The Indecisive Shopper: Incorporating Choice Paralysis into the Multinomial Logit Model

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Abstract

In this paper, we investigate choice paralysis and its implications on business decision making. Choice paralysis is the notion that too many options can paralyze a consumer and make them more prone to not purchasing anything at all or reverting to some default option. Using supermarket panel data, we find empirical evidence of this phenomenon; specifically, we find that consumers are more likely to purchase their more preferred (default) option as the cardinality of the assortment (offered set) increases. Interestingly, and despite the fact that there is extensive research in consumer psychology that has reported and studied choice paralysis, most popular consumer choice models—such as the Multinomial Logit model (MNL)—are not able to capture this type of consumer purchasing behavior. Normally, these consumer choice models assume that buyers are rational utility-maximizer agents and, under this paradigm, a retailer who increases the offered set should expect to see an increase in the likelihood of consumers buying a product or switching more from their default brand.

In order to bridge this gap, we aim to make two contributions: (a) provide empirical validation and quantification of this choice paralysis phenomenon, and (b) modify the existing MNL model to capture the implications of this effect. First, we analyze real-world panel data of yogurt, coffee, milk, and shampoo sales to test for the presence of the choice paralysis effect. Our results provide empirical validation in varying degrees across products for the choice paralysis phenomenon. Specifically, we find a negative quadratic relationship between a customer’s likelihood to switch from their default brand as a function of assortment size.

Next, we propose a modification to the MNL model that aims at capturing this choice paralysis and at the same time preserving its parsimonious nature. Our proposed model builds upon two fundamental postulates. First, we assume that consumers have a limited capacity (or patience) to evaluate an assortment of products and as a result they can only assess the utility of a subset of them. We refer to this subset as the consumer’s consideration set and
view its cardinality as a measure of the consumer’s *cognitive budget* to evaluate the available options. To capture heterogeneity in the consumers’ population, we model the cardinality of the consideration set as a non-negative integer random variable. Our second postulate is that consumers penalize the utility of the products in their consideration set with a factor that increases with the number of products that are not in this subset. The premise behind this postulate is that a consumer who is making a choice decision that only involves a subset of the available products will feel that her decision is “premature” and will leave her second-guessing whether she really made the best selection. We assume that this *remorse* increases with the number of unevaluated products and acts as a disutility on those products in the consideration set.

Combining the *cognitive budget* and *remorse* effects, we propose a variation of the MNL model that is consistent with consumers’ choice paralysis and use this model to (i) study optimal inventory and assortment planning decisions and to (ii) propose how these results can be used to quantify the revenue impact of not accounting for this behavioral phenomenon.