Unobserved Retailer Behavior in Multimarket Data: Joint Spatial Dependence in Market Shares and Promotion Variables

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Abstract
Marketing scholars and practitioners frequently infer market responses from cross-sectional or pooled cross-section by time data. Such cases occur especially when historical data are either absent or are not representative of the current market situation. We argue that inferring market responses using cross-sections of multimarket data may in some cases be misleading because these data also reflect unobserved actions by retailers. For example, because the (opportunity) costs of doing so do not outweigh the gains, retailers are predisposed against promoting small share brands. As a consequence, local prices and promotion variables depend on local market shares—the higher the local share, the higher the local observed promotion intensity. We refer to this reverse causation as an endogeneity. Ignoring it will inflate response estimates, because both the promotion effects on share as well as the reverse effects are in the same direction.

In this paper, we propose a solution to this inference problem using the fact that retailers have trade territories consisting of multiple contiguous markets. This implies that the unobserved actions of retailers cause a measurable spatial dependence among the marketing variables. The intuition behind our approach is that by accounting for this spatial dependence, we account for the effects of the retailer’s behavior. In this context, our study hopes to make the following contributions at the core of which lies the above intuition.

First, we separate the market response effect from the reverse retailer effect by computing responses to price and promotion net of any spatial—and therefore retailer—influence.

Second, underlying this approach is a new variance-decomposition model for data with a panel structure. This model allows to test for endogeneity of prices and promotion variables in the cross-sectional dimension of the data. This test aims to complement the one developed by Villas-Boas and Winer (1999), who test for endogeneity along the temporal dimension.

Third, to illustrate the approach, we use Information Resources Inc. (IRI) market share data for brands in two mature and relatively undifferentiated product categories across 64 IRI markets. Whereas we only use data with very short time horizons to estimate price and promotion responses with the spatial model, we do have data over long time windows. We use the latter to validate the approach. Specifically, within-market estimates of price and promotion response are not subject to the same endogeneity because we hold the set of retailers constant. Therefore, comparing within- and across-market estimates of price and promotion responses is a natural way to validate the approach. Consistent with our argument, ignoring the reverse causation in the cross-sectional data leads to inferences of price and promotion elasticities that are farther away from zero than the elasticities obtained from within-market analysis. In contrast, cross-sectional spatial estimates and time-series estimates show convergent validity.

From a practical point of view, this means it is possible to obtain reasonable within-market estimates of price and promotion elasticities from (predominantly) cross-sectional data. This may benefit marketing managers. The manager who would act on the inflated elasticities will over-allocate marketing resources to promotions because she ignores retailers’ censorship of promotions on the basis of already existing high share. We explore other approaches to correct for the inference bias, and discuss further managerial issues and future research.

(Spatial Analysis; Promotional Price Response; Promotion Strategy; Endogeneity Biases; Variance-Decomposition)