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Pricing and rebate strategies for an e-shop with a cashback website

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ABSTRACT

A cashback website (CW) is a type of reward website that pays its members a rebate when they purchase goods via affiliate links. The website receives a commission from an e-shop when a customer makes a purchase by following a link instead of visiting the e-shop directly. With the rapid rise in e-shops, CWs are becoming increasingly popular. However, these CWs' value to e-shops is still somewhat unclear, in both theory and practice. To clarify the process, we consider a system in which an e-shop sells a product to consumers and a CW provides the link to the e-shop. Based on consumers' utility, we develop a model to study the value of the CW to the e-shop in both centralized and decentralized settings, and demonstrate and compare the two parties' optimal strategies and their corresponding profits in both settings. Our main findings are as follows: (1) The CW can always bring the e-shop more profits, whether the setting is centralized or decentralized, by playing the role of price discrimination. (2) In contrast to the centralized setting, the decentralized setting does not lead to a higher sales price; in many cases, it offers a lower sales price, which is opposite of the case typically seen in traditional supply chain literature. (3) Compared with the decentralized setting, the centralized setting does not allow all consumers to have more consumer surplus—which, again, differs from traditional supply chain literature—but rather yields more total profit to the system, which implies that it is better for the e-shop to have its own CW than to use a third-party CW. (4) The degree of decrease in utility for consumers who buy via the CW significantly influences both parties' pricing strategies. More interesting is that a smaller degree of decrease in utility for consumers who buy via the CW is always beneficial to the e-shop, but may be detrimental to the CW.

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1. Introduction

Online shopping is becoming increasingly popular worldwide. According to Forrester Research (March 2012), about £82 billion was spent online in 2011 in Europe, and the number of online shoppers will continue to grow at a rate of 12% each year, to more than £146 billion by 2016. In 2012, the Boston Consulting Group reported that online retail sales in China would triple to more than $360 billion by 2015[1]. The rapid growth of e-business has motivated many manufacturers and traditional retailers, including Apple, Walmart, Carrefour, Tesco, and GOME, to open online stores. Consequently, competition among e-shops has become fierce. To help e-shops gain market share, cashback websites (CW), a new mode of sales promotion, have emerged and are steadily becoming more popular.

As defined by Wikipedia, a CW is "a type of reward website that pays its members a percentage of money earned when they purchase goods and services via its affiliate links." A CW works as follows (as described by Shravan (2013) on Techulator.com). First, a consumer registers as a member (at no charge) on the CW and creates an account by entering such information as name, email address, and phone number, and creating a password. The consumer can then log in, search for the e-shop from which he wants to purchase goods or services, and click on the e-shop's outgoing link. After that, the consumer can shop and transact as he normally would on the e-shop's site. Once a purchase is confirmed by the e-shop, the CW receives a commission from the e-shop. The CW then shares a percentage of that commission with the consumer in the form of a rebate, which is added to his CW account, from which he can request payment to a bank account. The CW earns the commission difference. In this regard, the cashback offered by the CW—the third-party service website—is notably different from traditional channel and consumer rebates, because a channel rebate is usually offered by manufacturers to retailers to improve their sales efforts, and a consumer rebate is offered directly to consumers by manufacturers or retailers to stimulate market demand.

Many well-known CWs already exist, including Fatwallet.com and Upromise.com in the United States, Quidco.com and TopCash-

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[1] http://www.bcg.com/media/PressReleaseDetails.aspx?id=tcm:12-103641

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Back.com in the United Kingdom, and 51fanli.com in China. Taking TopCashback.com and 51fanli.com as examples, TopCashback.com was founded in 2005 and has more than 3 million members and more than 4000 merchants—including Amazon, eBay, and Tesco—and paid about $41.6 million in rebates in 2013. In November 2011, it launched a US version of its website, which received publicity for saving consumers $150,000 in six months[2]. 51fanli.com, one of the most popular CWs in China, has more than 15 million members and pays more than 10 million RMB cashback per month. With a membership of almost 40% of online shoppers in China, its total revenue in 2012 was 6 billion RMB.

Although CWs are common, their value to e-shops is unclear, and professionals differ regarding their value. For example, a spokesman for etao.com said that CWs' shopping navigation services have great potential, because e-shops not only increase sales, but also collect important information about captive consumers[3]. However, a DONEWS.com manager argues that promotion via CWs is unstable and unsustainable, because the CW, acting as a service intermediary, may cancel out the e-shop's profit by controlling the e-shop's customers[4]. Although researchers have paid much attention to rebates (see literature review), thus far no one has discussed CWs. This paper addresses the resulting gap.

To provide a theoretical answer to the above question, we consider a system that consists of an e-shop and a CW. The e-shop sells a product to the end market and the CW provides the link service for the e-shop. Consumers make a purchase from the e-shop either by visiting the e-shop directly or via a link from the CW. We explore the following questions. (1) Does the e-shop benefit from offering a consumer rebate through the CW? (2) How do the e-shop and the CW set their optimal price/rebate strategies in their respective centralized and decentralized settings? (3) Does the degree of decrease in utility for consumers who use the CW influence the two parties' optimal strategies? If so, how?

Our results show that it is always beneficial for the e-shop to offer a consumer rebate through the CW, in both centralized and decentralized settings. Furthermore, (1) in the centralized setting, whether the degree of decrease in utility for consumers using the CW is small or large, the e-shop can always set the same sales price as it would without the CW and offer a rebate through the CW directly to customers; and (2) in the decentralized setting, when the degree of decrease in utility for consumers who buy via the CW is relatively small, the e-shop can keep the same retail price as it would without the CW and offer a rebate to the CW. Once the degree of decrease in utility for consumers who buy via the CW exceeds a certain threshold, the e-shop must lower its retail price and rebate rate—and when the degree of decrease in utility for consumers who buy via the CW goes up to a very high level, under certain conditions, the e-shop must adjust its retail price and rebate rate back to the original level.

The remainder of the paper is organized as follows. Section 2 briefly reviews the related literature. In Section 3, we present the model and its mathematical formulation in detail. In Section 4, we study the optimal pricing and rebate policies of both the CW and the e-shop under centralized and decentralized scenarios. In Section 5, we compare the centralized and decentralized scenarios, present the sensitivity analysis of parameters, and offer some management insights. We conclude the paper in Section 6. All technical proofs are given in the Appendix.

2. Literature review

The literature related to this paper mainly comes from two streams of research, one on channel rebates and the other on consumer rebates. We briefly review the literature for each.

A channel rebate is a payment from a manufacturer to a retailer based on the retailer's sales volume (Taylor, 2002). This type of payment has received much attention from researchers, including Pasternack (2005, 2008) and Lariviere (1999). Most researchers consider a channel rebate to be a manufacturer's incentive tool for improving channel performance or achieving channel coordination. For instance, Wang et al. (2011) show that the cash rebate offered by a supplier to a retailer can improve the profit of a decentralized supply chain. Wong et al. (2009) propose a vendor-managed inventory model in which a single supplier serves multiple retailers, and demonstrate that a sales rebate contract can help to achieve supply chain coordination. Xing and Liu (2012) design a contract with price matching and a selective compensation rebate to coordinate sales effort in a supply chain with one manufacturer and two retailers. Taylor (2002) shows that a linear rebate and returns or target rebate alone cannot achieve supply chain coordination, but argues that a properly designed target rebate and returns contract can achieve coordination and a win–win outcome when demand is influenced by a retailer's sales effort. Chiu et al. (2011) further consider the supply chain coordination problem with a risk-sensitive retailer and a target sales rebate, and find that the supplier can coordinate the channel through flexible target sales rebate contracts.

In this paper we focus on consumer rebates, which are offered by manufacturers or retailers to consumers via a rebate or coupon (Taylor, 2002). As Gerstner et al. (1994) note, introducing a customer rebate is a tactic to take price discrimination through a distribution channel. Consumer rebates have been studied extensively. For example, Chen et al. (2007) find that as long as some customers who are attracted by a mail-in rebate forgo the rebate, offering rebates is always beneficial for manufacturers. Aydin and Porteus (2009) compare consumer rebates to channel rebates under a Nash equilibrium game framework, and demonstrate that an equilibrium retailer rebate leads to a lower effective price (hence, higher sales volume) and higher profits for both the supply chain and the retailer; an equilibrium consumer rebate also leads to a lower effective price and higher profits for the retailer, but not necessarily for the chain. Lu and Moorthy (2007) compare coupons and rebates in terms of their effectiveness as price-discrimination tools. Under the assumption that consumers face uncertain redemption costs, the authors show that rebates are more efficient at surplus extraction, but coupons offer more finely tuned control over which consumers to target. Arcelus et al. (2012) develop a single-period decision model for a retailer facing uncertain and price-dependent demand by introducing a rebate to address the excess demand. Using a news vendor framework, they also identify the optimal price, rebate, and order quantity. Their model includes cases with a stochastic redemption rate (Arcelus et al., 2007) and asymmetric information (Arcelus et al., 2008). In our paper, the e-shop does not give customers a rebate directly, but rather through a CW, which is different from previous models in this stream of the literature.

The main results of the paper are as follows. First, based on consumers' option utility, we develop an analytic model to show the value of the CW to the e-shop. We find that the CW can always bring the e-shop more profit, whether the setting is centralized or decentralized; this explains why CWs are now so popular in e-business. Second, we illustrate and compare both partners' optimal strategies and their corresponding profits in centralized and decentralized settings. Our results show that (a) in the centralized setting, the e-shop can always keep the same optimal retail price as without a CW, as long as it provides consumers

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[2] <http://www.prlog.org/11863532-topcashback-thrust-into-the-us-spotlight-as-it-saves-consumers-150000-in-six-months.html>

[3] http://www.globaltimes.cn/content/733061.shtml and http://articles.economictimes.indiatimes.com/2014-03-04/news/47894645_1_pennyful-websites-cashback

[4] <http://news.ccidnet.com/art/11097/20130422/4883059_1.html>

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