Chapter 9
Purchase-Based Targeted Advertising: A Competitive Analysis

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ABSTRACT
Purchase-Based Targeted Advertising (PBTA) refers to the advertising that is targeted to an individual based on his or her purchase histories, which is ubiquitous in the age of e-commerce. This chapter examines the competitive effects of PBTA by establishing a two-period duopoly model: the first period consists of the consumer information gathering process while the second is the period where PBTA is embraced. Based on this model, it is found that PBTA may improve or damage industry profits, consumer surplus, as well as social welfare. The conditions under which the competitive effect is positive or negative are derived, showing that whether PBTA is beneficial or detrimental depends on the content of advertising designed by the competing firms. It is suggested that firms under competitive environments cautiously deploy PBTA with appropriate advertising contents.

INTRODUCTION
Advances in information technology and social media have unprecedentedly enabled firms to identify consumer preferences and marketing to consumer segments of their interest. As to the advertisers, targeting allows them to deliver messages to their interested consumer groups instead of wasting money on those not active in the category. For example, Facebook is now allowing advertisers to reach their mobile customers with relevant content by leveraging iOS identifier for advertising (Inside Facebook, 2013). Toyota is working with satellite-television provider Direct...
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TV to target Direct TV customers with ads on its RAV4 EV specifically in the Los Angeles, San Diego and San Francisco, where the SUV is sold. They are using a new tool that combines satellite-TV subscriber data to reach narrow slices of consumers and improve the effectiveness of ads (Automotive News, 2013). On the other hand, as to the retail outlets, targeting can help them to price discriminate consumers according to consumer preferences and thus fully extract consumer surplus. For example, CVS Pharmacy frequently sends out different in-store coupons to different consumer groups to increase in-store traffic and consumption (Coupon in the News, 2013). Safeway provides a mobile application for consumers so that the grocery chain can personalize the prices for each customer and send coupons to their mobile phones (New York Times, 2012). Examples of targeted advertising and targeted pricing are ubiquitous in the age of e-commerce. This paper focuses on purchase-based targeted advertising (PBTA).

Targeted advertising is generally carried out via two main forms, namely, contextual advertising and behavioral advertising. Contextual advertising refers to the advertising on a website or other media that is targeted to an internet user based on what he or she is currently viewing (e.g., Kenny & Marshall, 2000; Zhang & Katona, 2012). To be different, behavioral advertising refers to the advertising that is targeted to an internet user by collecting data on the specific individual’s behaviors such as browsing habits, search keywords, and purchase histories (e.g., McDonald & Cranor, 2010; Chen & Stallhaert, 2014). Obviously, PBTA is a specific form of behavioral advertising, the crucial operation mechanism of which is that how to recognize customers based on collected data. However, previous academic research on targeted advertising either ignores the data collecting process (for example, Ben Elhadj-Ben Brahim et al., 2011 focus on the markets where all the data needed to target an ad has been already known by each firm ex ante) or does not consider the customer recognition process (for example, Iyer et al., 2005 focus on the markets where heterogeneous consumers have been identified by each firm ex ante). This ignorance motivates us to try to fill this gap by investigating that how firms use consumer purchase data to sponsor targeted advertising.

We establish a two-period duopoly model with forward-looking firms and myopic consumers. In the first period, two firms compete for and divide the market with a uniform price. In the subsequent period, with information about consumers’ purchase histories revealed during the initial period, each firm is able to target advertising toward their old customers and to price discriminate between the new customers and the old ones. Advertising is assumed to be persuasive in the way that consumer valuation is enhanced and product differentiation is increased. The first element implies that the content of advertising is designed to emphasize the high value of one’s own product, while the second element is more applicable to the content that is designed to highlight the differences among competing brands. By proposing such a model, we can discuss the influence of consumer information gathering on each firm’s targeted advertising strategy. Our model holds a persuasive view on advertising; hence it applies to a mature market where consumers know the existence of each brand but are easily affected by the content of an ad. Our model allows firms to price discriminate between different consumer segments; hence it applies to most of the highly competitive industries such as supermarkets, hotels, airlines, online sales, and so forth.

Based on the model setup, several important and interesting findings are proposed. The first output is that in a duopoly market the firm’s ability of targeting does not necessarily benefit profits. It softens the second period competition on the one hand, but aggravates the first period competition on the other hand. The positive effect is owing to the role of PBTA—advertising enhances consumer valuation (which means stronger monopoly power...