

Estimating Loyalty and Switching Proportions

Radha Chandrasekharan and Gordon P. Wright

Procedure

We apply a Two Choice (mover-stayer) model to the brand switching data for eight cases: UK 198A-8D and France 198A-D. The Two Choice model (see Blumen et al., 1955; Colombo and Morrison, 1989; McCarthy et al., 1992) assumes that consumers are of two types: Loyals and Shoppers. For a market that is partitioned into N submarkets, let p_{ij} be the conditional proportion of consumers who make their current purchase in submarket j , given they previously purchased in submarket i . Let α_i be the proportion of consumers who make their current purchase in submarket i with probability one (i.e., who are Loyals), given they previously purchased in the same submarket i . Let $\pi_{i,j}$ be the proportion of Shoppers who currently purchase in submarket j , given they previously purchased in submarket i . Then the Two Choice model equations are:

$$P_{i,j} = \begin{cases} \alpha_i + \pi_{i,i}(1 - \alpha_i) & \text{if } j = i \\ \pi_{i,j}(1 - \alpha_i) & \text{if } j \neq i \end{cases} \quad (1)$$

The unknown parameters in (1) are estimated¹ using a search algorithm and the method of maximum likelihood (see McCarthy et al., 1992).

Let S_i be the share of submarket i by previous purchase. An estimator of S_i is $n_{i, \dots} / n_{\dots}$, where $n_{i, \dots}$ is the number of consumers in the data sample that previously purchased in submarket i and n_{\dots} is the total number of consumers in the data sample. We compute the following aggregate summary proportions (see McCarthy, Chandrasekharan, and Wright, 1991) that are useful in evaluating competition within and across submarkets in a partition: (1) the proportion $LP_j = (\alpha_j S_j)$ of all consumers in the market who are Loyals and make their current purchase in submarket j ; (2) the proportion $RP_j = (S_j \pi_{j,j} (1 - \alpha_j))$ of all consumers in the market who are Shoppers and also purchase in submarket j on both occasions; and (3) the proportion $CP_j = \sum_{i, i \neq j} \pi_{i,j} (1 - \alpha_i) S_i$ of all consumers in the market who are Shoppers and are captured by submarket j on their second purchase.

Discussion of Results

We consider a partition of eight submarkets in each of the data sets for UK and France from 198A-D. The partitions are listed in Tables I and II for France and UK respectively, and the aggregate measures LP_j , RP_j and CP_j reported. In the following analysis of the two tables, we determine: (1) the leading submarkets in terms of share $T_j (= LP_j + RP_j + CP_j)$, and (2) in each submarket the proportion of Loyals and repeat purchasing Shoppers ($= LP_j / T_j$ and RP_j / T_j respectively).

Table I: France

For each of the years 198A-D, Renault, Peugeot, and Citroen have by far the three largest shares (T_j) amongst the eight submarkets considered in Table I. Comparing the figures for 198B and

¹We compute an asymptotic estimate of the covariance matrix of the estimators of the unknown parameters and also obtain a second estimate of the covariance matrix using simulation (see McCarthy et al., 1991). We do not report the two estimated covariance matrices, but use them in our analysis.

198D, the shares (T_j) of the eight submarkets do not change significantly. There has been little change in the proportion of Loyals and repeat purchasing Shoppers amongst Citroen's customers (e.g., $LP_j/T_j = 42\%$ in 198D). There was an increase in loyalty and a corresponding decrease in repeat purchase shopping amongst Renault's customers comparing 198A and 198D figures ($LP_j/T_j = 45\%$ and 51% , and $RP_j/T_j = 46\%$ and 38% in 198A and 198D, respectively). Ford was successful in increasing both its loyalty and repeat purchase shopping proportions while General Motors had some success in increasing the proportion of repeat purchasing Shoppers. In general, the ability of submarkets to capture Shoppers (RP_j/T_j) from other submarkets declined (e.g., $CP_j/T_j = 55\%$ and 46% for Ford in 198A and 198D, respectively).

Table II: United Kingdom

For each of the years 198A-D, not surprisingly, Ford, General Motors, and Rover have the three largest shares (T_j) amongst the eight submarkets considered in Table II. It is seen that Ford has maintained a big lead in the UK over its principal US rival, General Motors. In 198A Ford was comfortably placed with the proportion of Loyals and repeat purchasing Shoppers amongst its customers being 43% and 46% , respectively. Rover had a relatively smaller proportion of Loyals ($LP_j/T_j = 24\%$) but a large proportion of repeat purchasing Shoppers ($RP_j/T_j = 40\%$) amongst its customers, and General Motors had a high proportion of Shoppers ($(RP_j + CP_j)/T_j = 69\%$).

In 198D the shares of submarkets changed little compared with the 1986 figures, exceptions being the share of General Motors which showed some increase and the share of Rover which decreased significantly. There is evidence that the decline of the share of Rover is mainly due to a decrease in its ability to capture Shoppers ($CP_j/T_j = 34\%$ and 19% in 1986 and 198D, respectively). The increased share of General Motors is due to an increase in its proportion of Loyals and captured Shoppers ($LP_j/T_j = 32\%$ and 41% and $CP_j/T_j = 24\%$ and 32% , respectively). Finally the presence of other competitors (e.g., Nissan, VW) is more evident in the UK market than in the French market. The combined share (T_j) of the remaining submarkets in the UK market (i.e., excluding the three largest submarkets by share) was 0.368 in 1986 and 0.418 in 198D. In particular, Nissan increased its proportion of Loyals and captured Shoppers (LP_j/T_j and CP_j/T_j). On the other hand, VW has a higher proportion of Repeat Purchasing Shoppers and a lower proportion of Loyals amongst its customers in 198D than in 1986 ($LP_j/T_j = 32\%$ and 39% in 1986 and 198D, respectively, and $RP_j/T_j = 26\%$ and 34% in 1986 and 198D, respectively).

Table 1: France

	A. 198D			B. 198C			C. 198B			D. 198A		
	L _j	RP _j	CP _j	L _j	RP _j	CP _j	L _j	RP _j	CP _j	L _j	RP _j	CP _j
Citroen	.053	.046	.025	.063	.043	.024	.065	.032	.033	.053	.048	.020
Fiat	.010	.017	.035	.011	.015	.037	.016	.008	.035	.011	.013	.030
Ford	.016	.022	.033	.009	.021	.034	.010	.025	.036	.013	.021	.042
GM	.008	.011	.030	.012	.008	.034	.011	.006	.028	.009	.008	.034
Peugeot	.095	.067	.063	.059	.091	.080	.077	.067	.062	.102	.057	.063
Renault	.157	.012	.033	.120	.150	.040	.146	.149	.044	.140	.143	.031
VW	.023	.019	.035	.023	.011	.030	.015	.015	.031	.019	.014	.032
Others*	.021	.025	.038	.026	.017	.041	.017	.024	.047	.015	.026	.051

* Others consist of: Alfa Romeo, BMW, Lada, Mercedes, Rover, Saab, Seat, and Volvo.

Table 2: United Kingdom

	A. 198D			B. 198C			C. 198B			D. 198A		
	L _j	RP _j	CP _j	L _j	RP _j	CP _j	L _j	RP _j	CP _j	L _j	RP _j	CP _j
Ford	.127	.105	.045	.125	.140	.029	.164	.122	.029	.124	.133	.030
GM	.063	.042	.047	.059	.055	.032	.065	.055	.035	.043	.061	.033
Nissan	.025	.019	.026	.018	.013	.029	.018	.019	.025	.021	.020	.021
Peugeot	.012	.014	.038	.002	.018	.035	.010	.012	.028	.010	.013	.034
Renault	.007	.012	.019	.009	.015	.017	.010	.015	.016	.014	.008	.022
Rover	.056	.069	.029	.054	.079	.024	.079	.046	.038	.052	.085	.072
VW	.019	.020	.020	.033	.001	.020	.019	.022	.019	.023	.016	.020
Others**	.081	.053	.049	.072	.065	.054	.059	.056	.033	.066	.047	.034

** Others consist of: BMW, Citroen, Fiat, Honda, Mazda, Mercedes, Saab, Toyota and Volvo.