Information Economics and Policy 40 (2017) 60–70

Contents lists available at ScienceDirect

Information Economics and Policy

journal homepage: www.elsevier.com/locate/iep

Behavior-based pricing under imperfectly informed consumers[☆]

Rosa-Branca Esteves[a,b,*], Sofia Cerqueira[a]

[a] Universidade do Minho and NIPE, Portugal
[b] Universidade do Minho, Portugal

ARTICLE INFO

Article history:
Received 7 January 2015
Revised 16 June 2017
Accepted 19 June 2017
Available online 20 June 2017

JEL classification:
D43
L40
M37

Keywords:
Competitive price discrimination
Customer recognition
Informative advertising
Retargeting strategies
Welfare

ABSTRACT

This paper is a first look at the dynamic effects of behavior-based price discrimination in a horizontally differentiation product market, where firms need to invest in advertising to generate awareness. When a firm is able to recognize customers with different purchasing histories, it may send them targeted advertisements with different prices. We show that in comparison to no discrimination, firms reduce their advertising efforts, charge higher first period prices and lower second period prices. As a result of that in contrast to the profit and consumer welfare results obtained under full informed consumers, we show that behavior-based price discrimination boosts industry profits at the expense of consumer welfare.

© 2017 Elsevier B.V. All rights reserved.

1. Introduction

In many markets firms need to invest in advertising to create awareness for products, prices and special offers. The informative view of advertising claims that the primary role of advertising is to transmit information about (new) products' existence and/or price to otherwise uninformed consumers. When firms and consumers interact more than once, firms can gather information about the "reach" of their advertising campaign and learn the identity of consumers that come to know about their products. Firms can also collect information about the consumers' past shopping behavior. When firms realize that some consumers do not buy from them currently, they can use this information to price differently towards their own and their rival's previous customers. This form of price discrimination, termed behavior-based price discrimination (henceforth BBPD) or price discrimination by purchase history or dynamic pricing, is now widely observed in many markets. Such pricing strategies have been adopted by web retailers, supermarkets, telecom companies, banks, restaurants and many others.

The literature on BBPD has addressed issues related to price offers based on information revealed by consumers' purchase history.[1] However, with the exception of Esteves (2009a) and De Nijs (2013)[2] the literature has hitherto focused on the assumption that there is no role for advertising and that consumers are fully informed (e.g. Chen, 1997 and Fudenberg and Tirole, 2000). Specifically, Esteves (2009a) and De Nijs (2013) depart from this assumption by investigating the competitive and welfare effects of BBPD in an informative advertising model under the homogeneous product assumption.

This paper extends Esteves (2009a) to a product differentiation market. The main goal is to evaluate the dynamic effects of BBPD when two firms endogenously segment the market into captive (partially informed) and selective (fully informed) customers by investing in informative advertising. We investigate *how* the permission of price discrimination affects: (i) the firms' pricing and adver-

---

[☆] This work was carried out within the funding with COMPETE reference nº PTDC/IIM-ECO/2280/2014, with the FCT/MEC's (Fundação para a Ciência e a Tecnologia, I.P.) financial support through national funding and by the ERDF through the Operational Programme on "Competitiveness and Internationalization – COMPETE 2020 under the PT2020 Partnership Agreement. Any errors are our own responsbility.

[*] Corresponding author at: School of Economics and Management, 4710 Braga, Braga, Portugal.

E-mail addresses: rbranca@eeg.uminho.pt, esteves.rosabranca@gmail.com (R.-B. Esteves).

[1] For a comprehensive survey on behavior-based price discrimination see Fudenberg and Villas-Boas (2007) and Esteves (2009b).

[2] De Nijs (2013) builds on Esteves (2009a) with one key modeling difference. While Esteves (2009a) assumes that firms make their advertising and first-period price decisions simultaneously, De Nijs (2013) consider a sequential timing in period 1. BBPD is employed in period 2.

http://dx.doi.org/10.1016/j.infoecopol.2017.06.007
0167-6245/© 2017 Elsevier B.V. All rights reserved.

tising strategies and (ii) the level of profits and consumer welfare. We also look at the implications of BBPD in markets with imperfectly informed consumers in comparison to the case where consumers are fully informed- the Fudenberg and Tirole (2000) model.

The paper considers a two period model with two horizontally differentiated firms competing for ex-ante anonymous consumers with stable exogenous preferences across periods who can buy from a firm only if they receive an advertising message from it. In the first period firms have no information to engage in price discrimination. Because prices can change faster than consumers' awareness, in the second period, the level of awareness is constant and firms can only change prices. Advertising plays a dual role. On the one hand, it generates consumer heterogeneity in awareness of the firm's existence and prices. On the other hand, by collecting information about the "reach" of their advertising, firms learn the identity of informed consumers who bought from them in the past and send later advertising messages (henceforth ads) with different prices to their own and to the rival's previous customers. Although in the recent past it was difficult for sellers to reconnect and communicate with "lost" customers and entice them back,[3] nowadays it is possible for advertising agencies (e.g. DoubleClick, Tacoda, ValueClick Media) to offer their clients the possibility to identify those visitors that were in their websites but did not buy the first time and reconnect subsequently with those potential consumers in order to encourage them to return and purchase. *The New York Times* (August, 29 and May, 16, 2010) reveals that this marketing practice, called *retargeting* is becoming increasingly common especially in online markets, such as retailing, travel, real estate and financial services.[4] Retargeting is based on the following main idea. Once a potential customer is aware of a firm's website (e.g. through normal advertising channels) and visits it, a cookie is passed to the consumer's browser that records his behavior on the site and identifies him as either a nonpurchaser or a customer that bought from the firm. Then, at a determined time, old customers and rival's consumers are retargeted with messages specific to them.[5]

Within this theoretical framework, some novel results are obtained. In comparison to no-discrimination, BBPD in our setting boosts industry profits and harm consumers. This finding challenges the "traditional" view that such pricing practices in oligopoly markets often intensify competition and potentially benefit consumers. We also highlight that the ability of firms to engage in behavior-based price discrimination can have a significant impact on the firm's advertising strategies. A relevant contribution of the paper is to highlight that in comparison to the no-discrimination case, the permission of BBPD leads firms to strategically reduce their advertising choices in period 1 as a way to induce a softer pricing behavior in period 2.

Hence, for competition policy our analysis suggests that it is important to taking into account different forms of market competition when evaluating the profit and welfare effects of BBPD.

Related literature

This paper is mainly related to two strands of the literature. It is related to the literature on competition with informative advertising (e.g. Butters, 1977; Grossman and Shapiro, 1984 and Stahl, 1994) in which rather than assuming that the information structure of consumers is exogenous, it is assumed that sellers can influence the consumers' information by investing in advertising. Specifically, it is assumed that a potential consumer cannot be an actual buyer unless firms invest in advertising. While Butters (1977) and Stahl (1994) look at competition in a homogeneous product market, Grossman and Shapiro (1984) look at the firms' advertising and price decisions in a product differentiation market. This paper is also related to the stream of research looking at the strategic effects of advertising in sequential games where firms first invest in advertising and, then, compete in prices (e.g. Ireland, 1993; Mc Afee, 1994 and Roy, 2000).[6] The main difference is that here we develop a model, where firms compete simultaneously at advertising and prices in the initial period and, if permitted, engage in BBPD in the next stage of the game.

The paper is also related to the literature on competitive BBPD where firms engage in price discrimination based on information about the consumers' past purchases. Like other forms of price discrimination, BBPD can have antitrust and welfare implications. While in the switching cost approach purchase history discloses information about exogenous switching costs (e.g. Chen, 1997 and Taylor, 2003), in the brand preference approach purchase history discloses information about a consumer's exogenous brand preference for a firm (e.g. Villas-Boas, 1999, Fudenberg and Tirole, 2000). A common finding in this literature is that BBPD tends to intensify competition and potentially benefit consumers (Chen, 2005). Behavior-based pricing tends to intensify competition and reduce profits in duopoly models where the market exhibits best response asymmetry[7], when (i) all firms have the required information to engage in price discrimination, (ii) consumer preferences are fixed across periods and (iii) consumers are fully informed (e.g. Chen, 1997; Villas-Boas, 1999; Fudenberg and Tirole, 2000; Taylor, 2003; Esteves, 2010).

Some authors have recently explored new avenues in the literature on BBPD. Chen and Pearcy (2010), for instance, look at BBPD under the assumption of correlated preferences across time. They show that if there is sufficiently strong dependence between preferences, BBPD reduces industry profits and increases consumer surplus. In contrast, under weak dependence they show that BBPD increases industry profits and reduces consumer surplus.[8] This paper enriches the literature on BBPD following the avenue of relaxing the assumption of perfectly informed consumers.[9] In so doing, we show that the use of BBPD in markets with informational differentiation among consumers (due to the firms' advertising decisions) can act in favor of industry profits at the expense of consumer welfare. A closely related paper is Esteves (2009a) which

---

[3] There are, of course, situations that motivate the present analysis where sellers have a way to communicate with current and potential consumers. There are for instance websites that ask consumers to register and their email may be one of the requirements, allowing the subsequent interactions. In the catalog industry, where firms rely on lists of names to advertise their products, it is also possible for sellers to identify different types of consumers and send them special offers.

[4] This marketing practice is also referred to as behavioral retargeting, remarketing or remessaging. For more on retargeting see, for instance, www.retargeter.com.

[5] Consider the following retargeting example. A consumer goes to an online shoe retailer and leaves the site without making a purchase. Then by utilizing a retargeting technology, the shoe retailer can catch the consumer the next time (when he's visiting a news site, perhaps). By visiting a site, a consumer has let that site know he is interested in the product and retargeting helps the advertiser entice the consumer to return and buy its product (e.g. receive 10% off if you buy today).

[6] An interesting contribution of Roy (2000) is to assume that firms can target consumers on the basis of their address (i.e. their location on a Hotelling framework). For other important contributions on targeted pricing in competitive settings see, for instance, Chen and Iyer (2002) and Iyer et al. (2005).

[7] Following Corts (1998), the market exhibits best response asymmetry when one firm's "strong" market is the other's "weak" market. In BBPD models there is best-response asymmetry because each firm regards its previous clientele as its strong market and the rival's previous customers as its weak market.

[8] Esteves (2014a) look at BBPD when demand is not inelastic; Esteves (2014b) extends the literature on BBPD allowing firms to employ retention strategies as a way to avoid losing part of the old customers willing to switch, and Esteves and Vasconcelos (2015) look at mergers when BBPD is permitted.

[9] Some authors have looked at competitive price discrimination when there is imperfect information on the firms' side: under static price discrimination (e.g. Chen et al., 2001; Liu and Serfes, 2004 and Esteves and Reggiani, 2014) and under BBPD Colombo, 2016).

Download English Version:

https://daneshyari.com/en/article/5075643

Download Persian Version:

https://daneshyari.com/article/5075643

Daneshyari.com