REWARD PROGRAM AND INFORMATION SHARING UNDER DIFFERENT CONTRACTS

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A B S T R A C T- When a manufacturer opens an online channel to compete with its retailer, it's an effective mechanism for the manufacturer to provide monetary support to the retailer to implement a reward points program to alleviate the O2O (online to offline) competition. However, the manufacturer and the retailer have asymmetric information about consumers' redemption rate on earned reward points. In this research, we propose two contracts for the manufacturer to employ in order to seek sharing the retailer's private information. Our results show that when the manufacturer offers the retailer a two-part tariff contract, the retailer would like to share its private information with the manufacturer only under certain condition; however, when the manufacturer offers the retailer a RPM (retail price maintenance) contract, the retailer has a strong self-motivation to share its private information with the manufacturer since RPM contract creates a win-win situation for all parties.

Keywords- Reward points; Asymmetric information; Retail contracts; O2O competition; Supply chain management

I. INTRODUCTION

Nowadays many manufacturers in a variety of industries, such as Hewlett & Packard, Lenovo, Dell Computer, Compaq, Sony, Panasonic, Mattel, Pioneer Electronics, Cisco System, P&G, and Estee Lauder, are using online channel to sell their products directly to consumers, which leads to channel competition and conflict with the retailer (Yan and Pei, 2011, 2015). Particularly when the product has a strong compatibility with online sales, the channel competition and conflict between online and offline (O2O) would further increase. A side effect of this trend is to lower the profits of all parties. It is, therefore, to the manufacturer's benefit to mitigate channel competition and conflict. This paper mainly considers reward points as an effective mechanism to coordinate the O2O distributions when the manufacturer opens an online channel to compete with its retailer.

Having a well-thought-out reward points program is the key to attracting and stimulating consumers' purchases. Generous reward points potentially increase consumer's willingness to purchase and lead to more sales (Taylor and Neslin, 2005). However, the offered reward points also bring monetary costs. Hence, the reward points program is a set of tradeoffs – generous reward points can increase sales revenue by inducing more consumers to purchase and stimulating consumers to purchase more but also motivate more consumers to redeem the earned reward points and thus lead to substantially higher costs. As a result, obtaining accurate information about consumers' redemption on earned reward points becomes critically important to firms.

In this study, we consider a manufacturer - retailer supply chain in which the manufacturer opens an online channel to compete with its retailer and in the meantime, provides monetary support to the retailer to implement a reward points program to alleviate the O2O competition. When the manufacturer provides monetary support to the retailer to implement a reward points program, the consumers' redemption rate on earned reward points significantly influences the manufacturer's support in the reward points. We assume that the manufacturer and the retailer have the asymmetric information about consumers' redemption rate on earned reward points. This assumption is based on the fact that manufacturers generally cannot accurately estimate the buyers' behaviors directly but retailers have accurate information about point-of-redemption data, deep knowledge about local consumer redemption on earned reward points, etc. (e.g. Corbett and DeGroote, 2000; Wei and Xiao, 2015). When the retailer doesn't share its information with the manufacturer, both the retailer and the manufacturer would use their own information to set their optimal strategies. We then examine if it is beneficial for the manufacturer to seek sharing the retailer's private information and if the retailer is willing to share its private information with the manufacturer. We propose two contracts, which are two-part tariff contract and RPM (Retail Price Maintenance) contract, for the manufacturer to employ in order to seek sharing the retailer's private information.

II. LITERATURE REVIEW

Information sharing

A substantial amount of papers studied asymmetric information in the literature of marketing and supply chain management. For example, Corbett and DeGroote (2000) investigated the scenarios of both full and incomplete information and derived optimal discount strategy for firms. Ha (2001) found that the ordered quantity will be smaller and the optimal price will be set higher under the information asymmetry than those under the complete

information. Corbett et al. (2004) addressed the different types of contracts can be utilized to achieve a channel coordination where there is an information asymmetry between the supply chain players. Cakanyildirim et al. (2007) revealed that information asymmetry about the manufacturer's production cost may bring higher efficiency to the whole supply chain consisting of one manufacturer and one retailer. Zhou and Benton (2007) showed that both information sharing and supply chain practice can help improve the supply chain performance effectively. He et al. (2008) found that the manufacturer or the retailer would not benefit from their information sharing simultaneously when information is transmitted from the manufacturer to the retailer. Yan and Pei (2011) showed that asymmetric demand information sharing improves the manufacturer's profit but has no impact on the retailer's profit in an O2O supply chain. However, the aforementioned studies focused on demand information, while our research focuses on the consumers' redemption rate on earned reward points. Furthermore, the aforementioned studies did not consider the strategic role the reward points play on the value of information sharing, while we do. Finally, the aforementioned studies did not examine how various contracts can be utilized to implement an information sharing arrangement and what contract is more effective to be utilized to create a Pareto situation for both the manufacturer and the retailer.

Reward points

A substantial and growing research studied the reward points programs in the extant literature. For example, Bolton et al. (2000), Lewis (2004), Yi and Jeon (2003), Keh and Lee (2006), Liu (2007), Melnyk and Van Osselaer (2012) investigated how the reward points programs affect consumer loyalty and retention through focusing on behavioral questions. Hartmann and Viard (2008) addressed how the reward points programs can be utilized in consumer's purchase tracking and price discrimination. In addition, several studies used empirical study to investigate the use of reward points programs as sales promotion strategy in the business market. For example, Dorotic et al. (2011) investigated the own and cross-vendor effects of reward points programs on the sales of each vendor. Zhang and Breugelmans (2012) addressed how the reward points programs can be utilized as retail sales promotion to stimulate consumers to buy in the item-based loyalty program. Wei and Xiao (2015) examined the impact of reward points' promotions in one category on other categories and found that reward promotions positively impact non-promoted but closed related category. However, our research has several major differences from the aforementioned papers. First, the aforementioned papers did not address the strategic value of reward points program in the competition of O2O supply chain, while we do. Second, the aforementioned papers addressed reward points program through empirical studies, but our paper examines the value of reward points program through analytical models. Third, the aforementioned papers did not consider the important factor of the product compatibility to the web and its vital impact on the reward points, while we do. Finally, the aforementioned papers did not consider information asymmetry about consumers' redemption rate on the offered reward points and the strategic importance of information sharing, while we do.

Proposed results

In this research, we use game-theoretical models to investigate various scenarios and derive important findings and strategies for business managers to employ in order to improve their decision-makings and profits. Reward points program is not only of interest to academic scholars but also economically important in the business world. However, no prior research ever examines information sharing about consumers' redemption rate on earned reward points in the extant literature, particularly when the strategic value of reward points in the manufacturer – retailer O2O supply chain is considered. Our research addresses these gaps and makes important contributions to the O2O information sharing literature.

In this paper, we study a manufacturer – retailer supply chain where the manufacturer opens an online channel to compete with its retailer and in the meantime, the manufacturer also provides monetary support to the retailer to implement a reward points program to stimulate the market sales in order to alleviate the O2O competition. The manufacturer and the retailer have asymmetric information about consumers' redemption rate on earned reward points. In this setting, we examine how the information sharing influences the profits of the manufacturer, the retailer, and the whole supply chain. We use analytical models to investigate if it is in the interest of the manufacturer to seek sharing the retailer's private information and if the retailer is willing to share its private information with the manufacturer as well. Our results reveal that reward points program is a vital mechanism to help the manufacturer and the retailer achieve higher profits, which makes the information about consumers' reward points redemption become a critical resource for both parties. Therefore, obtaining accurate information about consumers' redemption rate through sharing the retailer's private information has become a beneficial mechanism for both the manufacturer and the retailer to further improve their respective performances, particularly when the product compatibility to the web is considered. However, our results show that under the two-part tariff contract, the manufacturer always benefits from information sharing but the retailer benefits from information sharing only under certain condition. Hence, both the manufacturer and the retailer may not always like to share their information with each other. We thus propose that the

manufacturer can utilize a RPM contract as an effective mechanism to seek sharing the retailer's private information and create a win-win situation through profit bargaining for all parties.

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