



Search diversion and platform competition [☆]

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ABSTRACT

Platforms use search diversion in order to trade off total consumer traffic for higher revenues derived by exposing consumers to unsolicited products (e.g. advertising). We show that competition between platforms leads to lower equilibrium levels of search diversion relative to a monopoly platform when the intensity of competition is high. On the other hand, if there is only mild competition, then competing platforms induce more search diversion relative to a platform monopolist.

When platforms charge consumers fixed access fees, all equilibrium levels of search diversion under platform competition are equal to the monopoly level, irrespective of the nature of competition. Furthermore, relative to platforms that cannot charge such fees, platforms that charge positive (negative) access fees to consumers have weaker (stronger) incentives to divert search.

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1. Introduction

Search diversion occurs when platforms providing access to various products deliberately introduce noise in the search or browsing process through which consumers find the products they are most interested in. This practice is widespread among both offline and online platforms. All advertising-supported media (from magazines to online portals, news sites, and search engines) are purposefully designed to expose users to advertisements, even though they are primarily interested in content. Similarly, retailers often place the most sought-after items at the back or upper floors of their stores (e.g. bread and milk at supermarkets, iPods and iPhones at Apple stores), while shopping malls design their layout to maximize the distance traveled by visitors between anchor stores (Petroski, 2003). E-commerce sites (e.g. Amazon, Bing Shopping, eBay, Google Shopping) design their websites in order to divert users' attention away from the products they were initially looking for, and

towards the discovery of products that they might be interested in and eventually buy (unsolicited products or advertising).

On the one hand, search diversion may lead to higher platform revenues per consumer "visit" to the platform. On the other hand, it reduces the overall attractiveness of the platform to consumers and therefore also leads to lower consumer traffic (i.e. total number of visits). All platforms listed above face this fundamental trade-off.

The basic economic logic of search diversion was first analyzed by Hagiu and Jullien (2011), using a model with a monopoly platform (intermediary) that offers consumer access to two products, whose affiliation with (i.e. availability through) the platform is exogenously given. Here we extend that analysis by adding two important elements: (i) platform competition and (ii) endogenous affiliation on both sides of the market – consumers and an unsolicited product supplier (advertiser).

Our main result is that when consumers affiliate exclusively with one platform, competition does not necessarily reduce search diversion incentives relative to monopoly. Specifically, if competition between platforms is intense (low degree of differentiation) then competing platforms induce less search diversion than a monopolist. But when competition is of moderate intensity (intermediate degree of differentiation), search diversion is greater than in the case of a monopoly platform. Finally, if the degree of platform differentiation is large then competing platforms behave like local monopolies and therefore choose the monopoly level of search diversion. One interpretation of the scenario in which competing platforms divert search more than a

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monopoly is that, since consumers are more difficult to attract under competition, platforms may prefer to increase revenue per consumer by diverting more search. This result holds whether the advertiser affiliates exclusively or multihomes. Moreover, with exclusive advertising affiliation, each platform takes into account its competitor's incentives to compete for the advertiser. As a result, when competition is effective on both sides, the equilibrium level of search diversion maximizes total industry profit (both platforms and the advertiser). On the other hand, one platform may prefer not to compete for the advertiser if it derives sufficient consumer demand and revenue from the content solicited by consumers. In this case, the equilibrium level of search diversion does not account for the “losing” platform's profits.

Second, allowing platforms to charge fixed access fees results in less search diversion if and only if the actual fee charged is positive. Furthermore, if platforms can charge consumer access fees, competing platforms choose the same level of search diversion as a monopoly platform for all parameter values and regardless of the mode of platform competition: all platforms maximize the total surplus per consumer.

The remainder of the paper is organized as follows. In the next two subsections we provide a brief overview of our model and of the relevant literature. Section 2 lays out the modeling set-up and analyzes the monopoly platform case, with endogenous consumer and advertising affiliation. Section 3 introduces competition between platforms and analyzes three scenarios: a) platforms compete for the exclusive affiliation of consumers, whereas the advertiser multihomes; b) platforms compete for the exclusive affiliation of the advertiser, whereas consumers multihome; c) platforms compete for the exclusive affiliation of both consumers and the advertiser. In Section 4 we introduce the possibility for platforms to charge consumer access fees. Section 5 concludes.

1.1. Model overview and interpretation

In our model, each platform offers consumer access to two products, 1 and 2. Product 1 (content) offers consumers expected utility $u_1 > 0$ and is assumed to be exogenously affiliated with each platform throughout the paper. Product 2 corresponds to unsolicited content, which for convenience we refer to as advertising. It offers consumers expected utility u_2 and is supplied by a third-party seller (advertiser), who must be induced to affiliate by platforms' choices of fees and search diversion. Platforms may derive positive revenues from consumer exposure to both products. Each product exposure is costly to consumers: it requires time and attention. The platforms' revenues per consumer exposure to product 1 (π_1) could be referral fees paid by an independent seller or the margin made on the sale of product 1 multiplied by the conversion rate (probability that a consumer who sees the product ends up buying it) if the platform supplies product 1 itself; or any type of fees directly tied to usage of product 1 (e.g. pay-per-view). Meanwhile, the platforms' revenues per consumer exposure to product 2 (π_2) can be interpreted as “per-impression” or “per-click” fees paid by its seller.

The key decision made by the platform is the amount of search diversion to induce through its service, which we identify with the probability that it exposes consumers to product 2 *before* directing them to product 1. Indeed, although consumers always prefer being immediately exposed to product 1, the platform may find that first diverting them to product 2 maximizes total revenues. We use the term “search” because in a sense consumers are searching for product 1 and the platform chooses how efficient to make this search process. More search diversion leads to higher total exposure costs incurred by consumers.

Our modeling set-up is best interpreted as a stylized representation of advertising-supported media, such as the ones listed in Table 1.¹

All platforms listed in Table 1 provide users with first-party content (cf. Hagiu and Spulber, 2013), such as organic search results, information, editorial stories and products sold in their own name. All of them make positive revenues from user exposure to advertising or product users were not necessarily looking for ($\pi_2 > 0$). Some of them (search engines, content portals) make no revenues from first-party content, while others (shopping portals, e-commerce and paid video sites) derive positive revenues from exposing consumers to first-party content. For shopping portals, π_1 is equal to the click-through rate of listed products multiplied by the referral fees charged to the third-party merchants who sell those products. For online video sites and e-commerce, π_1 is the conversion rate multiplied by the video-on-demand prices (Hulu, Vimeo) or the booking fees charged to users (Fandango) or the margins made on shoes sold (Zappos).

The extent of search diversion varies across these platforms from minimal (small and unintrusive ads on Fandango.com, sponsored search results at the *bottom* of Google Shopping pages) to moderate (sponsored search results at the *top and right-hand side* of Google's search engine pages) to very high (in addition to showing several large ads on every content page, Forbes.com requires users to view a video ad prior to watching every piece of video content and oftentimes to click through a full-page display ad before reaching the desired content page).

1.2. Related literature

Our paper builds upon the model of search diversion introduced by Hagiu and Jullien (2011). That paper established that search diversion allows platforms to: (i) trade off higher total consumer traffic for higher revenues per consumer visit; and (ii) influence independent product sellers' choices of strategic variables (e.g., pricing). It also showed that search diversion is a strategic instrument that cannot be easily replaced by contractual extensions and that it can be socially desirable because consumers do not internalize the benefits of their search activities for product sellers. We extend Hagiu and Jullien (2011)'s analysis in two important and novel directions: competition among platforms and endogenous product and consumer affiliation (Hagiu and Jullien, 2011 focus exclusively on a monopoly platform with exogenously given product and consumer affiliation).

We contribute to the economics and strategy literature on two-sided platforms by introducing a key design decision that many platforms have to make, but have not been formally studied: search diversion. Indeed, most of the existing work on two-sided platforms focuses on pricing strategies (Armstrong, 2006; Parker and Van Alstyne, 2005; Rochet and Tirole, 2006; Weyl, 2010) and market outcomes (Caillaud and Jullien, 2003; Hossain et al., 2011) in the presence of indirect network effects. Our paper is aligned with an emerging body of work aiming to expand the formal study of platforms to design decisions (e.g. Parker and Van Alstyne, 2008; Boudreau, 2010; Hagiu and Spulber, 2013; Veiga and Weyl, 2012).

At a broader level, several articles have pointed out that platforms have to make design compromises between the interests of their two sides (e.g. Kaplan and Sawhney, 2000; Evans and Schmalensee, 2007), but this issue has received limited formal modeling treatment. An exception is the recent literature on search engines. Eliaz and Spiegler (2011) show that vertical search engines do not necessarily maximize consumer search quality, a point similar to Hagiu and Jullien (2011), though in a different context. Relatedly, Ghose and Yang (2009), Taylor (2013) and White (2013) emphasize that raising the quality of search results may cannibalize revenue from sponsored links, while Burguet et al. (2013) study the joint choice of match quality for the organic and sponsored links displayed. Our model here is different in that we focus on advertising that negatively impacts the perceived quality of the search service by consumers.

Finally, our paper is also connected to the literature on advertising-supported platforms: Anderson and Coate (2005), Gabszewicz et al.

¹ CPM is the advertising industry term for cost per impression (literally, “cost per mille”, i.e. a thousand impressions), while CPC stands for “cost per click”.

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