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Effects of TV advertising on keyword search☆

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ABSTRACT

This paper investigates the possibility that television advertising influences online search using the AOL search dataset. It uses a novel keyword mining technique to classify keywords as brand related, category related (generic), or unrelated, distinguishing between category search and consumers' tendency to search a branded keyword. A three-level conditional choice model is estimated to determine whether hourly changes in brands' television advertising expenditures are related to deviations from baseline trends in search behaviors. The results indicate a statistically significant relationship between TV advertising and consumers' tendency to search branded keywords (e.g. "Fidelity") rather than generic category-related keywords (e.g. "stocks") in the dataset. The effect is largest for relatively young brands during standard business hours with an elasticity, .07, comparable to extant measurements of advertising's impact on sales. However, television advertising is not found to influence category search incidence and has limited effects on click-through rates.

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1. Introduction

The online search process starts not with the search itself, but with the idea to search. The search idea may be general or very specific. For example, a consumer may want to learn more about a product category or may want to consider a particular brand. Next, the consumer chooses what query to enter into a search engine. A critical distinction is whether the query's keywords are generic (e.g. "Pick-up truck") or brand-related (e.g. "Ford F-150"). The specificity of the search query determines the breadth of competitive information returned by the search engine. It also influences the marketer's cost per click on paid links, which may differ dramatically between generic and branded keywords (Desai, Shin, & Staelin, 2014; Rutz & Bucklin, 2011). After entering the query, the consumer chooses which results to click.

The average American watches about 5 h of television per day (TVB, 2013), and television accounts for 58% of global ad spending (Nielsen, 2013), so one might suspect that television advertising could influence any of these search behaviors. It could prompt a consumer to search when she otherwise may not have done so. It may make a brand name more salient, increasing the chance that the consumer uses a brand-related query rather than a generic query. And it may influence whether the consumer feels satisfied with the search results and clicks a link.

The purpose of this paper is to estimate how online search for financial services responds to television advertising using the AOL search dataset. It relates individual-level behavior at the hourly level to intertemporal variation in brands' television advertising expenditures. A

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three-level conditional choice model is developed to isolate the impact of television advertising on category search incidence, branded keyword choice and click-through rates, controlling for brand- and time-specific baselines of search tendency, recent movements in the Dow Jones stock index, and advertising content. The model performs very well in both in-sample and hold-out validation tests.

The empirical results indicate that television advertising is positively related to consumers' choice of branded keywords at the expense of generic keywords. This relationship is largest for relatively young brands during standard business hours, with an elasticity of .07, similar to extant findings of the effect of advertising on sales. However, it does not appear that advertising expenditure changes the number of searches in the product category. In other words, television advertising shifts share of people who searched among competing brands' keywords, but it did not increase the proportion of people searching for financial services category. This suggests that financial services brands' advertising encourages substitution between keywords in the category, but does not increase the number of consumers who are interested in the category.

The next section reviews relevant literature and distinguishes the current article from its nearest neighbor (Joo, Wilbur, Cowgill, and Zhu, 2014). Sections 2 and 3 present the data and the econometric model. Section 4 discusses the results and Section 5 discusses their implications for practice and the academic literature.

1.1. Related literature

Online search has recently become consumers' primary source of information (Ratchford, Talukdar, & Lee, 2007), but consumer information search predates search engines. In fact, marketing academics have studied the antecedents and consequences of consumer search for decades. Their work has found a variety of mechanisms whereby advertising can influence consumer search for information.

Advertising has been shown to initiate consumer search for information about a product category. A consumer with little information about the category cannot search efficiently, whereas a consumer with extensive information has little need to search. Advertising can increase consumers' objective and subjective knowledge (Newman & Staelin, 1973) and stimulate information search in new categories with low prior knowledge (Bettman & Park, 1980; Swasy & Rethans, 1986). The effect of advertising on search can also vary across stages in the purchase funnel. For example, Punj and Staelin (1983) showed that consumers with more product-specific knowledge search less after seeing an advertisement, while those with general category knowledge are more likely to search. Klein and Ford (2003) distinguished between online and offline search, finding that consumers' mix of time spent on online vs. offline search activities depends on the relative importance of attributes that can be reliably verified through online search.

Advertising has also been shown to affect the means of consumers' search for information. Consumers may search using broad or focused means. Focused search strategies are more likely when the consumer has greater uncertainty about differences between brands (Moorthy, Ratchford, & Talukdar, 1997) and when the consumer overestimates her current level of knowledge (Moorman, Diehl, Brinberg, & Kidwell, 2004). Whereas this literature has relied primarily on experimental evidence, the current paper estimates similar effects using field data.

A number of recent papers have shown that online search data can help predict market outcomes, and therefore constitute important information that marketing managers need to track. For example, Kulkarni, Kannan, and Moe (2011) presented convincing evidence that online search data can improve forecasts of new product sales in the motion picture industry. Kulkarni, Ratchford, and Kannan (2012) showed that automobile purchasers who used the internet to search for their cars placed greater emphasis on product attribute ratings, while those who did not use the internet placed greater emphasis on summary recommendations. Hu, Du, and Damangir (2014) estimated a marketing mix model incorporating Google Trends data along with standard data like market shares, prices and advertising expenditures, finding that information about search volume enhanced model fit both in-sample and out-of-sample. Therefore, understanding the drivers of online search may help us to understand how search data can be used in forecasting new product sales and understanding purchaser characteristics.

The current article is also related to research on search engine marketing metrics. For example, Abou Nabout and Skiera (2012) showed that the profit implications of improving advertising quality depend on how ad quality affects costs per click; they recommended coupling advertisement quality improvements with lower keyword bids. Abou Nabout, Skiera, Stepanchuk, and Gerstmeier (2012) investigated the profitability of different search advertising agency compensation structures on search advertising profitability. Sayedi, Jerath, and Srinivasan (2014) showed that firms can free ride on a competitor's traditional ads by advertising on the competitor's keywords. These are just a few examples of a voluminous recent literature. Generally speaking, if online search is affected by a firm-controlled activity such as television advertising, then it would be important to adjust ROI metrics to optimize both offline and online marketing expenditures.

This paper also relates to extant research in attribution and path to purchase. Increasingly, researchers seek to understand how firms' marketing communications in multiple channels influence and interact with consumers' information acquisition strategies, expressions in social media, and purchase decisions. Studies have shown differences in online channels' differential effects on conversion (Li & Kannan, 2014), the impact of clicks on conversion (Jerath, Ma, & Park, 2014; Park & Park, 2014), how display ads influence online search (Kireyev, Pauwels, & Gupta, 2013), and how different payment schemes (such as cost-per-action or cost-per-mille) and the process of “last-touch” attribution influence publishers' strategic decisions (Berman, 2013). While this stream of research mostly examines online environments, the present article adds to this by considering the impact of offline marketing activities on the online channel.[1]

[1] A notable exception that explores TV advertising's effect on online shopping is Liaukonyte et al. (in press).

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