Sample Boxes for Retail Products:
Bundling Experience Goods to Leverage Consumer Uncertainty

**Motivation:** Buyers often have uncertain a priori product valuations for firms’ offerings. In order to resolve this uncertainty and discover their preferred products, consumers may need to ultimately try multiple product variations, via sequential trials. A trending alternative technique for facilitating consumers’ discovery of product valuations is for firms to offer *sample boxes*. A typical sample box includes a set of product varieties within a specific product category. Sample boxes are prevalent in both online and brick-and-mortar businesses. A prominent example in the online setting is Amazon, which has recently been offering sample boxes in such product categories as coffee, hair and skin care, sports nutrition, men’s grooming, and pet treats. Similarly, big-box retailers such as Target and Walmart offer sample boxes in multiple product categories including fragrances, cosmetics, and skin care products. Offering sample boxes is also a common practice that has been adopted by smaller businesses; online examples include Verdant Tea’s loose tea, Bubble Bandit’s dishwasher detergent, and Master of Malt’s whiskey sample boxes. The sample box concept may apply in different contexts under different names. For example, in a service context, wine and beer sampler “flights” may facilitate consumers’ discovery of their preferences through bundling multiple product varieties.

An important common characteristic in the above product examples is that consumers find it difficult or costly to fully assess their values prior to consumption. Nelson (1970) refers to these products as *experience goods*, on which consumers cannot obtain full information before purchase. In a market with multiple varieties of an experience good, a consumer may try several alternatives one after another in the absence of sample boxes. Naturally, consumers benefit from completing this search process and discovering their valuations for the product alternatives. The benefit derives from two sources: beyond the obvious immediate cost of consuming a less preferred product variety, there is also the imputed cost of delaying the consumption of a potentially preferable variety. Weitzman (1979) considers the tradeoff between a
consumer’s expected utility from further exploration versus the best currently known product value, and derives a threshold that dictates the optimal stopping point for the search process.

As an alternative to the sequential search process described above, a sample box allows consumers to efficiently discover their valuations for product varieties. Consider the example of a pet treat sample box. Pet owners wish to determine their pet’s most preferred variety. In the absence of the sample box, a consumer has no option other than engaging in the aforementioned sequential search process. On the other hand, given the option of purchasing a sample box of pet treats, the consumer can hasten resolving their value uncertainty for the sampled products. Moreover, beyond this time-related benefit, the sample box allows the consumer, by learning their valuation, to purchase their most preferred product variety. Without the seller-induced learning resulting from the sample box, a consumer may ultimately settle upon a less-than-ideal variety—due to the cost associated with extending the search process.

**Model:** In this paper, we analyze the potential benefits of offering sample boxes for a firm serving consumers facing value uncertainty. In particular, and consistent with the examples above, we assume the firm’s products are consumable experience goods that a consumer may purchase repeatedly. Consumers have heterogeneous product valuations, and are forward-looking. In each shopping period, they rationally choose a variety to purchase (if they decide to purchase at all). Facing these forward-looking consumers, the firm sets product prices to maximize profits. We first study the firm’s pricing problem in the absence of sample boxes. We then consider the alternative of offering a sample box, along with its associated optimal price and its effect on the firm’s expected profits. We also investigate the common tactic of offering a future price discount to those consumers who purchase a sample box. For example, in the case of Amazon.com, purchasing a sample box typically yields a future credit that the customer can apply to a subsequent purchase of any of the products featured within the box. Analyzing this future-credit tactic, we consider both its profit and consumer-surplus implications.
**Results:** We begin by proving that a sample box is an effective mechanism that can yield considerable value under a wide range of market settings. We establish that when a firm offers a sample box, its informational value implies an optimal price *premium* relative to the prices of individual products—considering equivalent net sizes. Despite this price premium, we prove that consumers obtain higher net expected surplus, while the firm’s expected profit may decrease. The gain in consumer surplus is possible because the aforementioned price premium is more than offset by the expected learning benefit—i.e., avoiding potential successive purchases of suboptimal products. From the firm’s perspective, the potential disadvantage of encouraging seller-induced learning via sample boxes is that low-valuation consumers may avoid successive purchases after the (early) discovery of their product valuations.

Our results also shed light on the benefit of including a future credit with the purchase of a sample box. We prove that when offering a sample box with an optimally specified future-credit level, the firm’s expected profit increases (compared to the baseline case of not offering the sample box). In addition, we establish in this case—i.e., offering future credit—that the firm optimally charges a more significant price premium for the sample box, compared to scenarios with no future credit. This price-premium increase is collected by the firm on *all* sample box buyers, yet only some subset of those customers ultimately invoke their future credit. Moreover, the firm will profit even on the second (future-credit discounted) purchases made by customers, further adding to the firm’s expected profits. Finally, when the firm guarantees future credit, we also prove that consumers’ aggregate surplus increases in the presence of the sample box option.

**References**
