



Contents lists available at ScienceDirect

Int. J. Production Economics

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

Game theoretical perspectives on dual-channel supply chain competition with price discounts and pricing schemes

Gangshu (George) Cai^{a,*}, Zhe George Zhang^{b,c,1}, Michael Zhang^{d,2}

^a Department of Management, College of Business Administration, Kansas State University, Manhattan, KS 66506, USA

^b Department of Decision Sciences, College of Business and Economics, Western Washington University, WA 98225, USA

^c Faculty of Business Administration, Simon Fraser University, Burnaby, BC, Canada V5A 1S6

^d Department of Finance and Management Science, Saint Mary's University, Canada

ARTICLE INFO

Article history:

Received 26 March 2008

Accepted 29 August 2008

Available online 18 September 2008

Keywords:

Channel competition

Channel coordination

Optimal pricing

Dual-channel

Direct channel

Stackelberg game

Nash equilibrium

ABSTRACT

This paper evaluates the impact of price discount contracts and pricing schemes on the dual-channel supply chain competition. Channel conflict occurs when the supplier enters the online direct channel. Traditional contracts normally require tedious administrative participation, full information of the cost structures, and other factors. The introduction of simple price discount contracts aims at providing easy implementation and effective coordination results. From supplier Stackelberg, retailer Stackelberg, and Nash game theoretic perspectives, we show that the scenarios with price discount contracts can outperform the non-contract scenarios. In addition, we show consistent pricing scheme can reduce the channel conflict by inducing more profit to the retailer. The leader in the games might, but is not guaranteed to, have advantages.

© 2008 Elsevier B.V. All rights reserved.

1. Introduction

With the prevailing popularity of the Internet, thousands of suppliers, such as IBM, Cisco, and Nike, sell products directly online while continuing to sell through the traditional retailers. The presence of online direct channel results in fiercer competition for the retailers. Consequently, channel conflict occurs. In an infamous letter to its thousands of suppliers, Home Depot stated that, “It is important for you to be aware of Home Depot’s current position on its vendors competing with the company via e-commerce ... a company may be hesitant to do business with its competitors” (Brooker, 1999). However, more and more retailers become accustomed to the coexistence of their own retail channels and supplier-owned online direct channels (Zrike et al., 2001). According to the Forrester Report (Allen et al., 2000), as retailers recognize that their role is to serve empowered consumers together with the suppliers, channel coordination will eventually overshadow channel conflict.

Collaborating suppliers and retailers will negotiate on the retail price, wholesale price, product availability, and other details. This paper is focused on pricing strategy and simple price contracts. There are two types of channel pricing strategies: consistent pricing and inconsistent pricing. A consistent pricing strategy exists if the direct channel and the retail channel are priced the same; otherwise, it is inconsistent pricing. According to Ernst & Young (2001), about two thirds of dual-channel companies utilize consistent pricing, whereas the remaining companies use inconsistent pricing.

* Corresponding author. Tel.: +1 785 532 4358; fax: +1 785 532 1339.

E-mail addresses: gcai@ksu.edu (G. Cai), george.zhang@wwu.edu (Z.G. Zhang), Michael.Zhang@SMU.CA (M. Zhang).

¹ Tel.: +1 360 650 2867; fax: +1 360 650 4844.

² Tel.: +1 902 491 8676.

This paper demonstrates that consistent pricing can protect the retailer from losing more profit when the supplier enters the online direct channel in Stackelberg games in as a leader.

Contracts have been widely used in supply chain channel coordination. In a seminal paper on channel coordination effects, [Jeuland and Shugan \(1983\)](#) show that the quantity discount contract can coordinate the supply chain. [Ingenue and Parry \(1995\)](#) demonstrate that a two-part tariff contract coordinates the supply chain of a manufacturer and multiple independent retailers. [Netessine and Rudi \(2004\)](#) suggest that the supply chain could be coordinated if the wholesaler partially sponsors customer acquisition expenses and partially credits the retailer for unsold products. [Cachon and Lariviere \(2005\)](#) conclude that a revenue-sharing contract can perfectly coordinate the supply chain with a supplier and a retailer or multiple symmetric retailers competing in quantities. [Bernstein et al. \(2006a, b\)](#) present that vendor-managed inventory partnerships can provide perfect coordination with simple wholesale pricing schemes in two-echelon supply chains with a single supplier and multiple retailers. However, few papers provide contracts to coordinate the dual-channel supply chain with a direct channel. An exception is [Boyaci's \(2005\)](#) work in a dual-channel distribution system where he observes that simple contracts, such as price-only, buy-back, rebate, revenue sharing, and VMI contracts, cannot coordinate the dual-channel supply chain with inventory decisions due to the vertical and horizontal competitions in both channels. He also demonstrates that a penalty contract can coordinate the supply chain, but it is difficult to implement. A compensation-commission contract can coordinate the supply chain, in which “the retailer earns revenues only as commissions on his channel sales that exceed a flexible target.” However, this contract might not be desirable for the retailers, especially when the retailers want more flexibility in dynamic Internet commerce environments.

Although theories show many contracts can perfectly coordinate the supply chain, in a laboratory experiment, [Ho and Zhang \(2004\)](#) show contract formats, such as two-part tariff and quantity discount contract, perform significantly lower than the coordinated level. In fact, these contracts do not even perform at a higher level than the linear wholesale price. Thus, we wonder whether a simple and easy-to-implement price discount contract can yield more profit for the retailer and reduce channel conflict while the supplier determines whether to enter the direct channel. The price discount contracts resemble the price-discount-sharing contract, as discussed in [Bernstein and Federgruen \(2005\)](#). While the supplier has incentive to conceal the cost information, the simple price discount contracts do not require the cost information. Another contract format worthy of noting is the revenue-sharing contract, which can coordinate a wide variety of supply chains; however, it is administratively burdensome and might negatively affect the sales effort ([Cachon and Lariviere, 2005](#)). Similarly, the revenue-sharing contract requires the suppliers reveal full cost information.

In this simple price discount contract, the wholesale price is a discounted rate of the direct/retail channel price to avoid fierce competition in pricing between the direct and retail channels. We also utilize this contract format to enable linking the wholesale price with the retail channel price. In fact, this type of price discount contract can be considered a form of the retail price markup (ratio), which is quite common in retail pricing. For example, according to [Fairtrade \(2002\)](#), “the retailer’s margin is typically around 30% of the retail price (for all products).” [Wikipedia \(2007\)](#) shows some customary markup percentages for retail industries, e.g., new cars—15%, electrical appliances—30%, clothing—50%, crystal ware—60%, food retailers—45%, cosmetics and fragrances—75–80%, and gifts and clocks—55%.

We address the dual-channel supply chain competition in a game theoretic framework. In a supplier Stackelberg game, the supplier is the leader and the retailer is the follower in determining pricing strategies. In a retailer Stackelberg game, the retailer is the leader and the supplier is the follower. In a Nash game, the supplier and retailer determine the pricing strategies simultaneously. This paper contributes to the literature in several aspects. First, it addresses the dual-channel competition from the above three game theoretic perspectives. Second, it shows that the simple price discount contracts can improve the performance of the supply chain in different game situations. Third, it compares consistent and inconsistent pricing schemes and shows that consistent pricing may help the Stackelberg leader.

The remainder of this paper is organized as follows. Section 2 reviews more relevant literature. We address the dual-channel competition model in Section 3. Section 4 is dedicated to the dual-channel competition without price discount contracts; whereas Section 5 discusses the competition with two different types of price discount contracts. We show the coordination effects of these price discount contracts compared with the revenue-sharing contract and conclude in Section 6. All proofs of this paper are in the appendices.

2. Literature review

In this section, we review more past studies related to our research in addition to those cited in Section 1. The emergence of the Internet prods tremendous interest in multi-channel distribution systems. [Chiang et al. \(2003\)](#) investigate a dual-channel market with a local retailer and an online direct market by assuming that all consumers have a common positive preference toward local purchasing. They show that entering a direct channel can enhance the supplier’s negotiation power and reduce the double marginalization in the retail channel. [Balasubramanian \(1998\)](#) examines how different factors affect the consumer’s choice and use of channels. [Chiang and Monahan \(2005\)](#) demonstrate that the dual-channel strategy outperforms other single-channel strategies in a two-echelon dual-channel inventory model in which inventory is held at a warehouse and a retailer location. [Kumar and Ruan \(2006\)](#) also show that the supplier can benefit from the direct channel in various scenarios by assuming that the consumers are either brand (or manufacturer) loyal or retailer loyal, and the retailer carries both the supplier and other brands.

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات