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Can Brand Equity Explain Excess Behavioral Loyalty?*

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Despite the well-known predictive power of Dirichlet model on customer loyalty, deviations of share of category requirement (SCR) predicted by Dirichlet model from actual SCR have been repeatedly reported. It has been shown that these deviations can be systematically explained by some factors such as brand's market share, product positioning strategy, purchase volume and retail marketing mix strategies. Presuming that brand equity would be additional sources of these deviations, current study assesses the incremental predictive power of brand equity by using over 4,000 brand-level observations for the consumer packaged goods industry in the U.S. Our model estimations indicate that brands that exhibit higher brand equity enjoy excess loyalty, with the primary driver being volume premium, rather than price premium. Overall, our findings support the notion that idiosyncratic brand properties can explain excess behavioral loyalty, a notion that is in stark contrast with the Dirichlet view of the world: brand equity does not exist.

Key words: Empirical Generalization, Brand Equity, Behavioral Loyalty, and Category Characteristics

Ⅰ. Introduction

A brand with strong equity is seen as providing advantages and benefits for the firm, such as better market performance of brand (e.g., retention rates or share of category requirements) (Keller and Lehmann, 2006; Anderson, 1996; Fornell, 1992; Fornell et al., 1996). However, the concept of brand equity has been empirically challenged by widely observed regularities of "double jeopardy" that small brands have fewer customers and these customers buy them less frequently (Uncles et al., 1995). According to the proponents of this explanation, the concept of brand equity is not necessary because market performance of each brand can be fully explained or predicted by such factors

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as penetration rate and purchase frequency, which are directly related to size of brand, that is, market share.

Negative Binomial Dirichlet model (for short, Dirichlet model) has successfully done a good to capture "double jeopardy" in a variety of market in a different time point (Ehrenberg et al., 2004). Therefore, the Dirichlet model implies that differences in brands are simply due to differences in their market shares (Uncles et al., 1995), suggesting that there are no strong brands or weak brands. This view contradicts the widely held brand equity view in marketing that an individual brand possesses different levels of brand equity (Aaker, 1996; Keller, 1993) and it is this brand equity that explains brand performance.

Despite a good fit of the Dirichlet model to purchase incidence and brand choice, certain persistent deviations between observed brand performance measures and estimated one by the Dirichlet model have long been reported and several predictors have been suggested to explain these deviations systematically (Fader and Schmittlein, 1993; Scriven and Bound, 2004; Bhattacharya, 1997; Ehrenberg et al, 2004; Jung et al., 2010). The obvious tension between the Dirichlet view of the world - there is no such thing as brand equity - and a more generally accepted view that brand equity not only exists, but it matters (Keller, 1993; Keller and Lehmann, 2003) provides an interesting and fruitful background to study this phenomena, identify additional factors that can explain persistent deviations from the Dirichlet norm, and possibly resolve the tension between the Dirichlet and the main stream view.

The current study examines the influence that brand equity has on persistent deviation from the Dirichlet norm using 11,000+ brands in more than 670 consumer packaged goods categories in the United States. We accomplish this by examining the impact that behavioral brand equity metrics have in predicting persistent deviations from the Dirichlet norm.

This is an important topic for academics, as well as practitioners. Understanding how a set of managerially relevant factors could explain deviations from the Dirichlet benchmark would enrich the value of Dirichlet benchmarking exercise and can provide guideline for interpreting and making inferences about excess loyalty.

Ⅱ. Theoretical Framework

2.1 Dirichlet Model as a Baseline

Dirichlet model is one of the most well-known empirical generalizations of repeat purchasing in marketing science (Ehrenberg et al., 2004; Uncles et al., 1995). The Dirichlet model is a stochastic model of purchase frequency and brand choice using a parsimonious set of inputs. Dirichlet model has been validated across vari-

ous countries and time to produce a variety of brand performance metrics including share of category requirements (SCR), which is most common behavioral loyalty measure used in industry.

2.2 Linking Brand Equity to Loyalty

Although a variety of approaches to measure brand equity has been suggested, there is a general consensus among researchers on the definition of the brand equity concept. Brand equity is usually defined as "the marketing effects, outcomes or added value that accrue to a product with its brand name compared with those that would accrue if the same product did not have the brand name" (Ailawadi et al., 2003; Aaker, 1991; Farquhar, 1989; Keller, 2003).

Generally the extant literature supports the notion of both a direct and indirect positive impact of brand equity on consumer's loyalty. Based on signaling theory, Erdem and Swait (1998) suggest that brand loyalty is a consequence of brand equity because of increased expected utility. Decreased information costs and perceived risk motivates consumers to buy the same subset of brands repeatedly. Taylor et al. (2004) show that brand equity and trust are consistently the most important antecedents of consumer loyalty.

Anderson and Sullivan (1993) and Anderson et al. (1994) show that the indirect impact of brand equity on consumer's loyalty that stronger brands are positively associated with customer satisfaction which leads to the increased customer loyalty (e.g., retention rates and SCR, etc.). That is, satisfied customers are more receptive to cross-selling and up-selling and are more likely to make a repeat purchase (Anderson et al., 2004; Fornell et al., 1996; Boulding et al., 1993; Keller and Lehmann, 2006).

The above arguments are in stark contrast with Ehrenberg et al. (2004) postulating that brand equity does not exist, since factors such as repeat buying are directly related to market share. It is argued that consumers buy 'a portfolio of brands' (Chaudhuri, 1995). They switch regularly between brands, often because they simply want a change. Thus, 'brand penetration' or 'brand share' reflects only a statistical chance that the majority of customers will buy that brand next time as part of a portfolio of brands they favor. Any deviations could be due to a variety of other marketing-mix factors (promotions, out of stock, a new flavor, repositioning, a change in sales director or in price, advertising, etc.), rather than any long term idiosyncratic brand characteristic (Ehrenberg, 1997).

According to the Dirichlet view, the notion that certain brands have greater potential than other brands in terms of "equity" or value or growth potential is unnecessary. Market share is the only metric that managers should try to influence, since high market share brands have a greater number of buyers than small market share brands and also because high market share brands have greater rates of repeat buying

among their greater number of buyers.

2.3 Deviations from the Dirichlet norm: Excess Behavioral Loyalty

Despite the good fit of the Dirichlet model, the extant literature has reported persistent deviations between observed and estimated market performance measures of the Dirichlet model (Ehrenberg, 1988; Bhattacharya, 1997; Ehrenberg et al, 2004; Scriven and Bound, 2004). Previous research have identified several primary sources of persistent deviations of the Dirichlet model. Availability of high share brands may drive excess loyalty levels compared to the expected one by the Dirichlet model (Fader and Schmittlein, 1993). High volume purchases would be positively related to the deviations of actual loyalty from the expected one because similar quantities of purchase volume are assumed in the Dirichlet model (Bhattacharay, 1997). Niche positioning brands which have higher purchase frequency level than the Dirichlet norm would enjoy higher than expected loyalty (Kahn et al., 1988; Fader and Schmittlein, 1993). Marketing interventions (Bhattacharya et al., 1996) would be negatively related to excess behavioral loyalty because those may distort the expected relationship between penetration and purchase frequency. We don't go into much detail here how these have been suggested to influence observed patterns of excess behavioral loyalty, and the interested reader is referred to Jung et al. (2010) for more details.

Consequently, based on the extant literature discussed above, we propose the following two hypotheses:

H1: Brands with low marketing mix, high market share, volume and niche positioning strategy have larger excess loyalty.

H2: Larger brand equity is likely to result in larger excess loyalty.

Ⅲ. Empirical Framework

We utilized IRI datasets for the year 2000 with 670 categories and 11,352 consumer packaged goods brands sold in the U.S. across multiple retail channels, including grocery stores, drug stores and mass merchandisers. Using the universe of CPG brands in the U.S. across all retail outlets allows us to have comprehensive and generalizable findings. IRI classifies brands into 8 departments (bakery, dairy, deli, edible grocery, frozen foods, health and beauty, non-edible, and general merchandise). Each department is further subdivided into categories and certain categories are divided into sub-categories. For example, the 'baking mixes' category consists of a variety of sub-categories, from brownies mixes to muffin mixes to coffee cake. Likewise, "coffee" includes subcategories ranging from ground coffee to instant coffee to coffee beans.

Following the previous Dirichlet papers (Fader and Schmittlein 1993, Bhattacharya 1997, Jung et al. 2010), we analyze the data at the subcategory level. We abide strictly by the brand definitions created by IRI; for example, Pepsi, and Diet Pepsi are distinct brands, but the caffeine-free versions of each are combined together with the regular (caffeinated) versions.

The measure of brand loyalty we use is SCR which is a widely used measure of brand loyalty by market researchers (Bhattacharya et al, 1996), and it has been used extensively in Dirichlet analysis (Ehrenberg et al., 1994; Uncles et al., 1994, 1995), which is available in IRI databases.

IRI database also provided us with penetration rates and purchase frequencies at the same level of aggregation as SCR metric, therefore providing us with all the variables necessary to estimate the NBD Dirichlet model and obtain predicted loyalty level, which were then used to compute excess behavioral loyalty (or deviations). Excess behavioral loyalty was computed as the difference between observed and estimated SCR which is denoted here as SCR_o and SCR_e respectively. This excess behavioral loyalty for brand i (DEV_i) is the focal variable of current study:

$$DEV_i = SCR_0 - SCR_e \quad (1)$$

Proposed independent variables such as marketing activities, volume per purchase occasion, and market share are available in IRI database. Niche positioning strategy was computed as detailed below.

Consumer use of retail promotions (*PROM*) measures each brand's percent of total sales volume purchased by consumers when it is promoted by the retailer. Retail promotions include newspaper features, in-store displays, short-term price cuts, and store coupons.

Average price (*PRICE*) and Depth of Price Promotion (*PCUT*) represents respectively average price paid for brand per volume basis and how deeply a brand cuts price when on deal, compared to average depth of price cut of all brands in the category.

Our measures of market share (*MS*) and volume per purchase (*VPPC*) are respectively average annual percent of total subcategory volume accounted for by the brand and average brand volume purchased per trip by buyers of the brand.

To identify niche brands (*NICHE*), we use the difference between purchase frequency weighted by the complement of penetration and a weighted average (weighted by market share) relative to the category average as an indication of the niche positioning of the brand following Kahn et al. (1993).

Additionally, we also used IRI data to compute brand equity metrics. Regarding behavioral brand equity metric, we utilized IRI dataset to compute revenue, volume and price premium metrics suggested by Ailawadi et al. (2001). IRI database includes volume and price

metrics for most brands, as well as for most private labels, making the calculations relatively straight forward. Revenue premium is defined as the difference in revenue between a branded good and a corresponding private label divided by that in corresponding private label within each category, more specifically:

$$Revenue\ Premium_b = \frac{[(Volume_b)(\mathrm{Price}_b) - (Volume_{pl})(\mathrm{Price}_{p1})]}{(Volume_{p1})(\mathrm{Price}_{p1})} \quad (2)$$

where bottom b and pl represents branded good and private label respectively.

Revenue premium provides a single, simple, objective measure of brand performance and is easy to calculate with readily available data which are based on the aggregated observed behaviors of consumers at the product-marketplace level. At the same time, it is more complete than some other product-marketplace metrics and thus provides a more accurate summary of brand health (Ailawadi et al., 2003).

Behavioral brand loyalty, which is quantified as SCR in our analysis, does not account for either the number of customers or the price they pay. Therefore, tracking revenue premium and determining in which of the specific cases (Ailawadi et al., 2001) their brand lies enables brand managers to flag a problem or upturn in brand strength more readily than would one of these measures alone. Thus, investigation of relationship between price premium, volume premium and deviations would enable us to see what underlie the relationship of excess loyalty. Accordingly, we define price and volume premium as the difference in price and volume between a branded good and a corresponding private label divided by those in corresponding private label within each category as follows:

$$Price\ Premium_b = \frac{\mathrm{Price}_b - \mathrm{Price}_{p1}}{\mathrm{Price}_{p1}} \quad (3)$$

$$Volume\ Premium_b = \frac{Volume_b - Volume_{p1}}{Volume_{p1}} \quad (4)$$

To ensure the validity of our results, we applied four screening criteria to eliminate inappropriate categories and brands. These criteria are consistent with previous research (Fader and Schmittlein, 1993; Bhattacharya, 1997). First, we screened out brands that had less than 1% share. Second, each category had to have at least three eligible brands. Third, the eligible brands have to represent a minimum of 80% of overall category volume. Finally, we limited our analysis to categories, where there is, on average, a minimum of three category purchases per household per year. These selection criteria result in 5,126 brands belonging to 422 categories. Finally, after removing observations for which we were unable to compute revenue, price or volume premium, we matched 4,218 out of 5,126 observations in 392 categories in our IRI databases for which we has a corresponding brand

equity calculation in category with private label brand. Table 1 and 2 detail univariates statistics and correlations for the datasets utilized for this study.

In order to analyze the impact of possible sources on deviations, we conducted multiple regressions using three datasets described above, including marketing mix, market positioning strategy, volume per purchase occasion, market share and brand equity metrics as independent variables. Additionally, and in order to compare estimates across categories, we normalized the dependent and independent variables by category (Bhattacharya, 1997). For normalization, we subtract the category mean from the actual values of the variable and then divide by the category standard deviations. Standardization makes the variables comparable across categories and facilitates the estimation of a cross category model. This standardization procedure

〈Table 1〉 Univariate Statistics (N=4,218)

Variable	Mean	Standard Deviation	Min.	Max
Deviation	0.000	1.000	-2.854	2.931
Niche	0.000	1.000	-1.937	3.586
Volume per Purchase Occasion	0.000	1.000	-3.164	4.224
Price	0.000	1.000	-3.675	3.931
Promotion	0.000	1.000	-2.916	3.606
Price Cut	0.000	1.000	-3.714	3.847
Market Share	0.000	1.000	-1.595	4.682
Revenue Premium	0.000	1.000	-3.125	4.274
Volume Premium	0.000	1.000	-1.976	2.000
Price Premium	0.000	1.000	-3.012	3.931

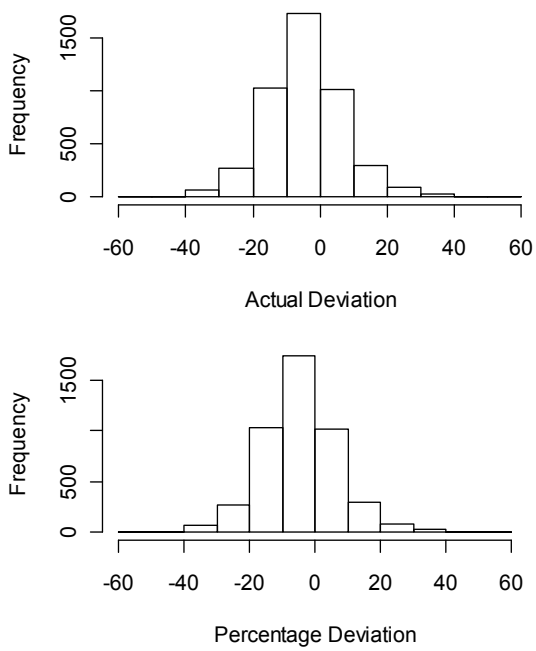
〈Table 2〉 Correlations

	1	2	3	4	5	6	7	8	9
1. Deviation	1.000								
2. Niche	-0.042	1.000							
3. Volume per Purchase Occasion	-0.105	0.333	1.000						
4. Price	-0.350	-0.115	0.027	1.000					
5. Promotion	0.616	0.028	-0.064	-0.548	1.000				
6. Price Cut	0.325	0.143	0.161	-0.143	0.185	1.000			
7. Market Share	-0.234	-0.154	-0.199	0.146	-0.214	-0.706	1.000		
8. Revenue Premium	0.269	-0.079	0.015	0.403	0.256	0.317	-0.255	1.000	
9. Volume Premium	0.612	0.030	-0.064	-0.548	0.590	0.186	-0.215	0.253	1.000

was also utilized for every behavioral metric obtained from IRI database, since all metrics computed are likely to be subcategory specific and therefore noncomparable.

In addition, we performed a variety of robustness checks, including the Breusch-Pagan test and White's general test to check for heteroskedasticity. Although the Breusch-Pagan test suggested heteroskedasticity not to be a problem, the White's test raised the possibility of heteroskedasticity. Therefore, we opted to use cluster adjusted robust standard errors (White, 1980) in regression to deal with estimated inefficiencies associated with heteroskedasticity. There is no concern of multicollinearity for the regression models estimated.

〈Figure 1〉 Empirical Distribution of Deviations



Figures 1 shows the empirical distribution of our dependent variable: deviations in SCR, both as actual magnitude of the deviations and the deviations expressed as a % of the actual SCR values. The empirical distribution of deviations reveals that although the Dirichlet model does a very good job of estimating SCR's (around 70% of the deviations are in the 10 SCR points range), there are fair amounts of deviations around the mean. Also Shapiro-Wilk normality test ($p < 0.0001$) shows that deviations are distributed normally. Normally distributed deviations imply that some possible reasons might explain deviations systematically.

Ⅳ. Findings and Discussions

Estimation was performed using 'the Dirichlet package' in R program. Table 3 summarizes our results. The first important finding has to do with the fact that every model estimated provides very adequate fit (with adjusted R^2 is always larger than 44%).

Our first set of analyses focus on behavioral brand equity. The empirical model estimated is detailed below in equation (1). Behavioral brand equity measure here is based on revenue premium of brands suggested by Ailawady et.al (2003). Additionally, we also estimated the relationship between price premium, volume premium and excess behavioral loyalty, as described

〈Table 3〉 Parameter Estimates of OLS

Predictors	Baseline	Model A	Model B
Niche	0.125***	0.068***	0.070***
Volume per Purchase Occasion	0.565***	0.491***	0.501**
Price	-0.020ˆ	-0.109***	-0.036*
Promotion	-0.084***	-0.080***	-0.077***
Price Cut	-0.059***	-0.056***	-0.054***
Market Share	0.283***	0.248***	0.297***
Revenue Premium		0.121***	
Volume Premium			0.166*
Price Premium			0.039***
Adj. R^2	0.441	0.451	0.459
AIC	9524.619	9467.916	9474.46

Note: Significance *** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$, ˆ = $p < 0.1$

in equation (2).

$$DEV_i = \alpha + \beta_1 NICHE_i + \beta_2 VPPC_i + \beta_3 PRICE_i + \beta_4 PROM_i + \beta_5 PCUT_i + \beta_6 MS_i + \beta_7 Revenue\ Premiun_i + \varepsilon_i \quad (5)$$

$$DEV_i = \alpha + \beta_1 NICHE_i + \beta_2 VPPC_i + \beta_3 PRICE_i + \beta_4 PROM_i + \beta_5 PCUT_i + \beta_6 MS_i + \beta_7 Price\ Premium_i + \beta_8 Volume\ Premium_i + \varepsilon_i \quad (6)$$

where *Revenue Premium* is a revenue premium, *Price Premium* is a price premium and *Volume Premium* is a volume premium.

Estimates for these empirical formulations are summarized in the second and third column Table 3. We find that revenue premium provides incremental explanatory power as a predictor of excess behavioral loyalty. Particularly, and supporting H2, higher brand equity (i.e., revenue premium) is significantly associated with positive excess loyalty. In addition, all other estimates remain compatible with the findings of Bhattacharya (1997) and Jung et al. (2010). Furthermore, our analyses on the differential impact that volume premium and price premium may have on excess behavioral loyalty, reveal that volume premium prevails over price premium. This finding is consistent with Zhu (2009) assertion that revenue premium is mainly driven by volume premiums. Finally, it is worth noting that the magnitude of *NICHE* variable is significantly attenuated with the inclusion of revenue premium (or its two components - price and volume). This contrasts Bhattacharya (1997) as well as our own findings. However, since

NICHE and *Revenue Premium* measure exceptions to double jeopardy, these exceptions actually make sense: since brand equity captures the strength of the brand, the impact of following a niche strategy becomes confounded with brand equity.

In this paper, we examine the influence that brand equity may have on loyalty deviations from the Dirichlet norm. Our primary finding suggests that brands with higher brand equity (proxied by revenue premium) enjoy significant excess loyalty and this revenue premium impact is mainly driven by volume premium. Overall, we find that brands that follow market niche positioning, are bought in higher quantities, have lower prices, promote to a lesser extent, have shallower price-cuts and have higher brand equity enjoy higher than expected levels of loyalty. The relative impact of brand equity on excess loyalty for high share brands gets larger because marketing mixes of leading brands are generally in line with the rest of the brands in the category and leading brands are positioned broadly.

The primary contribution of this study is that it demonstrates the existence of brand equity by showing that the observed patterns of deviations from the Dirichlet can be explained by brand equity. This is in stark contrast with assertions raised by Ehrenberg and other proponents of Dirichlet model (Goodhardt et al., 1984; Ehrenberg, 1988; Uncles et al., 1994; Uncles, 1995) that brand performance is solely determined by market share. Our finding suggests that observed patterns of behavioral loyalty may depend on idiosyncratic properties of the brand. Second, we confirm the previous findings that there are numerous factors that can explain the deviations of Dirichlet model even after accounting for the brand equity effect. By understanding these deviations systematically, marketing managers can evaluate the brand performance measures more accurately.

A number of additional limitations in our research provide avenues for future research. For instance, there are limitations in the data set we utilize. Our analyses focus on a single year of data. A longitudinal study might extend our understanding of the impact of brand equity on the excess behavioral loyalty and enable us to identify the development over time.

While our study has a focus on the possible sources of deviations from the Dirichlet model, investigation about the role of deviations would be also meaningful. If the excess behavioral loyalty from the Dirichlet model were correlated with change of market share over time, it would enable us to predict brand growth or decline in the market. Another very promising area for future research would be to identify the operational boundary conditions to use the Dirichlet model. Investigation into category characteristics such as the existence of submarket and average rate of repeat buying or evaluation about the assumption of the Dirichlet would enrich our understanding about the Dirichlet

deviations. Although Dirichlet model has been shown to closely describe the patterns of purchasing, consistent deviations have been reported. The Dirichlet provides a sound theoretical baseline against which to evaluate and understand these, and there is much opportunity for more research to fill in the gaps in our understanding of their implications.

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