International Journal of Industrial Organization xxx (2012) xxx–xxx

Contents lists available at SciVerse ScienceDirect

International Journal of Industrial Organization

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

Direct-to-consumer advertising and consumer welfare ☆

Jayani Jayawardhana *

Department of Health Policy and Management, University of Georgia, Athens, GA 30602, United States

ARTICLE INFO

Available online xxxx

JEL classification:
D12
D21
I11
L51
L65
M37

Keywords:
Direct-to-consumer advertising
Physician advertising
Prescription drugs
Structural model
Welfare

ABSTRACT

The welfare implications of direct-to-consumer advertising (DTCA) have garnered considerable attention and are complicated since the consumer delegates some decision-making authority to the physician, who is exposed to advertising as well. In this paper, I develop and estimate a structural model that explains the demand side behavior in the market for prescription drugs. I then use the estimated parameters of the model to compute the impact on consumer welfare that results from changes in demand for cholesterol-reducing drugs due to increased expenditure in DTCA. The results of the policy analysis indicate increased levels of consumer welfare due to presence of DTCA in comparison to the absence of DTCA. The results also support the argument that DTCA helps bring under-diagnosed patients to the physicians' offices. Furthermore, the results of the estimation support the informative role of DTCA on the decision to seek care, and both informative and persuasive roles of physician advertising on the choice of the drug.

1. Introduction

Drug advertising is not a novel concept for consumers. However, before August 1997, consumers' exposure to prescription drug advertising was limited. Although prescription drug advertising was never prohibited, the Food and Drug Administration (FDA) required all print and broadcast prescription drug ads to include a detailed description of contraindications, side effects, effectiveness of the drug, and a detailed statement of risks, which is known as a brief summary. Due to this FDA regulation, the cost of advertising in broadcast media was high and the direct-to-consumer advertising (DTCA) of prescription drugs was limited mostly to magazines and newspapers. In August 1997, the FDA relaxed its regulation on prescription drug advertising in broadcast media, allowing manufacturers to advertise prescription drugs without a brief summary. Since this deregulation, DTCA of prescription drugs through broadcast media has increased resulting in total promotional spending by pharmaceutical companies on prescription drugs to rise over 200%.

Along with the rise in pharmaceutical promotions in broadcast media, the public started questioning the pros and cons of DTCA. Opponents argue that DTCA could influence the consumer to demand specific drugs from the physician, which could lead to harmful results if the consumer were to receive a wrong treatment or an overdosage. On the other side, proponents argue that DTCA could be welfare improving if the information provided by DTCA on existing drugs could help bring the under-diagnosed consumers to physicians' offices while helping existing patients to make informed decisions on their health care consumption. The welfare implications of advertising in the market for prescription drugs are complicated since the consumer delegates some decision-making authority to the physician, who is exposed to advertising as well. Hence, it is important to take physician-directed advertising into consideration when analyzing the effects of DTCA in the market for prescription drugs.

In the literature, the role of advertising is categorized into two key roles: informative and persuasive.[1] While informative advertising tends to promote competition among available products by providing information about the existence of the product, price and quality (Butters,1977; Grossman and Shapiro, 1984; Goeree, 2008;

☆ I would like to thank Simon Anderson and John Pepper for their invaluable support and guidance on this research. I thank David Mills, Leora Friedberg, Keith Brand, and Richard Lindrooth for their helpful comments and support on earlier drafts. I would also like to thank participants in various seminars and conferences, and especially, Pat Bajari and several anonymous referees for their helpful comments and suggestions. I am grateful to John Kennedy, Eric Yaker and IMS Health for making the advertising and sales data available for this research. I gratefully acknowledge the financial support provided by the Bankard Fund for Political Economy at the University of Virginia. The Bankard Fund did not play any role in designing the research project, or collecting, analyzing or interpreting the data, or taking part in any of the steps associated with completing this research project other than by providing the financial support. I am responsible for all the remaining errors.

* Department of Health Policy and Management, College of Public Health, University of Georgia, 110 E Clayton St, Suite 300, Athens, GA 30602-7396, United States. Tel.: +1 706 369 5963; fax: +1 706 369 5997.
E-mail address: jayaward@uga.edu.

[1] See Bagwell (2001).

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http://dx.doi.org/10.1016/j.ijindorg.2012.09.001

Ackerberg, 2003), persuasive advertising tends to alter consumers' tastes and influence them to buy products by creating artificial product differentiation and brand loyalty (Erdem and Keane,1996; Anand and Shachar, 2004).

Since the consumer cannot make the purchase decision of prescription drugs himself, it is difficult to assume that DTCA could influence the consumer to purchase specific drugs, and hence have any persuasive effects. However, DTCA could play an informative role since the consumer could learn about the existence of a product for a specific medical condition through the information provided by the advertisement, and as a result seek care. Therefore, I assume that DTCA is informative and it may influence the consumer's decision to seek health care. Hence, DTCA could be welfare improving if it increases the probability of seeking health care and as a result the consumer receives an appropriate amount of medication. In contrast, advertising directed towards physicians could have both persuasive and informational effects since the physician makes the final decision of which drug to prescribe for the consumer.[2] Therefore, using parameter estimates, I test whether physician advertising could have both persuasive and informative effects in the model.

The main objectives of this paper are to develop a structural empirical framework to explain the effects of DTCA on the demand side behavior in the market for prescription drugs, and to find out how the consumer welfare changes due to the FDA deregulation of policy on DTCA of prescription drugs. This research explicitly models consumer and physician directed advertising and their impact on three consumer choices. The three choice decisions in the model are consumers' decision to seek health care, the choice of the drug, and the choice of the quantity level of the drug,[3] and these choices are described in a unified framework using same preferences. I apply this model to the cholesterol reducing drug class known as statins, and estimate the change in consumer welfare that results from changes in demand for statins due to increased expenditure in DTCA.

Although, few recent papers have studied the effects of DTCA on the market demand (Calfee et al., 2002; Iizuka and Jin, 2005, 2007; Wosinska, 2002; Rosenthal et al., 2003) and supply (Iizuka, 2004; Brekke and Kuhn, 2006) of prescription drugs, this is the first study to provide a welfare analysis due to increased expenditure in DTCA. This is also the first study to model the decision to seek health care distinct from the drug choice, and to model the choice of the drug and the quantity choice separately. Furthermore, this study incorporates data on media exposure to allow for variation in consumers' exposure to advertising at the demographic level, which was not included in previous studies. Moreover, structural form approach in this study facilitates counterfactual policy experiments, which is generally not possible through reduced form analysis. The goal of this study is to fill these gaps in the literature.

The consumer is a utility maximizing agent who makes sequential decisions. First, the consumer decides whether to seek care depending on his health state, budget constraint, and the level of exposure to DTCA. Second, the consumer chooses the drug and the quantity level of the drug to receive depending on his health state, budget constraint, drug specific characteristics, and the level of physician-directed advertising. This modeling structure assumes that the physician makes the decision that the consumer would with full information. DTCA enters the model as informative advertising that influences the consumer's decision to seek health care while physician-directed advertising may enter the model as both informative and persuasive advertising.[4] Informative effects of physician-directed advertising influence the consumer's choice of the drug and the quantity while persuasive effects influence the consumer's choice of the drug only.[5]

I use four different data sets in this study: individual level health care utilization data from the annual Medical Expenditure Panel Survey (MEPS) from 1997 to 2000,[6] brand level advertising and sales data from IMS Health, consumers' exposure to media data from the Survey of Media and Markets, and data on formulary status of statin drugs and their copay rates from the Atlantic Information Services, Inc. The reason behind choosing the statin class of drugs for this study is that it treats the major risk factor of the leading cause of death in the U.S., high cholesterol. It has been the second largest DTCA expenditure category among prescription drugs during the time period of this study, next only to antihistamines. In addition, there were no over-the-counter substitutes or any generic versions of cholesterol reducing drugs available on the market during 1997–2000, which helps to simplify the analysis. Moreover, since high cholesterol is a chronic condition rather than an acute condition, individuals may not automatically seek physician care, and thus be more influenced by DTCA.

The findings of the policy analysis indicate that the presence of DTCA results in an increase in consumer welfare in the statin drug market in comparison to the absence of DTCA. The findings also indicate that DTCA helps bring the under-diagnosed consumers to physicians' offices, which in turn helps to improve consumer welfare. The results of the estimates also support the informative role of DTCA on the decision to seek health care, which is consistent with previous findings in the literature (Iizuka and Jin, 2007; Mukherji et al., 2004). Moreover, the estimates suggest that physician advertising could be both informative and persuasive on choosing the drug, although the magnitude of the persuasive effects seems to be pretty small.

The remainder of the paper is organized as follows. Section 2 provides background information on advertising in the prescription drug market and the therapeutic class studied in the paper. Section 3 describes the economic model. Section 4 describes the data, and the estimation procedure is discussed in Section 5. Section 6 presents the results from the model estimation and the policy experiment. Section 7 concludes and discusses the limitations of the study.

2. Background

Promotional spending by pharmaceutical companies has more than doubled within last few years, rising from $9.2 billion in 1996 to $19 billion in 2001. Prescription drugs are now the fourth largest advertising category in the U.S.[7] While most persuasive activities of prescription drugs are still directed towards physicians (85%), DTCA accounts for an increasing proportion of total spending, increasing from 8% in 1996 to 15% in 2000 and resulting in a three-fold growth from $800 million in 1996 to $2.5 billion in 2000 (see Table 1).

Promotional advertising directed toward physicians takes three forms: sampling, detailing, and professional journal advertising. Sampling involves providing free samples to physicians. Spending on sampling depends on the retail value of free samples and accounts for the highest percentage of promotional spending directed toward physicians.[8] Detailing is advertising done by sales representatives

[2] Physician might be influenced through advertising to prescribe a certain drug over other drugs, allowing for persuasive effects. Also, information received through advertising could influence a physician to prescribe a certain drug, allowing for informative effects.

[3] Although, in reality the drug choice and the quantity choice are made at the same time as a single decision, for computational simplicity I make that decision in two steps in this model.

[4] See above for an explanation for why DTCA cannot be persuasive in this market.

[5] While persuasive effects might influence a physician to prescribe a specific drug, it usually does not affect the dosage decision of the chosen drug. However, informational effects might affect both the drug and the dosage decisions, since clinical outcome information may affect dosage decisions.

[6] The weighted total health care expenditure in MEPS from 1997 to 2000 is almost constant indicating no increase in health care expenditures over time. According to the Fig. 1-1 in Folland et al. (2004), U.S. health care expenditure shares seem to be constant over the period of 1997–2000 as well.

[7] www.imshealth.com.

[8] Spending on sampling is calculated by multiplying number of free samples from the average retail price in the market. Note that this method overvalues the cost of sampling to manufacturers since actual average price would be lower if the samples were put out in the market.

Please cite this article as: Jayawardhana, J., Direct-to-consumer advertising and consumer welfare, International Journal of Industrial Organization (2012), http://dx.doi.org/10.1016/j.ijindorg.2012.09.001