will increase our confidence that the premium for large-share brands relates to a relatively broad-based behavioral expression of brand loyalty.

EMPIRICAL ANALYSIS #1: REPEAT PURCHASE PATTERNS OF JAPANESE HOUSEHOLDS

In this section we use brand switching and repurchase data reported separately for 39 product categories in Japan to examine the possible existence of a market share premium in repeat purchasing. The repeat purchase data in this study are taken from a periodic market summary report by the Distribution Economics Institute (DEI) of Japan, a non-profit research center that collects, publishes, and analyzes UPC scanner data from a panel of approximately 10,000 Japanese households. The data are collected in grocery stores, where the panelists regularly use identification cards to ensure that complete, accurate purchase records can be maintained at the household level. DEI provides an aggregate switching matrix for each product category, which provides precisely the kind of repeat purchase data needed for the proposed analysis. To our knowledge, no other major data supplier offers this type of repeat purchase information on such a comprehensive (cross-product) and regular (over time) basis. We draw our data set from the 1990 DEI *Factbook*.

The key quantities used for each brand are its market share MS_i and the conditional probability of repeat purchase $P(i|i)$. This pair of statistics was calculated for each substantial brand in every DEI product category with at least four such brands.[1] The essential question is whether the relationship expressed in equation 4 can be validated empirically. Suppose we estimate the following linear regression model across the brands within each product category:

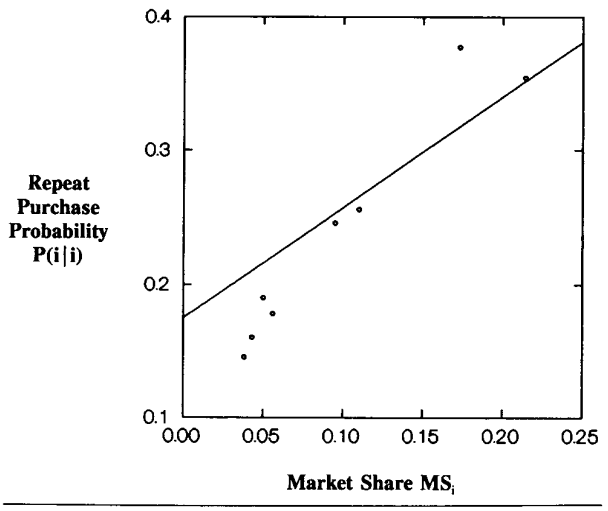
$$P(i|i) = \alpha_c + \beta_c MS_i \quad (5)$$

where α_c and β_c are regression coefficients estimated for each product category. If the Dirichlet model (and thus double jeopardy) holds, then equation 4 implies that $\alpha_c + \beta_c = 1$. On the other hand, if high-share brands exhibit greater than expected repeat purchasing, we should observe $\beta_c > 1 - \alpha_c$. So, within each product category, we have a simple statistical test to determine whether a market share premium exists. That is, we test the null hypothesis of no market share premium ($\beta_c = 1 - \alpha_c$) against the hypothesis that such a premium exists ($\beta_c > 1 - \alpha_c$), for each product category.

Furthermore, we conduct an omnibus test for the presence of a market share premium across all 39 product categories. To do this, we see whether the inequality ($\beta_c > 1 - \alpha_c$) holds more often (and, statistically speaking, more strongly) than would be expected by chance. For this test, the null hypothesis is an absence of any market share premium across all these product markets.

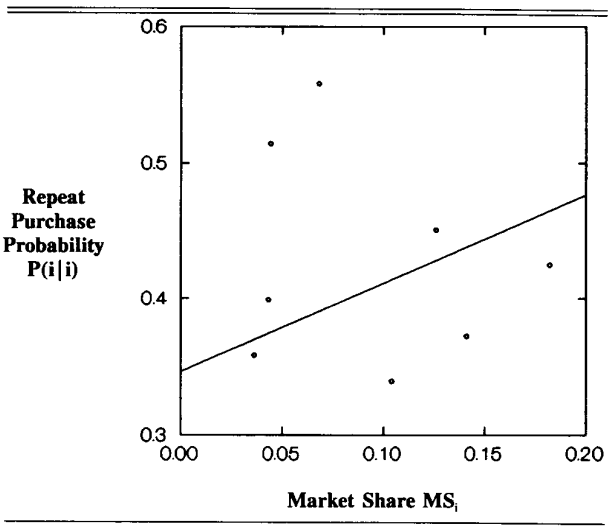
Before presenting the category-by-category regression results, we first examine the disaggregate $P(i|i)$ vs. MS_i graphs for two categories at the extremes in terms of market share premiums. Figure 2 shows the pattern for a typically strong positive effect. The category is biscuits, and the superimposed line represents the best-fit relationship from the Dirichlet model, equation 4. In this case, $\phi = .175$. There is an indisputably positive rela-

Figure 2
THE RELATIONSHIP BETWEEN MARKET SHARE AND REPEAT-PURCHASE PROBABILITY FOR EIGHT JAPANESE BISCUIT BRANDS



[1]In some markets, a small number of brands with exceedingly low shares were eliminated, because the number of repeat purchases observed was too low to reliably estimate $P(i|i)$. Specifically, the analysis included up to the eight largest brands in the category, but all brands with a share less than 1% were eliminated. For a category to be included, it had to have at least 1000 repeat purchases and/or switches; this criterion eliminated some infrequently bought categories.

Figure 3
THE RELATIONSHIP BETWEEN MARKET SHARE AND REPEAT-PURCHASE PROBABILITY FOR EIGHT JAPANESE YOGURT BRANDS



tionship between share and repeat purchase rates; however, the Dirichlet line clearly overstates repeat purchasing for the six low-share brands and understates it for the two high-share brands. Several product categories exhibit patterns very similar to this one.

Figure 3 displays the "worst case analysis" of a market share premium. This category (yogurt) shows signs of niche behavior, since two of the small brands have the highest repeat purchase rates. Therefore, not only is a market share premium hard to detect, but there is little support for double jeopardy or the Dirichlet model in general. It is important to note that this type of relationship is quite rare across the 39 DEI categories, as we will now show in the full set of category-level results.

Table 1 summarizes all the estimation results for the DEI data.[2] The categories are ordered by their estimated market share premium, shown in the first column. This premium is the excess influence that market share has on repeat purchasing, beyond that in the Dirichlet model. As a modification to the Dirichlet model's equation 4, we can write

$$P(i|i) = \phi + [(1 - \phi) + b]MS_i \quad (6)$$

where b is now the market share premium.

[2]Because the dependent variable is estimated with error, and the typical magnitude of this error depends on the number of purchases used to estimate $P(i|i)$ (and hence depends on market share), we use weighted least squares to avoid the problem of heteroskedasticity in the regression models.

The second column of the table displays the p-values derived from the hypothesis test $\alpha_c + \beta_c = 1$, with one-sided alternative hypothesis $\beta_c > 1 - \alpha_c$. This is equivalent to testing whether b is significantly greater than zero in equation 6. Observe that 31 of the 39 categories (i.e., 79%) have a positive market share premium. Nearly 50% of the market share premium estimates are significant at the .20 level, and 20% are significant at the .05 level. In contrast, of the eight negative coefficients, none are significant at the .05 level. Given the small number of brands each category possesses (and the correspondingly low power of each category's statistical test), this set of results provides substantial evidence of a repurchase premium for high-share brands.

To assess the overall significance of this collection of p-values, Dutka (1984) offers a test that converts these values into a single chi-square statistic. Under the null hypothesis that the market share premium does not exist, the expression $-2\Sigma\log(p)$ is distributed χ^2 with $2n$ degrees of freedom, where n is the number of p-values in the set. The p-values in Table 1 yield $\chi^2 = 133.97$, with 78 degrees of freedom. This statistic is significant at $p < .001$, indicating that the collection of category-level regressions departs substantially from the Dirichlet model.

The final two columns of Table 1 offer evidence about the systematic bias in the Dirichlet model's estimate of the heterogeneity index, ϕ. The first column shows the value of ϕ that comes from estimating the "pure" Dirichlet model in equation 4. The second column shows the "adjusted" value of ϕ after accounting for each category's market share premium; this is the estimate of ϕ obtained from equation 6. In all 31 categories with a positive market share premium, the "pure" Dirichlet model overstates the "adjusted" estimate of ϕ, sometimes by sizeable margins. This is fairly strong evidence that the simple Dirichlet model can regularly overstate the level of heterogeneity in a market, at least when operationalized using equation 4. We will revisit this issue later and discuss a version of the Dirichlet model that can correct for this apparent bias.

In summary, despite the intuitive appeal of the Dirichlet model as a natural baseline, this analysis provides strong evidence that the model is unable to completely capture the repeat-purchasing patterns in these data. In the next section we perform a similar analysis on a different data set; after that we return to this type of $P(i|i)$ analysis to examine possible causes for a repeat-purchase premium for high-share brands.

EMPIRICAL ANALYSIS #2: SHARE OF CATEGORY REQUIREMENTS FOR U.S. HOUSEHOLDS

So far we have not estimated any Dirichlet models in their entirety (i.e., the set of α_j) but only a linear rela-

Table 1
EVIDENCE FOR EXCESS REPEAT PURCHASING FOR HIGH-SHARE BRANDS AMONG JAPANESE PACKAGED GOODS

Category	Market Share Premium	p-value	ϕ (unadjusted Dirichlet)	ϕ (adjusted for market share)
1 milk	1.265	.001	.645	.398
2 canned vegetables	.860	.105	.452	.287
3 regular coffee	.715	.116	.373	.247
4 salad oil	.514	.031	.228	.107
5 noodle sauces	.395	.008	.602	.499
6 biscuits	.334	.033	.175	.124
7 lactic acid beverage	.288	.144	.544	.471
8 nutritious drinks	.238	.180	.502	.444
9 ciders	.228	.034	.440	.326
10 instant noodles	.212	.030	.274	.217
11 canned fish	.185	.175	.243	.197
12 fruit juices	.180	.052	.401	.364
13 carbonated soda	.131	.335	.499	.466
14 frozen foods	.118	.171	.111	.095
15 soy sauce	.117	.246	.402	.334
16 canned fruit	.109	.452	.347	.333
17 sports drinks	.106	.168	.615	.554
18 dressing	.099	.048	.353	.323
19 instant soup	.088	.346	.358	.339
20 spaghetti	.087	.155	.399	.365
21 chocolate	.077	.311	.135	.123
22 wheat flour	.074	.154	.382	.346
23 cheese	.074	.296	.291	.272
24 tea drinks	.070	.239	.578	.552
25 cereal	.053	.318	.478	.457
26 instant coffee	.033	.417	.387	.367
27 vegetable juices	.026	.399	.657	.645
28 instant curry	.017	.366	.301	.293
29 seasonings	.017	.361	.648	.638
30 catsup	.005	.468	.186	.183
31 vinegar	.004	.410	.423	.420
32 sauces	−.004	.513	.390	.391
33 snacks	−.007	.605	.140	.142
34 bread flour	−.021	.545	.537	.542
35 sauce mix	−.026	.531	.323	.328
36 chinese tea	−.054	.619	.681	.699
37 cleansers	−.171	.682	.310	.383
38 fresh cream	−.504	.873	.527	.655
39 yogurt	−.827	.938	.346	.455

tionship that is *implied by* the full model. In this section, we test for the market share premium by estimating a set of 28 full Dirichlet models using software developed specifically for this purpose (Uncles 1989). We compare estimates for SCR provided by the Dirichlet software to actual values from IRI's *Marketing Factbook*, and show how the repeat-purchase premium continues to emerge for the substantial majority of product categories considered.

The *Marketing Factbook* (1989) consists of aggregated data collected from card-carrying panelists. We used IRI's 1989 *Factbook*, at which time 1500–3500 panelists in 27 different markets were involved in the data collection process. Further details are available from published papers, such as Fader and Lodish (1990), which have utilized the *Factbook*. In total, the *Factbook* provides data for over 7500 brands in about 350 different product categories, but many brands and/or product categories fail to meet criteria for inclusion in our analysis.[3] Applying our selection criteria, the sample is reduced to 192 brands in 28 categories. Though this is considerably smaller than the full dataset, it is still reasonably representative of the overall distribution of product cate-

[3]As with the DEI data, we had to screen out many brands and categories because of insufficient purchase data. As before, eligible brands were those with shares of at least 1%. We used categories meeting the following criteria: (1) a minimum of three eligible brands, (2) a minimum of 80% of overall category volume represented by eligible brands, and (3) a minimum of three category purchases per buyer per year on average. We also eliminated categories that include two or more sub-categories, as defined by IRI. Examples include laundry detergent (powders and liquids) and ready-to-drink fruit juice (apple, prune, and grapefruit juice).

gories, as judged by the *Factbook*-based cluster configurations of Fader and Lodish (1990).

Two measures—purchase frequency and penetration—are used for each brand and product category to calibrate the Dirichlet models. Estimation is performed using the BUYER software package (Uncles 1989). In addition to providing Dirichlet parameter estimates, this software also furnishes a number of diagnostic statistics, including SCR, that can be calculated directly from the Dirichlet model. We denote these estimated SCR values as $SCR_i^{(e)}$. The *Factbook* also provides a value of SCR for each brand (denoted as $SCR_i^{(a)}$), calculated directly from the household-level panel data. These two sets of SCR values offer a test to determine whether the full Dirichlet model is generating biased estimates of brand loyalty and whether these errors are related to a brand's market share. Specifically, we estimate the following linear regression model for each product category:

$$SCR_i^{(a)} - SCR_i^{(e)} = \gamma_c + \delta_c MS_i. \quad (7)$$

If the market share premium is present, we should expect to see $\delta_c > 0$ in many product categories.

Note that this hypothesis test is somewhat different from that of the previous $P(i|i)$ analysis. In the earlier case, the Dirichlet model predicted a positive relationship between $P(i|i)$ and MS_i, but we observed that the MS_i effects were even larger than expected. In this case, however, the Dirichlet model offers no *a priori* reason why the *Factbook*'s $SCR_i^{(a)}$ values should differ from the model's estimates of $SCR^{(e)}$: Any persistent deviation from $\delta_c = 0$ is evidence that the Dirichlet model (and double jeopardy) is missing something.

Results

The regression results in Table 2 show an overabundance of positive market share premiums, analogous to those seen earlier.[4] Of the 28 categories, 19 (68%) indicate the presence of a positive premium. As before, nearly half of the p-values are significant at the .20 level, and none of the negative coefficients are significant at $p = .05$.[5] We report in Figure 4 the cumulative distribution of the p-values for the Japanese and U.S. product categories. If the Dirichlet model held (i.e., there was no behavioral loyalty premium for high-share brands) the distributions should approach the 45-degree line. Instead, too many of the p-values are too small (indicating statistical significance). A Kolmogorov-Smirnov test across the two sets of p-values cannot reject the hypothesis (at $p = .20$) that the two distributions are identical.

In summary, there is strong and consistent statistical evidence of a positive association between excess repeat purchasing and market share. It may be coincidental that the two distributions obtained here are so similar, but it is hard to dispute the presence of a market share premium in most product categories. Of the 67 product categories analyzed across both countries, 75% revealed excess repeat purchasing for high-share brands. Furthermore, in the next section we discuss the possibility that this proportion might actually understate the true extent of the market share premium.

Market Share Premium and Purchase Frequency

Unlike the earlier $P(i|i)$ analysis, the SCR regression models do not offer any indications about possible biases in the Dirichlet heterogeneity index. But the data in Table 2 do offer another insight about the occurrence of a positive market share premium. The last three columns of the table contain category-level measures that might have some association with the size of the premium. Of these, the first two show no meaningful relationship with this premium ($r = -.009$ and $r = -.117$ for number of brands and category penetration, respectively). However, the correlation between purchase frequency and the share premium is $r = .317$, which is fairly significant ($p < .10$). Observe that the top seven market share premiums include the three most frequently purchased products (cigarettes, toilet tissue, and chewing tobacco). This pattern suggests that, for infrequently purchased categories, the premium in Table 2 may actually be *understated*. As discussed in footnote 4, we expect to see less reliable SCR estimates for brands that are purchased relatively infrequently. As average purchase frequency grows the SCR estimates will stabilize. Therefore, some categories with a seemingly insignificant market share premium (e.g., frozen whipped toppings) may simply have had a high variability in the SCR estimates, masking the market share premium. This may also explain why there is a slightly smaller proportion of positive premiums in the SCR analysis than in the earlier $P(i|i)$ analysis.

EXPLANATIONS FOR THE MARKET SHARE PREMIUM

In this section we discuss factors that might explain the existence of the market share premium. In essence, we are looking for mechanisms that can cause a large brand to have abnormally high repeat purchase rates without an equivalently high market share.

One might initially propose that the premiums are caused by price and/or promotion effects that vary across brands. It is hard to see, however, how these effects can differentially improve repeat purchasing for high-share brands without making their shares proportionately higher as well. For example, some believe in the existence of advertising thresholds, beyond which an advertiser can earn increasing returns to scale on expenditures (e.g., Little 1979). Suppose only high-share brands have the resources and visibility to get beyond such a threshold. Even if this premise were true, it would not generate a

[4]The SCR measure is highly unstable over short purchase histories: Brands purchased infrequently will generally have less reliable estimates of SCR. For this reason we continue to use weighted least squares in the regression models.

[5]Across all 28 categories, the omnibus test from Dutka (1984) yields $\chi^2 = 94.64$, with 56 degrees of freedom, which is significant at $p < 0.001$.

Table 2
EVIDENCE FOR EXCESS SHARE-OF-CATEGORY REQUIREMENTS FOR HIGH-SHARE BRANDS AMONG U.S. PACKAGED GOODS

Category	Market Share Premium	p-value	Number of Brands	Category Penetration	Average Purchases per Buyer
1 chewing tobacco	.631	.015	5	9.3%	12.4
2 hair spray	.550	.117	11	33.1	3.3
3 dog biscuits	.457	.040	9	30.5	7.9
4 disposable cups	.409	.011	7	43.0	3.5
5 cat treats	.353	.160	4	9.5	3.6
6 toilet tissue	.261	.114	7	95.8	13.8
7 cigarettes	.226	.073	7	38.1	19.7
8 baked beans	.221	.048	9	70.5	4.7
9 toaster pastries	.219	.017	5	28.5	4.4
10 moist towelettes	.166	.161	7	18.0	3.3
11 frozen dinners	.155	.017	9	51.1	5.1
12 paper towels	.143	.163	10	92.9	11.6
13 catsup	.114	.049	5	76.7	3.6
14 egg substitutes	.077	.365	4	15.8	4.6
15 baby formula	.066	.441	4	7.0	5.4
16 canned pudding	.043	.335	5	20.2	3.1
17 dishwasher detergent	.025	.448	6	49.8	4.2
18 dish detergent	.022	.424	5	83.5	4.6
19 frozen whipped toppings	.007	.467	5	57.9	3.1
20 add-to-meat dinners	−.013	.548	8	35.5	3.6
21 baby juices	−.033	.792	3	8.3	5.2
22 frozen pot pies	−.047	.601	6	39.2	3.2
23 breakfast/snack bars	−.049	.555	11	26.3	4.3
24 peanut butter	−.088	.658	9	78.7	4.5
25 facial tissue	−.092	.716	6	78.1	6.9
26 paper napkins	−.312	.803	9	72.7	4.8
27 string cheese	−.321	.725	11	14.8	3.2
28 fruit rolls	−.386	.930	5	22.6	4.9

market share premium. High-share brands might indeed benefit from threshold effects, but any benefits would improve share as well as repeat purchasing. We have consistently observed excessively high repeat purchasing *relative to share;* it is not at all clear how threshold-type explanations can lead to such an imbalance.

In light of this brief discussion, it is unlikely that the market share premium is caused primarily by the kinds of exogenous factors (such as pricing or promotion) that have recently been incorporated into Dirichlet-type models (Fader 1993; Wagner and Taudes 1986). More likely, it can be attributed to some sort of systematic deviation from the Dirichlet model's underlying assumptions about consumer behavior. These deviations may be brought on by certain types of marketing mix activities, but it is a shortcoming of the model itself that allows the premium to exist.

Analyzing the Assumptions of the Dirichlet Model

The brand choice component of the Dirichlet model rests on four principal assumptions:

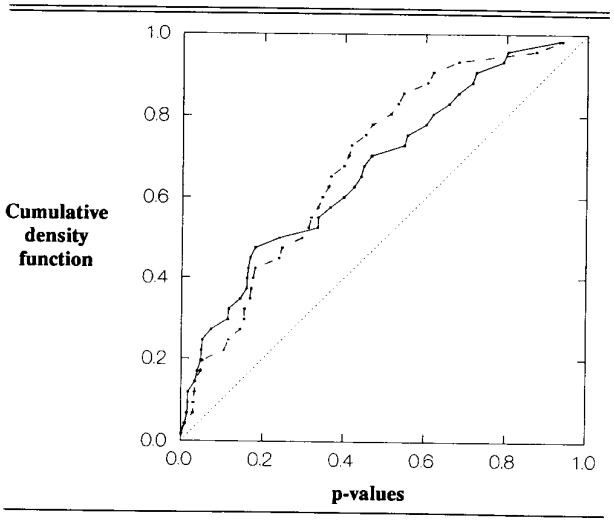
1. Consumer choice probablities are *stationary* over time;
2. Consumer choice follows a *zero-order* multinomial process;
3. The consumer population is *unsegmented*; and
4. There are *no sub-markets* among the available brands.

One might expect that a violation of one or more of these assumptions would lead directly to the type of market share premium uncovered in the earlier empirical analyses. Accordingly, we will examine each assumption to determine what impact, if any, its failure will have on the existence of a market share premium.[6] We show that violations of the first two assumptions cannot induce such a premium, but violations of the latter two assumptions can (in some cases). Following this analysis, we will look at the third assumption more closely, since we believe consumer segmentation is the leading cause of the market share premium that we have observed in the two cross-category datasets.

Nonstationarity. The Dirichlet model assumes that each consumer's choice probabilities are represented by a single draw from a Dirichlet distribution. This set of multinomial probabilities (one for each brand) is assumed not to vary over time for each consumer. Suppose, in contrast, that choice behavior is actually *nonstationary;* that is, a household may update its choice probability (by a new draw from the Dirichlet distribution) occasionally during the choice history. Sabavala and Mor-

[6]This systematic examination evolved out of an anonymous reviewer's suggestions and speculation on these issues.

Figure 4
CUMULATIVE DENSITY FUNCTIONS FOR JAPAN AND U.S. DATA



rison (1981) modeled such a process, incorporating the timing of these renewals as geometric random variables. Fader and Lattin (1993) demonstrated strong empirical support for this model. In the $P(i|i)$ context discussed earlier, this type of nonstationarity would lead to the following restatement of equation 3:

$$(3') \qquad P(i|i) = \rho \frac{\alpha_i}{\Sigma_j \alpha_j} + (1 - \rho) \frac{\alpha_i + 1}{\Sigma_j \alpha_j + 1}.$$

The ρ parameter represents nonstationarity: At the extremes, a value of $\rho = 0$ implies pure stationarity (in which case the original version of equation 3 emerges) and $\rho = 1$ implies that a renewal takes place between every purchase, in which case the consumer always chooses with probabilities equal to market shares (equation 2).

What would happen if we mistakenly assume a stationary model was operating when this nonstationary process was actually in effect? Simple arithmetic shows that this type of misspecification *cannot* generate excess repeat purchase premiums for high-share brands. Equation 3′ can be transformed into the following analog of equation 4:

$$(4') \qquad P(i|i) = \phi(1 - \rho) + [1 - \phi(1 - \rho)]MS_i.$$

Two relevant observations can be made about this equation. First, there is no market share premium: The constant and the intercept terms clearly sum to one. Second, the intercept is not equal to ϕ but instead it equals the *adjusted* polarization index that accounts for the presence of nonstationarity (Sabavala and Morrison 1981).[7] This adjusted polarization index is smaller than that for the stationary Dirichlet model, so nonstationarity can be one cause of the empirical phenomenon documented earlier: the tendency of the ordinary Dirichlet model to underestimate ϕ.

Therefore, even if we superimpose a stationary model onto a nonstationary process, the observed relationship between repeat purchasing and market shares will not indicate a market share premium. An explanation for such a premium must stem from one or more of the other Dirichlet assumptions.

Non zero-order choice process. The Dirichlet model not only assumes that each consumer retains a single set of choice probabilities over time, but also that choices are made in a simple multinomial manner at each choice occasion. That is, there is no inertia or variety-seeking to push the consumer's probabilities up or down from one purchase occasion to the next. In contrast, researchers have suggested that choice probabilities at a particular purchase occasion may be related to the brand purchased most recently (Givon 1984, Jeuland 1979, Morrison 1966). Nevertheless, we show that this type of "last purchase loyal" behavior cannot generate a market share premium in terms of repeat purchasing.

Consider a typical last-purchase-loyal model in which there is a constant probability, λ, that the consumer will "overrule" his or her probabilities and make a repeat purchase, even when the Dirichlet model suggests otherwise. In this case, the observed repeat-purchase probability ($P^o(i|i)$) will be linked to the theoretical repeat-purchase probability ($P^t(i|i)$) as follows:

$$(3'') \qquad P^o(i|i) = P^t(i|i) + \lambda(1 - P^t(i|i)).$$

which can be algebraically re-expressed as the following association between $P^o(i|i)$ and market share:

$$(4'') \qquad P^o(i|i) = \lambda + (1 - \lambda)\phi + (1 - \lambda)(1 - \phi)MS_i.$$

Though it is less clear than with the previous case of nonstationarity, this relationship does not yield any excess repeat purchasing for high-share brands. The coefficients sum to one, and the intercept term makes intuitive sense.[8] We have therefore ruled out a second possible source for the market share premium.

Consumer segmentation. Just as the Dirichlet model

[7]When $\rho = 0$ (i.e., there is no nonstationarity), this model collapses back into equation 4. When $\rho = 1$, consumers are maximally homogeneous, since everyone shares the same choice probabilities (market shares).

[8]When $\lambda = 0$ (i.e., there is no last purchase loyalty), this model collapses back into equation 4. When $\lambda = 1$, consumers are maximally heterogeneous, since one purchase dictates the rest of each household's purchase history. Note also that the intercept in equation 4″ is greater than ϕ. Comparing this result under nonzero-order choices with the intercept in equation 4′ under nonstationarity, it is clear that these two phenomena have countervailing influences on the ordinary Dirichlet model's estimate of heterogeneity (which will be the intercept in equation 4′ or 4″). We thank an anonymous reviewer for noticing this.

assumes that a single Dirichlet distribution operates over time (i.e., stationarity), it also assumes that a single Dirichlet distribution captures all the heterogeneity across households. Consumer segmentation can represent a violation of this assumption: If two or more distinct groups of consumers can be characterized by different Dirichlet distributions, then the resulting aggregate-level distribution will generally not be a Dirichlet. The key question is, Will this pooled distribution reveal excessive repeat purchasing for high-share brands? The answer is yes, under certain conditions. Specifically, we show that if one or more segments are highly loyal to the market's high-share brand(s), then excessive repeat purchasing for these brands will become apparent. We construct a simple two-segment example to show how and why this phenomenon can occur. Later, we will offer several explanations and additional empirical support for this finding.

Consider an ordinary unsegmented market that obeys the standard Dirichlet model. We focus our attention on brand 1, the category leader, with market share MS_1^u. Now suppose a new segment emerges, consisting of consumers who are strictly loyal to brand 1. Assume this new segment occupies a fraction γ of the overall market. After accounting for the segmentation, the new market share for brand 1 can be expressed as

$$MS_1^s = (1 - \gamma)MS_1^u + \gamma.$$

The increase in market share ($MS_1^s - MS_1^u$) is equal to $\gamma(1 - MS)$. Under the Dirichlet model, how much additional repeat purchasing should be associated with this incremental increase in share? Using equation 4, the expected incremental repeat purchasing can be calculated as $\gamma(1 - \phi)(1 - MS)$. However, the actual gain in repeat purchasing can be shown (see appendix) to be

$$\frac{\gamma(1 - \phi)(1 - MS_1^u)}{(1 - \gamma)MS_1^u + \gamma}.$$

If we assume that $MS_1^u < 1$ and $0 < \gamma < 1$, then the denominator of this expression must be less than 1. Therefore, actual repeat purchasing for the high-share brand in this type of segmented market will exceed the level that would arise in an unsegmented Dirichlet market.

Intuitively, brand 1's unique status as the sole brand in the second segment guarantees it a level of repeat purchasing that would be much more difficult to obtain in the original unsegmented market alone. On the other hand, if the sole brand in segment 2 has a *small* overall market share, we would have a classic niche situation: a small-share brand with unusually high repeat purchasing. Later, we discuss reasons for both possibilities, though our empirical evidence suggests the former occurs much more often than the latter. This illustrative example can be extended to general segmentation situations. The critical element is that at least one segment must consist of consumers who are exceptionally loyal to the high-share brand(s). The size and significance of the resulting market share premium depends on the various parameters in the Dirichlet model (e.g., ϕ), as well as properties of the segments (e.g., γ and the number of brands involved in each).

Structured submarkets. The final Dirichlet assumption states that each market is unfragmented; i.e., all brands in a product category are assumed to compete within a single partition. Several articles have indicated otherwise—namely that many markets are more finely structured into two or more submarkets (e.g., Grover and Dillon 1985; Grover and Srinivasan 1987; Jain, Bass, and Chen 1990; Rubinson, Vanhonacker and Bass 1980). Suppose we ignore such an arrangement and aggregate brands across distinct submarkets. We will show that in this case the market share premium can indeed exist, but only under certain conditions that seem unlikely to hold in general.

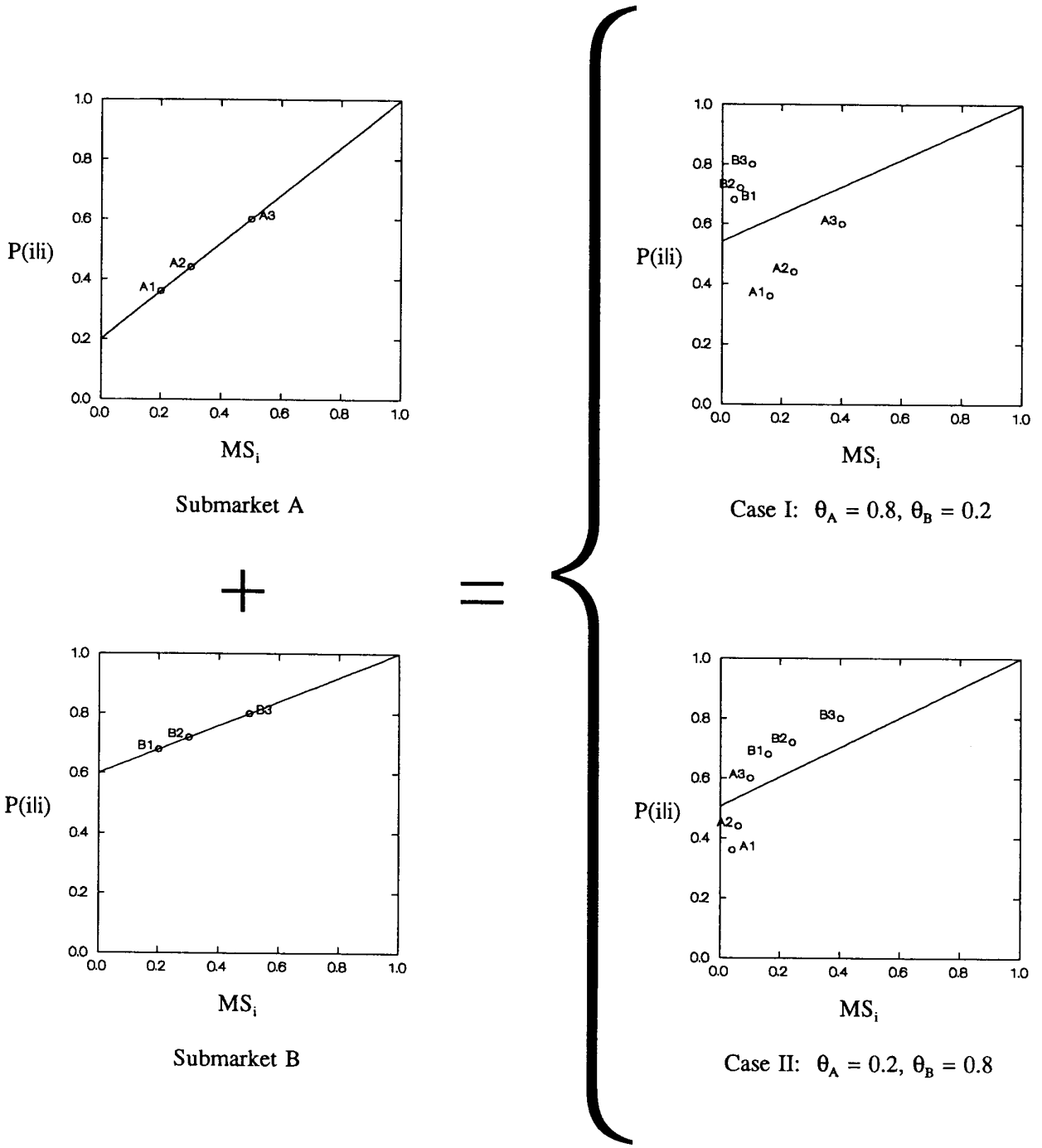
We illustrate the market situation in Figure 5. Consider a category with two submarkets, each containing three distinct brands. We assume that, within each submarket, the Dirichlet model holds, and different polarization indices characterize each submarket: submarket *A* is somewhat homogeneous (ϕ = .2), whereas submarket B is more heterogeneous (ϕ = .6). We further assume that consumers are strictly loyal to one submarket or the other,[9] and the parameters θ_A and θ_B denote the fraction of the category represented by each submarket ($\theta_A + \theta_B = 1$).

What happens when we pool these six different brands together and estimate a single Dirichlet model for the entire category? The figure portrays two opposite cases, one in which the homogeneous submarket is far larger than the heterogeneous submarket, and the other in which the reverse is true. When aggregating across submarkets, each brand will retain its original $P(i|i)$, since each consumer is loyal to his or her submarket, but the brands' market shares will shift downward by a factor of θ_A or θ_B. It is clear, therefore, that the aggregated brands will generally not conform to the Dirichlet model. The interesting issue is whether we will see a market share premium in the resulting amalgamation.

In Case I, with the homogeneous market dominating, there is no evidence of a positive premium. The pooled brands bear a rough resemblance to Figure 3, our "worst case analysis" from the DEI data. The three submarket *B* brands begin to take on niche-like properties. But there is only moderate statistical support for a negative premium (p = .08). In contrast, Case II (with the heterogeneous market dominating) shows a positive market share premium. The deviations between actual and expected (Dirichlet) repeated purchasing clearly rise with increases in market share. Statistically, we would reject

[9]This assumption is made for analytical convenience; it does not affect the qualitative nature of the subsequent results.

Figure 5
AGGREGATING BRANDS ACROSS DISTINCT SUBMARKETS



the hypothesis of no premium at the 0.05 level of significance.

Similar patterns will generalize from these simple examples. A natural question is whether this is the primary cause for the market share premium we have observed. Unlike the segmentation story discussed earlier, there is no obvious rationale as to why larger submarkets should frequently be more heterogeneous than smaller ones. For example, in the caffeinated and decaffeinated submarkets of the instant coffee product category analyzed by Grover and Srinivasan (1987), an examination of the reported shares and repeat purchase rates does not support such a contention. Furthermore, one of the screening criteria used to choose eligible product categories (see footnote 3) eliminated every IRI category with predefined submarkets (including coffee).

Brand Availability and the Market Share Premium

We have shown that consumer segmentation is one of two possible sources for high-share brands to experience a repeat-purchase premium. This explanation holds only if certain "loyal" segments will tend to disproportionately favor the market's high-share brands. In this section we show that cross-sectional differences in retail distribution frequently give rise to such a phenomenon.

The version of the Dirichlet model analyzed to this point has relied on a key assumption: all brands within a given product category are implicitly envisioned as being available at every choice occasion. In reality, brand availability is generally less than 100% and often varies considerably from brand to brand. Moreover, differences in brand availability are often associated with differences in market share. Farris, Olver, and de Kluyver (1989) show that high-share brands have significantly higher levels of distribution than smaller brands. They also demonstrate that this large-brand advantage is even stronger in small stores with limited shelf space.

When the Dirichlet model does not account for these differences in availability, the market share premium can emerge through the segmentation explanation offered earlier. Consider a small store that carries only one brand, and assume there exists a segment of buyers loyal to this store. Farris, Olver, and de Kluyver (and basic intuition) suggest that the sole brand is probably a high-share brand in the overall market. If so, we will observe a market share premium.[10]

A closely related consequence is the bias in the Dirichlet model's heterogeneity index (ϕ) that was discussed earlier. In trying to account for these overlooked availability effects, the Dirichlet estimation procedure will push the estimate of ϕ to an artificially high level, since it attempts to reconcile the unexpectedly high repeat purchase rates with the more moderate market shares.

[10]In contrast, if this sole brand has small share, we will observe a niche effect. Uncles and Ellis (1989) suggest that this commonly occurs for private label brands.

Adjusting for Differences in Retail Availability

The key to the explanation just described is that the "standard" version of the Dirichlet model does not account for availability effects that vary across brands. When using aggregate data, as in our empirical analyses, it is impossible to adjust for these effects. In calibrating models using household-level data, however, it is usually possible to know exactly which brands are available at each purchase occasion. One can then assess the biases caused by ignoring availability effects and gain an indication about this potential source of the market share premium.

We illustrate this type of analysis using disaggregate scanner panel data. Fader (1993) shows how the brand choice component of the Dirichlet model can be calibrated using household-level data, taking account of brand availability at each purchase occasion. We use household-level data from the refrigerated orange juice category and estimate two different heterogeneity indices—one using the disaggregate approach discussed in Fader (1993) and the other using the BUYER software with aggregated penetration and purchase frequency measures derived from the same database. Table 3 contains these aggregate measures as well as market share and brand availability information.

As suggested by Farris, Olver, and de Kluyver (1989), there is a strong positive relationship between market share and brand availability ($r = .499$), so we have reason to expect that a market share premium will be detected. In comparing the two different heterogeneity estimates, we see clear evidence of the aforementioned bias: $\phi = .195$ using the disaggregate data and $\phi = .463$ for the aggregate data. By ignoring brand availability, the aggregate approach overstates consumer heterogeneity, just as we observed earlier in Table 1. In this particular case, the bias appears to be quite large. Perhaps this is because average brand availability is only 80% across all 1589 purchase occasions in the data base.

Discussion

To summarize our explanation of the market share premium, it is unlikely to be found in the advantages that large brands may experience in advertising, pricing, or promotion. Nor can it emerge from violations to the Dirichlet model's assumptions of stationarity or zero-order choice. One possible, but unlikely, origin is the existence of structured markets in which a large submarket(s) is more heterogeneous than a small one(s).

On the basis of our analysis, the most common cause of a market share premium seems to be consumer segmentation, and a specific source may be distribution patterns that differentially favor large-share brands. There are other forms of segmentation that might also favor large brands. For example, it is well known that many consumers consider only a small subset of available alternatives in making brand choice decisions (Hauser and Wernerfelt 1990, Roberts and Lattin 1991). It is reasonable to imagine that membership in these limited choice

Table 3
DISTRIBUTION LEVEL AND PURCHASING PATTERNS FOR REFRIGERATED ORANGE JUICE BRANDS

	Percentage of Availability[a]	*Market Share*	*Penetration*	*Purchase Frequency*
Citrus Hill	.992	.288	.615	3.72
Minute Maid	.997	.236	.535	3.50
Regional Brand	.821	.151	.350	3.43
Tropicana Regular	.826	.146	.380	3.05
Store Brand	.404	.137	.200	5.45
Tropicana Premium	.814	.042	.105	3.19

[a]Fraction of all purchase occasions at which each brand was available.

sets may be correlated with overall brand popularity, i.e., market share. If so, then this "internal" constraint will produce a market share premium in exactly the same manner as the "external" constraint of brand availability. We leave a closer investigation of this and other segmentation schemes to further research.

SUMMARY AND IMPLICATIONS

Having demonstrated the existence of the market share premium and one likely cause for it, we now summarize our findings and some managerial implications that can be drawn from this analysis.

Large brands are generally better off than smaller brands. This notion was first made evident when Ehrenberg, Goodhardt, and Barwise (1990) firmly established the concept of double jeopardy. Though the market share premium emerges from a systematic deviation to double jeopardy, the mutual coexistence of these two phenomena does not invalidate either of them in any way. Double jeopardy continues to endure as a well-established "empirical law," and the premium discussed here only amplifies the big-brand advantage.[11]

Consumer packaged goods categories are notable for a lack of niche brands. The double jeopardy phenomenon suggests that there should be roughly as many niche brands as change-of-pace brands, with neither occurring frequently. If the managers of small-share brands have any influence on this positioning (and subscribe to the strategy literature's recommendations), there should be more niche than change-of-pace brands.

But we find the opposite. Where deviations from the Dirichlet/double jeopardy *are* found, they are generally *away* from a niche positioning. That is, low-share brands tend to have repurchase rates even lower than their (small) shares would predict.

This conclusion comes through clearly in Tables 1 and 2. For 39 product categories in Japan, *none* show evidence (significant at the .05 level) of containing niche (as opposed to change-of-pace) brands. By chance alone—*without* a tendency toward niche brands—two such cases would be expected. Similarly, for the 28 products in the United States, none show a tendency toward niche brands, where at least one would be expected by chance alone.

In short, small brands in both countries have a distinct tendency to be change-of-pace (low penetration with particularly low purchase frequency) brands. Perhaps this results despite the best efforts of these brands' managers. More troublingly, one might wonder whether this phenomenon stems from such managers' attempts to focus (ultimately unsuccessfully) on growing market share rather than concentrating on satisfying the brand's current users.

Differences in brand preferences across consumers may be overstated by current measurements. As our analysis of Japanese household purchases showed (Table 1), the Dirichlet model often overestimates a natural index of the brand-choice heterogeneity in a market. We have shown how one can adjust for such a bias.

Differences in brand availability have a substantial impact on aggregate choice models. Though the Dirichlet model does not explicitly account for the effects of marketing mix variables, proponents (e.g., Ehrenberg 1988) suggest that marketing mix effects can often be inferred as deviations from the Dirichlet baselines. However, availability effects are more subtle and can impact the model in surprisingly strong ways. We have suggested that a significant cause of the market share premium is the assumption that all brands are always available in a given market. If this assumption were true, or at least if brand availability was unrelated to market share, then these premiums might not be so prevalent. But in many markets, choice sets vary greatly from purchase to purchase, and these variations are often associated with overall brand popularity. As such, aggregate choice models (Dirichlet or otherwise) will frequently credit these widely available large brands with greater loyalty and repeat purchasing than they truly deserve.

Try to use disaggregate choice models whenever possible. In many cases, including the two empirical analyses discussed earlier, it is impossible to calibrate disaggregate models that adjust for availability effects.

[11]It is worth noting that this "big-brand advantage" refers only to repeat purchasing. Other elements not considered here, e.g., cost factors, might mitigate these results somewhat when examined from the perspective of brand profitability.

However, as scanner panels continue to grow in size and number, it is becoming easier to take advantage of the benefits of using disaggregate household-level data. In some sense, disaggregate modeling offers tangible benefits at virtually no cost—analysts can estimate the same parsimonious choice models (e.g., Dirichlet), without worring about potential availability effects or other biases caused by aggregation.

Stay on the lookout for other forms/causes of the market share premium. We have concentrated on the role of brand availability as a principal source of excess repeat purchasing for high-share brands. But we also acknowledge that other forms of consumer segmentation, and possibly structured submarkets, may contribute to this effect as well. We encourage researchers and managers to sort out these competing effects and to try to identify others that may exist.

In conclusion, we have documented an interesting and important advantage enjoyed by high market-share brands. Between two-thirds and three-quarters of our numerous consumer goods categories show such an effect, in both the Japanese and U.S. markets. Though the empirical finding has important implications in its own right, we have also explored some potential sources/causes of this effect. We hope this current study stimulates others to investigate this excess behavioral loyalty experienced by high-share brands.

APPENDIX

Here we derive the relationship between repeat purchasing and market share for the two-segment scenario described in Consumer Segmentation and calculate the incremental gain in repeat purchasing relative to the unsegmented Dirichlet model.

Adopting the same notation used earlier, we use the "u" and "s" superscripts to refer to the unsegmented and segmented markets, respectively. For example, $P^u(i|i)$, the repeat-purchase probability in the unsegmented market, is simply equation 4. We now derive $P^s(i|i)$, the observed level of repeat purchasing in the segmented market.

We assume that segment A buyers choose among all brands available in the market, with market shares equal to those in the unsegmented market. Segment B occupies a fraction γ of the overall market and is strictly loyal to the market leader, brand 1. Since brand 1 can be repeat purchased in either segment,

$$(A1) \qquad P^s(1|1) = P^A(1|1)P(A|1) + P^B(1|1)P(B|1),$$

where $P(A|1)$ is the probability that the consumer of interest is a member of segment A, conditional on her immediate past purchase of brand 1. Using Bayes Theorem, we calculate

$$P(A|1) = 1 - P(B|1) = \frac{(1-\gamma)MS_1^A}{(1-\gamma)MS_1^A + \gamma}.$$

Recognizing that $P^A(1|1) = P^u(1|1)$, $P^B(1|1) = 1$, and $MS_1^A = MS_1^u$, we can restate $A1$ as

$$P^s(1|1) = \frac{(1-\gamma)MS_1^u[\phi + (1-\phi)MS_1^u] + \gamma}{(1-\gamma)MS_1^u + \gamma}.$$

Unlike the relationships between repeat purchasing and market share shown earlier (equations 4, 4′, and 4″), this one can not be expressed as a simple linear function. However, it is not difficult to calculate the difference between $P^s(1|1)$ and $P^u(i|i)$:

$$P^s(1|1) - P^u(1|1) = \{(1-\gamma)MS_1^u[\phi + (1-\phi)MS_1^u] + \gamma\} - \frac{[(1-\gamma)MS_1^u + \gamma][\phi + (1-\phi)MS_1^u]}{(1-\gamma)MS_1^u + \gamma}.$$

The numerator can be simplified and rearranged into the expression shown earlier:

$$P^s(1|1) - P^u(1|1) = \frac{\gamma(1-\phi)(1-MS_1^u)}{(1-\gamma)MS_1^u + \gamma}.$$

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