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International Journal of Industrial
Organizationwww.elsevier.com/locate/ijioSearch prominence and return costs[☆]Arthur Fishman^a, Dmitry Lubensky^{b,*}^a *Department of Economics, Bar-Ilan University, Ramat Gan, 5290002 Israel*^b *Kelley School of Business, Indiana University, Bloomington, IN 47405 United States*

ARTICLE INFO

Article history:

Available online xxx

JEL classification:

D83

L13

Keywords:

Search position

Consumer search

Search with costly recall

Search prominence

ABSTRACT

It is widely held that sellers prefer to appear early in a consumer's search, but evidence suggests this need not be the case. We develop a model which incorporates costly search and costly return and demonstrate that appearing later may be better. When return is free, prominence is desirable by standard logic, however costly return induces a tradeoff – it benefits an earlier seller by reducing the initial search but also benefits a later seller by preventing return conditional on search. We show that for small search costs later is better whenever high outcomes have a low likelihood, or whenever two independent match value draws are likely to be near one another. Later can still be better if sellers compete in prices prior to search. Finally, with many sellers the optimal position may be first, last, or in between but earlier positions are favored as the number of sellers grows.

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1. Introduction

A job candidate schedules an interview with an employer and is aware of the dates other candidates will be interviewed. Which date should she request? A car dealership can

[☆] We thank Mark Armstrong, David Ronayne, Matthijs Wildenbeest, Chris Wilson, as well as the editor and anonymous referee for their insightful comments. We are also grateful for the helpful feedback from the participants of the Consumer Search and Switching Cost Workshop in 2017 in Vienna and the Indiana BEPP Brown Bag in the Fall of 2016.

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<https://doi.org/10.1016/j.ijindorg.2017.10.009>

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open a location at the center of town where consumers are likely to start their search, or on the outskirts where consumers come only after visiting more centrally located competitors. Which location is optimal? A newspaper provides content to an aggregator, where each reader inspects a list of competing article titles and accompanying blurbs in sequence and chooses an article to read in more detail. What is the newspaper's optimal position on this list?

Conventional wisdom is that in all such situations in which buyers choose from different options on a list, position matters and earlier positions are better than those further down. And indeed there is considerable empirical support for this intuition. For example, there is abundant evidence that earlier position is an important determinant of the clicks sellers receive from price comparison sites, auction sites, and online market places (See [Ansari and Mela, 2003](#); [Ellison and Ellison, 2009](#); [Baye et al., 2009](#); [Brynjolfsson et al., 2010](#), and the studies cited therein).

Explanations for such top position effects often rely on behavioral arguments (e.g. [Dayan and Bar-Hillel, 2011](#); [Murphy et al., 2006](#)). An alternative is the explanation provided by [Armstrong et al. \(2009\)](#) and [Zhou \(2011\)](#), where consumers engage in costly sequential search. Consumers follow a threshold rule, and consequently those sellers searched earlier gain a competitive advantage whenever their offer exceeds this threshold, allowing them to sell to consumers who would otherwise have purchased from later competitors. The theory thus predicts not only that first is best, but that across all positions earlier is better.

However, there is also evidence that sometimes it is more desirable to appear further down on the list. For example, [Novarese and Wilson \(2013\)](#) analyze position effects for the number of hits and downloads of REPEC economics working papers on lists emailed to academic subscribers. While the authors confirm the existence of a strong top position bias, they also find a bias favoring working papers at the bottom of the list, relative to items in the position immediately above them. [Feenberg et al. \(2017\)](#) find an even stronger bottom position effect for downloads of NBER working papers and shows that “when conditioning on rank, the effect of being listed last is not significantly different from the effect of being listed first”.

In the context of online hotel listings, [De los Santos and Koulayev \(2013\)](#) find a still greater variety of position effects, showing that sometimes even middle positions can be better than higher up or higher down positions. Documenting the number of clicks for search results for hotels on Kayak.com listed in decreasing popularity, they find that while the click rate decreases within each page of results, the monotonicity is broken across pages. For instance, the 16th result which appears at the top of page two received more clicks than any of the results 4–15 on the first page, and similarly the 31st result which appears at the top of the third page received more clicks than any of the results 20–30 on the second page.

To address this richer body of evidence about position effects, we develop a more comprehensive model of search position to accommodate both settings in which earlier is better as well as settings in which later is better. In particular, we investigate the effect of

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