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Similarities in Choice Behavior Across Product Categories

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Abstract

Differences between consumers in sensitivity to marketing mix variables have been extensively documented in the scanner panel data. All studies of consumer heterogeneity focus on a specific category of products and ignore the fact that the purchase behavior of panel households is often observed simultaneously in multiple categories. If sensitivity to marketing mix variables is a common consumer trait, then one should expect to see similarities in sensitivity across multiple categories. The goal in this paper is to measure the covariance of both observed (linked to measured characteristics of households) and unobserved heterogeneity in marketing mix sensitivity across multiple categories. Measurement of correlation in sensitivities across categories will serve to guide the interpretation of the literature on household heterogeneity. If there is a large correlation, one can be more confident that sensitivity to marketing variables is a fundamental household property and not simply a category-specific anomaly.

Detection of correlation in sensitivities across categories requires an appropriate methodology that can handle the high dimensional covariance structures and properly account for uncertainty in estimation. For example, a simple approach might be to fit a brand choice model to each of the available categories in turn, ignoring the data in the other categories. For each category, household parameter estimates could be obtained for the parameters corresponding to price, display, and feature sensitivity. These parameter estimates could be viewed as data and the correlations across categories could be computed. Such a procedure could induce a downward bias in the estimation of correlation due to the independent sampling errors, which are present in each parameter estimate.

We develop a hierarchical model structure that introduces an explicit correlation structure across categories and utilizes the data in multiple categories at the same time. To reduce the size of the covariance matrix, we use a variance components approach. We introduce household-specific demographic variables to decompose the correlation across categories into that which can be ascribed to observable and unobservable sources. Shopping behavior variables such as shopping frequency and market basket size as well as intensity of shopping in a category are also included in the model.

Using data on five categories, we find substantial and statistically important correlations ranging from .32 for price sensitivities to .58 for feature sensitivity. These correlations are much larger than the correlations obtained with the state-of-the-art techniques available prior to our work. We attribute our ability to detect substantial correlations to our method, which involves the joint use of multiple category data in a parsimonious and efficient manner. Unlike previous studies with panel data, household demographic variables are found to be strongly related to price sensitivity. Higher income households are less price sensitive and large families are more price sensitive. Shopping behavior variables are also important in explaining price sensitivity. Households that visit the store often are more price sensitive. Households with larger market baskets are less price sensitive, confirming the view of Bell and Lattin (1998). Heavy user households tend to be both less price sensitive and less display sensitive.

The evidence presented here of substantial correlations validates, in part, the notion that sensitivity to marketing mix variables is a consumer trait and is not unique to specific product categories. It also opens the possibility of using information across categories in making inferences about consumer brand preference and marketing mix sensitivity, providing a richer source of information for target marketing.
(*Multiple Categories*; *Choice Models*; *Parameter Correlations*; *Bayesian Methods*)