Journal of Business Research 70 (2017) 67–73

Contents lists available at ScienceDirect

Journal of Business Research

An integrative framework of cooperative advertising: Should manufacturers continuously support retailer advertising?☆

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ARTICLE INFO

Article history:
Received 18 August 2015
Received in revised form 22 July 2016
Accepted 23 July 2016
Available online 31 July 2016

Keywords:
Cooperative advertising
Game theory
Pricing
Retailer advertising

ABSTRACT

A two-period game is developed in a bilateral monopoly where, besides pricing decisions, the retailer and manufacturer can set their advertising and cooperative advertising support rates for each period. It is demonstrated that, in addition to the established continuous cooperative advertising programs, in which the retailer advertises and the manufacturer supports retailer advertising in each period, two other advertising schedules are possible. First, the retailer advertises in each period, while the manufacturer only supports the second-period advertising. Second, whether or not the manufacturer provides a cooperative advertising program in the first period, the retailer only advertises in the second period and receives advertising support. The conditions under which each of these advertising arrangements is implemented are identified. In a continuous cooperative advertising schedule, the manufacturer may change his advertising support over time depending on the nature of the long-term effects of retailer advertising. The implications of these findings are discussed.

1. Introduction

The optimal design of cooperative advertising programs over time remains a major challenge for both scholars and decision makers. Cooperative advertising is a joint promotional arrangement, whereby a manufacturer reimburses a percentage of advertising expenditures that retailers support in promoting his product. A cooperative advertising program aims at providing additional incentives to retailers to increase their local advertising of a manufacturer's product. Retailer advertising is believed to benefit manufacturers in three ways. First, retailers have a better knowledge of their local markets and can therefore undertake more effective advertising programs for manufacturers' products. Second, retailers use local media, which generally apply lower advertising rates than do national media. Finally, retailer local advertising is known to stimulate immediate sales at the retail level, although its long-term effects on sales remain controversial (Jørgensen, Sigué, & Zaccour, 2000, 2001; Jørgensen, Taboubi, & Zaccour, 2003; Herrington & Dempsey, 2005).

Two research streams have investigated the optimal design of cooperative advertising programs to retailers (See Aust and Buscher (2014) and Jørgensen and Zaccour (2014) for review). The first research stream uses static games. The optimal strategies derived from these static games apply to a single period and overlook, among others, the now well-established long-term effects of retailer advertising (e.g., Berger, 1972; Huang & Li, 2001; Karray, 2013, 2015; Karray & Amin, 2015; Karray & Zaccour, 2006; Li, Huang, Zhu, & Chau, 2002; Szmerekovsky & Zhang, 2009; Xie & Ai, 2006; Yan, 2010; Yan & Pei, 2015; Yan, Cao, & Pei, 2016). The findings of this research stream are known to be more relevant in circumstances where the decision environment is relatively stable and channel members' decisions do not have carryover effects (Jørgensen & Zaccour, 2014). As a consequence, it is implicitly believed that channel members' decisions related to cooperative advertising do not change over time.

The second research stream uses sophisticated dynamic models and seeks to study more realistic cooperative advertising situations where the environment can change and channel decisions can have long-term effects. Most works in this second research stream uses differential games (e.g., Jørgensen et al., 2000, 2001, 2003; He, Krishnamoorthy, Prasad, & Sethi, 2011; Sigué & Chintagunta, 2009; Zhang, Cou, Li, & Huang, 2015; Zhang, Gou, Liang, & Huang, 2013). For mathematical tractability, however, these works have studied infinite horizon cooperative advertising contracts and mainly derived stationary feedback strategies, as they all use time-independent parameters. Not surprising, these

☆ We thank two anonymous reviewers for their helpful comments and Janice Thiessen for copy-editing assistance. The first author's research is partially supported by MEC under projects ECO2011-24352 and ECO2014-52343-P, co-financed by FEDER funds and the COST Action IS1104 "The EU in the new economic complex geography: models, tools and policy evaluation".

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http://dx.doi.org/10.1016/j.jbusres.2016.07.005
0148-2963/

works mainly prescribe constant cooperative advertising support rates that do not change over time.

In their recent review of cooperative advertising works, Jørgensen and Zaccour (2014) pointed out the exclusive prescription of stationary cooperative advertising rates as a serious shortcoming of the current literature. In the real world, cooperative advertising programs, as many other promotional activities, are offered within limited time periods and their support rates are barely constant over time. Among other strategies, manufacturers change their cooperative advertising contributions depending on seasonal periods and the type of local advertising they want to stimulate. A manufacturer may choose to support retailer advertising exclusively when the sales in the industry are at the seasonal peak. Similar practices are known in the advertising literature as pulsing, when advertisers alternate between zero and positive advertising levels (Sasieni, 1989; Villas-Boas, 1993). For example, Mitsubishi Motors (2012) developed a three-month cooperative advertising program in 2012 that went from April 3 to July 2. Honda Canada Inc. (2010) has a flexible annual cooperative advertising policy, which allows special rates to support specific dealers' sales initiatives. On the other hand, while cooperative advertising programs set very specific requirements for the use of funds, they are generally flexible and give enough freedom to retailers to use or not to use them during a given period. As a matter of fact, while all authorized Mitsubishi Motors North America dealers were eligible to participate in the 2012 cooperative advertising program, only those who endeavored to meet the program requirements were able to take advantage of it.

There is therefore a need to further explore what drives the changes in both cooperative advertising programs and retailer advertising schedules over time. This paper hopes to contribute an integrative framework that can explain observed practices in the business world and provide useful guidelines to help implement more effective cooperative advertising programs. On the theoretical ground, this paper helps to integrate some of the findings of previous static and dynamic cooperative advertising models in bilateral monopoly contexts. Following these works, we develop a stylized two-period model in which a manufacturer sells a single brand to a retailer. In each period, the manufacturer determines the optimal wholesale price and cooperative advertising support rate, while the retailer sets the optimal rate of local advertising and retail price. This setup allows various cooperative advertising and retailer advertising schedules to be considered as potential equilibria. Technically, unlike current differential games-based models that prescribe a constant cooperative advertising rate over time, in our proposed configuration, the manufacturer may or may not offer cooperative advertising support from one period to another. In response, the retailer may or may not advertise in a given period even if cooperative advertising support is provided. The research questions then are:

1. Should the retailer continuously advertise? And should the manufacturer continuously support retailer advertising?
2. What are the drivers of change in the players' strategies over time?
3. What types of cooperative advertising arrangements should the manufacturer and retailer implement over time if they both act so as to maximize their individual profits?

To address these questions, we use the Stackelberg solution concept to derive equilibria in a game where the manufacturer is assigned the leadership role. This research differs from previous works in several ways. First, we disregard competition, which is studied in several recent works and proven to affect cooperative advertising decisions, to focus on vertical interactions over time (Karray, 2015; Karray & Amin, 2015; Yan & Pei, 2015; Yan et al., 2016).

Second, we consider unconstrained cooperative advertising programs for which the manufacturer does not set a maximum contribution to his cooperative advertising program as a percentage of the retailer's purchases. The 2012 Mitsubishi Motors cooperative advertising program referred to above is a good example of a constrained cooperative advertising program. It has been recently demonstrated that, even in a bilateral monopoly context, when such a constraint is used, an increase of the manufacturer's cooperative advertising support may not translate to an increase of retailer advertising as is otherwise expected (Zhang et al., 2015). In this particular case, our work is more in line with the majority of previous cooperative advertising works.

Third, unlike previous static cooperative advertising models, this paper acknowledges the possibility of retailer advertising carryover, which means that the first-period retailer advertising may also impact on the second-period demand. Therefore, unless the long-term effects of retailer advertising are set to zero, the game played in the second period cannot be considered as a mere successive static game.

Finally, compared to infinite horizon cooperative advertising contracts previously studied in the literature, which exclusively lead to constant cooperative advertising rates, this paper shows that cooperative advertising rates can change over time to support various types of retailer advertising. As a matter of fact, we do not make any restrictive assumption on the role of retailer advertising and its effects, as in some of the published works. Instead, we study the general scenario where, depending on the content of this type of advertising, retailer advertising can have no, negative, and positive carryover effects. Previous works do not simultaneously investigate these three possible effects (Jørgensen et al., 2000, 2001, 2003; Sigué & Chintagunta, 2009). In this paper we show that these effects play a critical role in how channel members schedule their advertising decisions.

The remainder of the paper is organized as follows. Section 2 describes the model and discusses its assumptions. Section 3 describes the methodology and derives the game equilibrium solutions. Section 4 studies how the manufacturer's and retailer's decisions change over time. Section 5 compares the findings derived in Section 3. Finally, Section 6 concludes and discusses the managerial and theoretical implications of our findings.

2. The model

Consider a bilateral monopoly in which a manufacturer enters into an exclusive distribution arrangement with a retailer who then sells the manufacturer's product to consumers. The manufacturer's product faces no direct competition or, when competition does exist as in the automobile industry, it is disregarded to focus on how vertical interactions between channel members affect advertising decisions. Also, because of the exclusive distribution arrangement, there is no intrabrand competition at the retail level. As a matter of fact, the existence of such vertical interactions in advertising has lately led companies such as Toyota and Honda to prohibit certain types of retailer advertising that are believed to damage their brand image (Cole, 2015). Let a_i and s_i be, respectively, the rate of retailer's local advertising and the manufacturer's cooperative advertising rate or the percentage of the retailer's advertising expenditures that the manufacturer is committed to share in period i, $i\in\{1,2\}$. Also, let w_i and p_i denote the wholesale and retail prices in period i, $i\in\{1,2\}$. We consider that the retail price is the effective price consumers pay for the product in period i.

As in many other papers in the distribution channel literature (Chu & Desai, 1995; Martín-Herrán, Sigué, & Zaccour, 2010; Sigué, 2008), we assume the following linear demand functions: $q_1 = g - p_1 + \alpha a_1$ and $q_2 = g - p_2 + \beta a_1 + \alpha a_2$. These demand functions are mainly used for convenience and tractability. They can also approximate quite well more complicated functions for both non-durable and durable products (Lilien, Kotler, & Moorthy, 1992). The parameter g is positive and represents the baseline demand at the start of the game. For simplicity, consumer sensitivity to retail prices in the two periods is normalized to 1. The parameters α and β respectively represent the short-term and long-term effects of retailer advertising. The short-term effects of retailer advertising (α) in the two periods are identical and positive. On the other hand, the long-term effects of the first-period retailer advertising (β) on the second-period demand can be either zero, negative, or positive depending on the type of retailer advertising and the target market.