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Optimal trade-in strategy of business-to-consumer platform with dual-format retailing model[☆]

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ABSTRACT

B2C platforms are increasingly implementing trade-in programs to boost sales. Most of these platforms have adopted dual-format retailing model including both self-run stores and third-party stores. Under trade-in program framework, B2C platforms will determine the optimal trade-in rebate, and whether to offer the rebate to consumers with gift card (GC) or cash coupon (CC). GC can only be used in self-run stores, while CC can be used in both stores. To entice more consumers to trade-in products, platforms may launch trade-in efforts in the market. To address such decision-making challenges, we consider a B2C platform who owns a self-run store and hosts a third-party store, and examine the optimal trade-in strategy for the platform by developing four theoretical models. We first present two models without considering trade-in efforts, i.e., one model regarding GC payment, and one model regarding CC payment, and then extend them by taking trade-in efforts into consideration. Some interesting findings and insights are achieved. In particular, we find that both GC and CC do not always benefit the platform. Interestingly, offering high quality and low selling price for products in both the self-run store and the third-party store are also not always beneficial to the platform. So is the competition between both stores. Launching trade-in efforts may lead to a lower trade-in rebate but a higher profit for the platform. A counterintuitive finding is obtained that a higher gift card redemption rate is not beneficial to the platform, and vice versa.

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1. Introduction

Consumers are increasingly purchasing on online retailing platforms, e.g., Amazon.com and JD.com. To retain consumers and expand market share, many platforms adopt trade-in programs to entice the existing consumers to make repeat purchases, and further attract potential new comers to buy products. Typical trade-in program as a service in a business-to-consumer (B2C) platform operates as follows. Consumers firstly turn in used products to the platform. When receiving used products, the platform will check the products and offer consumers special discounts, which can be used in their future purchases. This discount is referred to as trade-in rebate [1]. Finally, consumers can use trade-in rebates to buy any desirable products on the platform. Trade-in programs are widely observed on B2C platforms such as Amazon.com, Bestbuy.com, JD.com, Suning.com and Gome.com.cn.

Traditional trade-in programs are extensively used in durable product markets, e.g., automobile, household appliances, electronics and technology industries [1–3]. In traditional trade-in programs, trade-in rebates are commonly redeemed toward repeat purchases of successive-generation products of used products. Consequently, trade-in can serve as an effective new product sales mechanism [2]. For instance, sales percent of new car through trade-in is approximately 57% in automobile industry [4]. However, in B2C transactions, trade-in is regarded as an important strategic leverage of B2C platforms to entice the existing consumers to make further purchases for any desired products to increase profitability. Furthermore, trade-in program can accept any specified used products regardless of whether bought from the platforms. In this regard, this program can effectively attract new consumers to make deals on platforms. Motivated by these evidences, the primary goal of this paper is to examine the optimal trade-in strategy of B2C platforms.

In recent years, many B2C platforms are increasingly adopting “dual-format” retailing model to sell products. In such a retailing model, in addition to self-run stores, third-party stores are also hosted. An increasing prevalence of third-party stores are widely observed in e-commerce platforms [5], e.g., Amazon.com,

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Walmart Marketplace, JD.com, Suning.com and Gome.com.cn, and these stores have largely facilitated e-commerce growth [6]. A recent report shows that third-party transactions in Amazon.com account for roughly 40% of its total sales [7]. JD.com also reports that there are approximately 99,000 third-party sellers on its marketplace as of December 31, 2015 [8].

On dual-format retailing B2C platforms, trade-in rebates are usually offered to consumers with gift card (GC) or cash coupon (CC). Some platforms like Amazon.com and JD.com, offer trade-in rebates with GC, while others (e.g., Suning.com and Gome.com.cn) use CC. For example, Gome.com.cn use “red coupon” to pay the rebates. Both GC and CC contain a value of trade-in rebate that can be redeemed toward future product purchases. Notably, GC is usually used to buy products from self-run stores, while CC is applicable to both self-run and third-party stores. Intuitively, CC may offer consumers more choices for shopping than GC. However, it may lead to the competition between self-run stores and third-party stores. Hence, these B2C platforms may face an important challenge: which payment (GC or CC) is better for offering trade-in rebates to consumers?

Trade-in rebate generally specifies the conditions under which B2C platforms can accept trade-in products for some rebates. In general, trade-in products can serve as a significant source of revenue for B2C platforms. When receiving traded-in products, platforms transfer these products to manufacturers. Manufacturers may generate some revenue (or equivalently cost saving) either by totally remanufacturing these products and selling them as new through platforms, or by reusing some components, or even by recycling the material [1]. These revenue can be seen as actual residual values of used products. Accordingly, if the rebate is too large, i.e., especially larger than actual residual value, platforms may incur some losses from trade-in programs. In contrast, if the rebate is too small, consumers would not participate in trade-in programs. Hence, how to determine a suitable trade-in rebate is an important decision-making issue for B2C platforms.

As platforms can obtain profits from both disposing used products and selling new products, platforms may exert sales efforts with respect to trade-in program to entice more replacement consumers to conduct trade-in transactions. Many platforms such as Amazon.com, JD.com, Gome.com.cn and Suning.com offer free shipping or door-to-door recovery services to replacement consumers who are willing to participate in trade-in activities. In particular, Suning.com provides each consumer who trade-in a used phone a chance to obtain a “red envelope” that contains certain monetary value as a gift in the summer of 2017 [9]. Notably, these sales efforts are typically launched by platforms, and for ease of notations, we use “trade-in effort” to represent this sales effort in this study. Note that, trade-in effort may directly affect consumer behaviors, and thus the optimal decisions on trade-in rebate and strategies. Hence, how to determine their trade-in effort levels is also an important issue for B2C platforms.

The aforementioned evidences and findings raise the following questions: (1) How do platforms determine whether to pay trade-in rebates with GC or CC? (2) How to determine the optimal trade-in rebates? (3) How do platforms determine their optimal trade-in effort levels?

Despite the importance of trade-in strategy including payment mode and rebate value to B2C platforms, the prior studies have not well documented the above described issues. The primary goal of this paper is to fill this gap. To this end, we consider a B2C platform with a self-run store and a third-party store, and focus on replacement (or trade-in) consumers who own used durable products. We then develop four theoretical models, i.e., two models without considering trade-in efforts under GC and CC payment modes, respectively, and two models considering trade-in efforts under GC and CC payment modes, respectively. To investigate the optimal trade-in strategy, i.e., trade-in payment and rebate, we first examine the optimal trade-in strategy by comparing the platform’s optimal decisions and profits obtained from models under GC and CC payment modes without trade-in efforts. To identify the impact of trade-in efforts on the platform’s optimal trade-in strategy, we then compare the platform’s optimal decisions and profits obtained from the two models under GC and CC with trade-in efforts. Since gift cards may not be fully redeemed in practice, further extension by considering the impacts of the redemption rate of gift card on the platform’s optimal decisions and profits is presented. Some important findings and management insights are obtained.

The remainder of this paper is organized as follows. Section 2 reviews the most relevant literature. In Section 3, we present our theoretical models. The results are also provided in this section. In Section 4, the optimal trade-in strategies and trade-in effort levels are analytically examined, and the optimal profits of the platform are also investigated. Section 5 provides concluding remarks. All the proofs are offered in Appendix A.

2. Literature review

Our work lies at the intersection of trade-in rebate, platform-based online retailing and sales efforts. We review the most relevant studies in this section.

2.1. Trade-in rebate

An increasing number of studies have explored economic motivations for firms to offer trade-in rebates. Klemperer [10] shows that consumers incur switching costs for changing firms, if the original firm from which consumers bought products offers trade-in services. Van Ackere and Reyniers [11] indicate that the primary goal of trade-in rebate is to increase purchase frequency. Zhu et al. [4] reveal that trade-in consumers exhibit higher willingness-to-pay for new products than consumers who just buy new products alone, and find that trade-ins can effectively increase sales percent of new car in automobile industry. Rao et al. [12] theoretically and empirically examine the motivation of implementing trade-ins, and find that trade-ins can effectively increase firm profits. Furthermore, Li and Xu [13] show that, for a product with technology innovations, trade-in can protect firms against the risk caused by uncertain innovation process.

Another stream of research focuses on examining the optimal trade-in rebates and product prices for firms, e.g., Van Ackere and Reyniers [11] and Fudenberg and Tirole [14]. These studies explore the optimal product prices and trade-in rebates under a two-period framework. In the first period, pricing decisions are made by segmenting consumers into potential replacement consumers and first-time buyers for new generation products. In the second period, firms determine the optimal trade-in rebates for upgrades toward repeat purchases, or discounts of selling old models. Following this framework, Yin and Tang [15] study the optimal customer purchasing decision under trade-in programs with up-front fees, and find that a firm is always better off offering trade-ins. By considering forward looking consumers, Yin et al. [16] show that these consumers are willingness to pay higher prices than their product valuations. Chen [17] further shows that strategic consumer choice among three options (i.e., no trade-ins, trade-ins to replacement consumers with high quality used goods, and trade-ins to all replacement consumers) depends critically on the features and prices of new goods. Zhu et al. [18] apply a two-period model to examine the competition between two firms, and derive the equilibrium decisions of the two firms. Unlike these studies that model consumer expectations in dynamic settings, Ray et al. [1] assume that the technology related to a durable product is relatively stable and examine firm decisions at the time of offering

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