Excess Loyalty in CPG Markets:

A Comprehensive Examination

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Abstract

Customer loyalty is a key concern of marketing managers due to its potential impact on brand and firm performance. Share of category requirements (SCR) is one of the most widely used (and available) metrics of behavioural loyalty. We replicate existing research indicating that the Dirichlet model is an accurate predictor of a brand's SCR using a broad set of brands and categories in consumer packaged goods (CPG) markets across multiple retail channels in the United States. However, systematic deviations between the observed SCR and that predicted by the Dirichlet benchmark (i.e. "excess loyalty") remain. Excess loyalty is positively related to market share in most CPG categories (86%), a circumstance labelled by some authors as Triple Jeopardy. A cross-category analysis suggests that excess loyalty is significantly influenced by a brand's market share and average purchase volume while measures of the brand's marketing mix provide comparatively little explanatory power. By better understanding the drivers of excess loyalty, managers can more accurately evaluate a brand's performance with respect to SCR, a key behavioural loyalty metric.

Keywords: Brand loyalty, Share of requirements, Dirichlet model, Empirical generalizations.

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1. Introduction

Customer loyalty is a key concern of marketing managers due to its potential impact on firm performance (Reichheld and Teal, 2001). Of the various approaches used to measure loyalty, one of the most important is "share of category requirements" or SCR (Farris et al., 2006). Also known as "share of wallet", SCR is defined as, "each brand's market share among the group of households that bought the brand at least once during the time period in question," (Battacharya et al., 1996). This key behavioural loyalty metric is very widely used in consumer packaged goods (CPG) markets and is available from syndicated marketing research suppliers such as Information Resources, Inc. (IRI), ACNielsen, etc. (Battacharya et al., 1996; Ehrenberg et al., 2004).

To understand variations in SCR across brands, the Dirichlet model has been successfully used as a benchmark across multiple product categories (see Ehrenberg et al., 2004 for an excellent review). The Dirichlet model is a stochastic model of purchase frequency and brand choice at the level of the individual consumer. It provides an accurate representation of a wide variety of patterns of repeat purchasing behaviour in established competitive markets (Goodhardt et al., 1984). This model does so using a parsimonious set of inputs to produce a large number of important brand performance metrics including SCR.

While the Dirichlet model can estimate a brand's SCR from a small number of inputs, the extant literature has identified deviations between a brand's observed SCR and that predicted by the Dirichlet benchmark (Fader and Schmittlein, 1993; Bhattacharya, 1997; Ehrenberg et al., 2004, Scriven and Bound, 2004; Pare et al., 2006, 2007, 2008). Several predictors have been proposed to explain the source of this "excess loyalty" including high market share (Fader and Schmittlein, 1993), marketing mix interventions such as price and promotions (Bhattacharya, 1997), and purchase volume (Bhattacharya, 1997).

In this paper, we replicate and extend the works of Bhattacharya (1997) and Fader and Schmittlein (1993) in three important ways. First, we examine the ability of the Dirichlet model to closely predict a brand's share of category requirements (i.e., brand loyalty) using a comprehensive set of CPG brands and categories from the

United States. In addition to a broader range of product categories, our sample measures sales across multiple retail channels, including grocery stores, drug stores and mass merchandisers. These data are more consistent with the ways in which consumers buy and brands compete today. The scope and breadth of our data (literally the universe of CPG brands in the U.S. across all retail outlets) suggest that our findings are comprehensive and generalizable.

Second, we investigate the prevalence of the so-called "Triple Jeopardy" effect at the category level. Double Jeopardy stems from the observation that small brands are at a dual disadvantage due to size; they have a smaller number of buyers than large brands and these buyers tend to purchase less often (Ehrenberg, et al. 1990). Fader and Schmittlein (1993) suggest that small brands may be at a further disadvantage if excess loyalty is positively related to market share. In other words, Triple Jeopardy exists when large brands have higher levels of behavioural loyalty than would be predicted by the Dirichlet benchmark. Finally, using a cross-category model, we determine whether the findings from existing studies regarding the above mentioned sources of these deviations generalize to a much larger universe of branded CPG products.

2. Key Concepts and Measures

We begin with a definition of excess behavioural loyalty and a discussion of triple jeopardy. We then discuss the other factors that may explain a brand's level of excess loyalty.

2.1 Excess Behavioural Loyalty

While the concept of brand loyalty may have multiple facets (Jacoby and Chestnut 1978, Oliver 1987), we are focused on the effects of brand loyalty on observed consumer behaviour as in the following definition of brand loyalty, "The degree to which a consumer consistently purchases the same brand within a product class" (Bennett, 1995). Of the various alternative measures of behavioural brand loyalty, our focus is a brand's share of category requirements (SCR) which is well-known and widely used by researchers and practitioners. SCR_i measures the brand i's average market share among consumers who purchased the brand within a given time frame. It is defined in Equation 1.

$$SCR_i = \frac{Number\,of\ Purchases\,of\ Brand_i}{Total\ Category\ Purchases\,by\,Buyers\,of\ Brand_i} \qquad (1)$$

The observed level of SCR is directly computed at the brand level from the recorded purchasing behaviour of consumers participating in a panel.

For each brand in our sample, we estimated the parameters of Dirichlet model using the "Dirichlet" package in R (Chen, 2009). The inputs were the category level penetration rates and purchase frequencies and brand level shares and penetration rates. The expected SCR for each brand was calculated directly using the estimated parameters of the Dirichlet model.

Excess behavioural loyalty for each brand is defined by the difference between a brand's observed SCR and the SCR predicted by the Dirichlet model. This measure of excess behavioural loyalty is denoted as DEV_i in Equation 2. This is the focal dependent variable for this study.

$$Dev_i = SCR_i(Actual) - SCR_i(Estimated) \qquad (2)$$

2.2 Triple Jeopardy

When observing repeat purchasing over time, researchers have consistently found that small share brands have fewer buyers overall and these buyers purchase the small share brand less often (e.g., Ehrenberg, et al. 1990; Uncles, et al. 1995). These twin disadvantages for small brands are known as "Double Jeopardy" and represent one of the most important "law-like" empirical generalizations in marketing (Ehrenberg, et al. 1990). Fader and Schmittlein (1993) identify a further disadvantage due to size. They find that high market share brands have higher levels of behavioural loyalty (as measured by SCR) than would be predicted by the Dirichlet model. They label this further challenge for small share brands as "Triple Jeopardy."

Fader and Schmittlein (1993) discussed several possible explanations for this phenomenon including differences in brand availability; the existence of submarkets and degree of consumer segmentation. In this paper, we test for the existence of Triple Jeopardy across a much wider range of CPG categories. Our approach is to determine whether market share is positively related to excess behavioural loyalty in a category-by-category analysis.

2.3 Marketing Mix Variables

One of the major attractions of the Dirichlet model is its ability to accurately predict various aspects of brand performance using a parsimonious set of measures of repeat purchase behaviour, e.g. market share, category penetration rates and average purchase frequency. A brand's performance on various metrics is determined primarily by its market share and only indirectly by its marketing mix through its effect of market share (Ehrenberg et al., 2004). However, a brand's marketing mix may distort the expected relationship between a brand's penetration rate and level of repeat purchases (Bhattacharya, 1997). For example, consider a brand with a deep price discounts or extensive dealing. These promotional activities might attract customers who buy the product once or at most twice. Such one-off purchases would increase the brand's penetration rate and market share while, at best, keeping the brand's purchase rate constant. This would result in an observed level of SCR lower than one would expect based on the Dirichlet benchmark (Bhattacharya, 1997; Danaher et al., 2003).

Brand switching between high and low priced brands is generally not symmetric (Blattberg and Wisniewski 1989). A consumer who usually buys a low priced brand may switch to a higher priced alternative. This may occur due to a special usage occasion or some promotional effort on the part of a high priced brand. The opposite situation, however, is unlikely. Buyers of high priced brands generally do not "trade down" when a low priced brand is promoted. Consequently, the penetration rates for high priced brands tend to be inflated by, for example, price promotions. At the same time, this switching behaviour to high priced brands is temporary and does not result in a high level of repeat purchasing. Therefore, the Dirichlet model will predict a higher than expected SCR for a high priced brand due to the inflated penetration rate. As in the case of brands selling at deep discounts or being promoted often, a brand's price will account for some of the discrepancy between a

brand's observed SCR and the SCR predicted by the Dirichlet model.

We measure marketing mix using three variables: average price, average price discount and level of promotional activity. Average price is computed on a per volume basis. The average price discount is the average percentage off the non-discounted price. The level of a brand's promotional activity is indicated by the percent of volume purchased on any deal including price discounts, features, displays and coupons (and combinations thereof). These are the same measures used in prior research by Bhattacharya et al. (1996), Bhattacharya (1997) and Danaher et al. (2003).

2.4 Volume per Purchase Occasion

The Dirichlet model assumes that brands in a category are purchased in similar quantities. (For example, beer is often sold in six packs.) Therefore, purchase volume is usually not an input to the Dirichlet model (Bhattacharya, 1997). However, there may be variations in purchase quantities across brands due to differences in package sizes or "stocking up" by buyers of more popular brands. Since volume per purchase occasion is directly involved in the calculation of SCR, the actual SCR will deviate from the estimated SCR to the extent that brands differ on the purchase quantity dimension (Bhattacharya, 1997). We expect that the volume bought per purchase occasion will be positively related to the deviation of actual SCR from the expected SCR.

3. Empirical Study

3.1. Data

Our dataset is based on the Consumer Knowledge Suite by Information Resources Inc. (IRI). The annual data (year = 2000) for 670 CPG categories and 11,352 brands sold in the U.S. across three major retail outlets (i.e. grocery stores, drug stores and mass merchandisers) provides the initial sampling framework for our study. 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 "coffee" includes subcategories ranging from ground coffee to instant coffee to coffee beans. We analyzed the data at the sub-category level in order to focus on a set of brands in an unsegmented market, consistent with the basic assumptions of the Dirichlet model.

To ensure the consistency of our results with existing studies (Fader and Schmittlein, 1993; Bhattacharya, 1997), we applied four screening criteria to restrict the categories and brands we analyzed. First, we screened out brands that had less than 1% market share. Second, each category had to have at least three eligible brands. Third, the set of eligible brands has to jointly represent a minimum of 80% of overall category volume. Finally, we limited our analysis to categories where there are – on average – a minimum of three category purchases per household per year. These selection criteria result in a set of 422 categories and 5,126 brands.

3.2 Model 1: Triple Jeopardy

To test for the existence of Triple Jeopardy, we fitted the following linear regression model across the brands within each product category.

$$Dev_{i,j} = SCR_{i,j}(Actual) - SCR_{i,j}(Estimated) = \gamma_j + \delta_j MS_{i,j} + \varepsilon_j \qquad (3)$$

where i refers to each brand in the category and j refers to the category. $MS_{i,j}$ is the market share of brand i in category j. The parameters γ_j and δ_j are estimated using OLS regression. The ε_j term is a random error with zero mean. We then examined whether the parameters associated with a brand's market share (δ_j) are positive and significantly different from zero.

3.2 Model 2: Excess Behavioural Loyalty

To better understand how the factors discussed above (market share, marketing mix, purchase volume) impact differences between the observed SCR for a brand and the SCR predicted by the Dirichlet model, we conducted a multiple regression analysis across categories. The empirical model estimated is given by:

$$DEV_{i,j} = \alpha + \beta_1 VPPC_{i,j} + \beta_2 PRICE_{i,j} + \beta_3 PROM_{i,j} + \beta_4 PCUT_{i,j} + \beta_5 MS_{i,j} + \varepsilon \qquad (4)$$

where i refers to the brand and j refers to the category. $MS_{i,j}$ is the brand i's market share in category j. The brand's volume per purchase occasion is given by $VPPC_{i,j}$. The brand's average price, average price cut and percent of volume sold on any deal are indicated by $PRICE_{i,j}$, $PCUT_{i,j}$ and $PROM_{i,j}$ respectively (Bhattacharya, 1997). The βs terms are parameters to be estimated and the ε is a random error with zero mean.

In order to make the variables comparable across categories and facilitate the estimation of a cross category model, we standardized all dependent and independent variables within each category (Bhattacharya et al., 1996; Bhattacharya, 1997; Danaher et al., 2003) by subtracting the category mean from each observation and dividing by the category standard deviation.

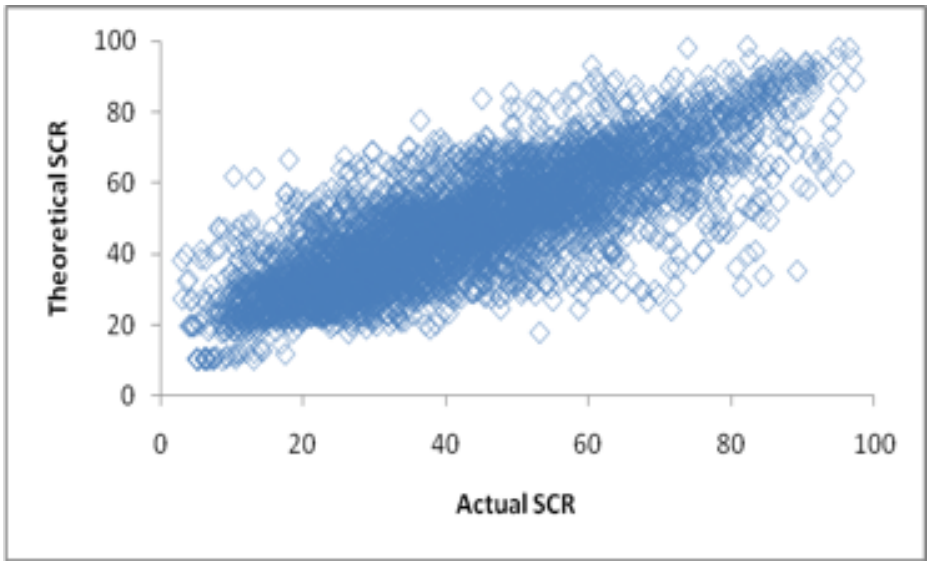
We corrected for possible heteroskedasticity using white estimated standard errors (White, 1980). Tests of multicollinearity (Kennedy, 2003) indicate that it does not appear to be a problem in these data.

4. Results

The Dirichlet model does a very good job in predicting a brand's share of category requirements. We have plotted the results in Figure 1. The correlation between the observed SCR and the SCR predicted by the Dirichlet model is high (r = 0.79) and is consistent with prior findings (r = 0.77) by Bhattacharya (1997).

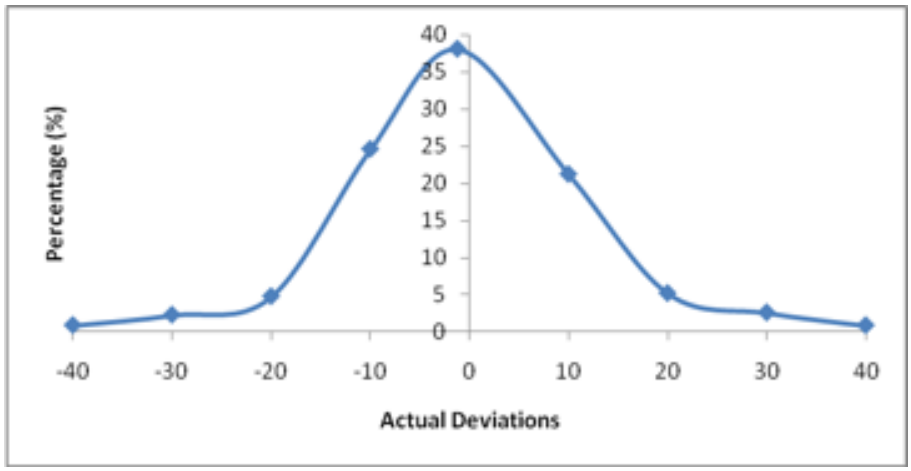
This is an important generalization of prior results. Our results span a very wide range of CPG categories and include nearly half of the branded packaged goods sold in grocery stores, drug chains and mass merchandisers in the U.S. (Most of those omitted from this analysis have national-level market shares of less than 1%). Our results confirm that over half of the variance in SCR can be explained by the Dirichlet benchmark.

Figure 1: Relationship between Actual and Theoretical SCR (r = 0.79)



The empirical distribution of SCR deviations is detailed in Figure 2. Sixty percent of the SCR's estimated by the Dirichlet model were within +/- 10 points of the actual SCR.

Figure 2: Empirical distribution of SCR Deviations



This figure reveals that although the Dirichlet model does a very good job of estimating SCR, there are a fair number of deviations from zero in the data. A Shapiro-Wilk normality test ($p < 0.0001$) indicates that these deviations are normally distributed, consistent with the findings of Bhattacharya (1997). We next seek to systematically account for these variations.

4.1 Triple Jeopardy Results

We estimated the impact of brand market share on the deviation between the actual and expected levels of SCR for a set of 5126 brands in 422 different categories. We find that market share is positively related to excess behavioural loyalty in 86% of the categories (361 out of 422). Of these, the positive coefficients on market share are significantly different from zero at the 0.20 level or better for 49% of the categories (176 out of 361). The

category-level coefficients are greater than zero at the 0.05 level or better for 69 (19%) of the categories. Of the 61 out of the 422 categories (14%) with negative coefficients, none were significantly less than zero at the 0.05 level. Table 1 provides a summary and comparison with the findings of Fader and Schmittlein (1993).

Table 1: **Comparative Results for Triple Jeopardy Analysis**

	This Study (2000 Data)	**Fader and Schmittlein (1993)**
Number of Product Categories	422	28
Categories with a Positive Coefficient on Market Share (δ)	361 (86%)	19 (68%)
Categories with a Positive Coefficient (p-value < 0.20)	176 (49%)	13 (46%)
Categories with a Positive Coefficient (p-value < 0.05)	69 (19%)	6 (21%)
Categories with a Negative Coefficient on Market Share (δ)	61 (14%)	9 (32%)
Categories with a Negative Coefficient (p-value < 0.05)	0	0

Clearly, our results generalize the earlier findings to a much larger set of brands and CPG categories. While Triple Jeopardy may not be a universal phenomenon, we find strong evidence of a positive association between excess behavioural loyalty and market share.

4.2 Excess Behavioral Loyalty Results

Table 2 summarizes the results of our cross-category analysis of excess behavioural loyalty as well as comparable findings reported in from Bhattacharya (1997) study.

Table 2: **Comparative Excess Behavioural Loyalty Results**

Variable	This Study (2000 Data)	Bhattacharya (1997)
VPP	0.568***	0.453***
PRICE	-0.068***	-0.107**
PROMO	-0.087***	-0.088**
PCUT	-0.062***	-0.072*
MS	0.242***	0.165***
Number of observations	5,126	372
Adjusted R^2	0.45	0.63
F-statistic	602.02***	108.08***

Note:* significant at $p < 0.05$; ** significant at $p < 0.01$; *** significant at $p < 0.001$

The explanatory variables account for a large proportion of the observed variation in excess loyalty: the adjusted R2 is 44% and the F-statistic is highly significant. All estimates are significant and consistent with the findings of Bhattacharya (1997). A brand's marketing mix (price, average price cut and promotional activity) reduce the deviation between the observed and expected SCR. In contrast, a brand that is sold in larger volumes has a higher level of excess loyalty. Consistent with the category level findings above (Table 1), excess behavioural loyalty is positively associated with market share.

5. Conclusions

This study provides additional evidence demonstrating the ability of the Dirichlet model to closely predict a brand's share of category requirements (i.e., brand loyalty). We provide further empirical evidence for the prevalence of the Triple Jeopardy phenomenon. This also study confirms existing findings regarding the determinants of excess behavioural loyalty. The primary contribution of this study is that we analyzed a much broader array of brands and product categories than any other prior study. In addition, our sample measured buyer behaviour across three retail channels (i.e. grocery stores, drug stores, mass merchandisers). This is an important generalization since most consumers shop for FMGC across retail outlets.

This study closely replicates and generalizes Bhattacharya's (1997) findings regarding the association between a brand's observed SCR and the SCR predicted by the Dirichlet model. We extend the number of brands analyzed from 372 (Bhattacharya, 1997) to 5,126 and find a comparable correlation between observed and predicted SCR to that reported by Bhattacharya (1997), i.e. 0.79 versus 0.77. Consistent with Bhattacharya's (1997) findings, we observe that the Dirichlet benchmark accounts for nearly half of the variation in the observed SCR across all brands.

Additionally, we extend the Fader and Schmittlein (1993) analysis regarding the presence of Triple Jeopardy over a much broader number of categories (422 versus 28). Our estimates provide additional supporting evidence for prevalence of Triple Jeopardy. We find that market share is positively related to excess behavioural loyalty in a high proportion of categories (49% at the $p < 0.20$ significance level). Like Fader and Schmittlein (1993) we also conclude that despite Triple Jeopardy's prevalence, it is by no means a universal phenomenon. Additional empirical research is needed to determine the conditions under which high share brands have higher

than expected brand loyalty. For instance, like existing research, we have no access to brand availability metrics or brand distribution intensities, which might allow the testing of alternative explanations for the presence of Triple Jeopardy.

Finally, we replicate and extend Bhattacharya's (1997) study on the determinants of excess behavioural loyalty. Our cross-category estimates (5,126 brands in 422 categories versus 327 brands in 34 categories) confirm that when brands deeply discount or sell a high proportion of volume on deal, they have significantly lower brand loyalty, as measured by share of category requirements. In terms of explanatory power, purchase volume and market share have the strongest impact in explaining deviations in loyalty while the marketing mix variables provide comparatively little explanatory power.

Overall, this study provides very generalizable and useful implications for marketing practice: First, the prevalence of Triple Jeopardy in so many CPG categories suggests that low market share brands are at a more significant disadvantage than previously thought. The buyers of high share brands are more numerous, buy more and are more loyal. These findings are confirmed by our category level analysis (Table 1) and cross-category analysis (Table 2), the latter of which also controls for other potential sources of excess loyalty. This is an important result for firms selling in the CPG arena. Specifically, we do not find a great deal of support for the notion that low share brands are purchased by a small core of highly loyal partisans. While there may be exceptions, behavioural loyalty as measured by SCR - like market penetration and purchase frequency - are generally determined by a brand's market share.

Second, we confirm that there are a number of factors which affect the ability of the Dirichlet model to serve as a benchmark for modelling share of category requirements. By better understanding these systematic deviations, managers can more accurately and precisely evaluate the performance of individual brands.

Despite our best efforts, we can identify a few limitations in our research, which also provide venues for future research. First, our analyses examined a single year of data. A longitudinal study might extend our understanding of the impact of possible sources on the excess behavioural loyalty and enable us to examine the stability and continuity of factors and identify their development as a category matures over time. Second, we use market share as a proxy for brand distribution intensity. Access to actual distribution intensities would allow us to better ascertain the conditions under which Triple Jeopardy is present.

One interesting avenue of future research is to explore whether various types of retail promotions (e.g. feature, display, coupons, price cuts) have different effects on excess loyalty. In this study, we used an aggregate measure of a brand's promotional activity, i.e. percent of sales on any deal. Conventional wisdom suggests that high levels of promotions hurt brand loyalty. And, as expected, high levels of promotional activity overall have a negative effect on excess loyalty. However, the overall effect was rather small. Whether a promotional activity decreases or, perhaps, increases excess loyalty would be of great interest to brand managers.

In summary, our study extends existing empirical findings regarding the Dirichlet model's ability to closely predict a brand's share of category requirements, the prevalence of Triple Jeopardy and the determinants of excess behavioural loyalty to a much broader number of brands and CPG categories, providing clear supporting evidence for the Dirichlet model providing empirically generalized insights into a brand's share of requirements.

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The fit seems good with no very large and obvious patterns in the residuals. We therefore conclude that the model is not a bad first approximation of the data. A closer look shows a few large and positive residuals for the southeast box. To a lesser extent the other block diagonals have mostly positive residuals while the off-diagonal blocks have mostly negative residuals. The overall conclusion then is that the C-M model fits reasonably well but tends to overpredict in the leading block diagonals and under predict in the off-diagonal blocks. There is more switching within broad groups of cars than the model predicts and conversely there is less switching among groups of cars. There does, therefore, seem to be some market structure.

By and large the same story holds for the other years for the French data and also for the UK data (where there are four groups because Japanese cars have a significant presence in the UK). The BMW-Mercedes and Mercedes-BMW residuals are large for both countries and for all four years indicating that there is more switching between these two makes than would be expected if there were no market structure. The switcher and loyal parameters summarize the eight datasets.

Table 2: Switching Probabilities and Proportion of Loyals

		Switchers				Loyals			
		1989	**1988**	**1987**	**1986**	**1989**	**1988**	**1987**	**1986**
FRANCE	Ren	25	26	30	26	51	47	49	47
	Peu	23	26	21	22	48	41	41	44
	Cit	9	9	10	10	51	54	51	52
	Ford	8	7	8	9	50	44	50	50
	VW	9	7	7	7	52	50	48	50
	Fiat	8	8	7	7	41	40	40	43
	GM	7	7	6	7	49	50	44	54
	Rov	2	2	2	3	34	33	37	39
	Seat	3	0	2	2	24	*	21	44
	Lada	1	2	1	1	39	29	49	49
	Alfa	1	1	1	1	37	30	35	32
	BMW	1	1	1	2	45	56	46	55
	Merc	1	1	1	1	69	64	63	58
	Volv	1	1	1	1	47	46	43	54
	Saab	0	2	0	0	53	*	67	*
BRITAIN	Ford	25	27	27	24	52	63	62	60
	Rov	13	13	16	24	46	48	44	51
	GM	16	14	15	12	45	56	61	45
	VW	6	5	6	6	51	52	54	51
	Peu	9	9	7	8	48	36	35	41
	Ren	4	5	4	5	44	49	48	48
	Fiat	3	4	4	3	54	52	48	51
	Volv	4	4	4	2	59	60	61	48
	Cit	4	4	3	2	58	61	47	40
	Nis	7	8	7	6	65	50	53	53
	Toy	3	2	2	2	50	60	56	39
	Hon	1	2	1	1	57	49	*	39
	Maz	1	1	0	1	55	50	*	51
	BM	2	2	2	1	51	49	56	49
	Mer	1	1	1	1	65	63	62	54
	Saab	1	0	1	1	51	53	42	55
	Por	0	0	0	0	55	31	*	*

A more refined analysis would fit separate C-M models to each car grouping, but we doubt that we would gain any new insights by doing so.