Comments on “Search Duration”
by Raluca Ursu, Qingliang Wang, and Pradeep Chintagunta

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I have the privilege to comment on this very interesting paper on search durations by Raluca Ursu, Qingliang Wang, and Pradeep Chintagunta. The paper sets out to model and rationalize the empirical observation that consumers, when searching, often re-visit the same seller multiple times before making a purchase decision – a pattern that cannot be rationalized by the “standard” simultaneous and sequential search models:¹ in price search models, consumers are assumed to resolve all uncertainty about the price of a product through a single search and, in match value search models, consumers are also assumed to resolve all uncertainty about their match value with a product through the single search. Thus, if consumers resolve all uncertainty in a single search, they subsequently know everything about a product and should have no reason to re-visit a seller again (other than potentially to make a purchase). However, for many products, e.g. vacation packages, cars, fashion items or houses, we observe that consumers investigate the same product on multiple occasions.

To explain this empirical pattern, the authors propose that consumers only partially resolve their uncertainty through a single search thus necessitating multiple searches of the same product if the consumer desires to know even more precisely about the product before making a purchase decision. Practically, the authors combine approaches from two streams of literature: the literature on consumer learning (using Bayesian updating) and the consumer

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¹Standard search models (which usually assume perfect recall) only allow for one visit of each searched option and, potentially, a single potential re-visit of the to-be-purchased option to make the actual purchase if that to-be-purchased option is not the one the consumer searched last. Sequential search models without recall are not commonly used in empirical settings and assume that the consumer has no memory at all – a very strong assumption.
search literature (more specifically, sequential search). Suppose a consumer wants to resolve the uncertainty about his match value with a vacation package. He has some prior belief or expectation of the match value. After searching once, e.g. by reading a review, the consumer receives a signal about the match value and updates his belief about it. The more the consumer searches, i.e. the more signals he receives, the less uncertainty he has about the match value. Thus, at each point in time during the search process, intuitively speaking, the consumer decides whether to search a previously unsearched once or spend another search on a previously already searched option allowing the model to capture and describe the empirical observation of re-visits.

A crucial question in this context relates to the characterization of optimal behavior in such a model of sequential search, i.e. how do consumers optimally decide which product to search next (including the same), when to stop, and which one to purchase. For the “standard” sequential search model, Weitzman (1979) developed the well-known selection, stopping, and choice rules. For the model of consumer search with learning, the authors point to Chick and Frazier (2012) who developed analogue selection, stopping, and choice rules. The authors take the theoretical results by Chick and Frazier (2012) and apply them within their empirical context.

For the empirical application, the authors use browsing data from a restaurant review site. The authors assume that a unit of search is represented by spending one minute on a restaurant page. Using this definition, the authors document in the paper that both the extensive and the intensive margins of search matter. They find that consumers search very few restaurants, but those that are search are searched extensively (for about 3.5 minutes). These observations translate into search costs of $6 - 7 per minute.

I see the contribution of this paper as two-fold: first, it takes an important empirical pattern and develops and estimates a consumer search model with learning that rationalizes this behavior. To do so, it carefully takes the theoretical results developed by Chick and Frazier (2012) and applies them within the consumer search model. Second, it puts the topic
of the intensive search margin on the academic research agenda. So far, the consumer search literature has studied how many and which products are searched by consumers, i.e. the extensive margin of search. This is the first paper that not only studies how many and which products are searched, but also how much each product is being searched, i.e. the intensive margin of search. I am optimistic that by doing so this paper will spur more work on this aspect of consumer search.

And lastly, no paper is without limitations. The statements in this commenting article are based on the working paper version from August 2017. Given that draft, what follows are my suggestions to the authors: first, the paper would be richer if they could show whether their model simplifies to Weitzman (1979) if all uncertainty is resolved in a single search. Second, maybe to further motivate the paper and especially the empirical application, a discussion of where a standard sequential search model with seller-specific search costs would fail, i.e. which empirical patterns it could and could not explain, could be added. And lastly, in a standard search model, the benefit of an additional search is an increase in the expected maximum utility. In the model proposed by the authors, making an additional search yields two benefits: an increase in the expected maximum utility and a decrease in uncertainty. The current utility specification captures the former, but not the latter benefit. Modeling both benefits would further strengthen the paper.

References
