10-3-2024

Price Discounts In Online Two-sided Markets: The Impact Of Customer Loyalty And Buyer Switching

Salman Aljazzaf
Kuwait University, salman.aljazzaf@ku.edu.kw

Ahmad Ashkanani
Kuwait University, a.ashkanani@ku.edu.kw

PRICE DISCOUNTS IN ONLINE TWO-SIDED MARKETS: THE IMPACT OF CUSTOMER LOYALTY AND BUYER SWITCHING

Research-in-Progress

Salman Aljazzaf, Kuwait University, Kuwait, salman.aljazzaf@ku.edu.kw

Ahmad M. Ashkanani, Kuwait University, Kuwait, a.ashkanani@ku.edu.kw

Abstract

Online multi-sided markets or platforms are digital marketplaces that facilitate transactions between distinct groups, such as buyers and sellers. While sellers who join a platform may increase their customer base, they also risk losing their existing customers to competitors within the same platform. This research aims to investigate how sellers can attract new customers while retaining their existing ones using promotions on the platform. The study focuses on an online food ordering platform, where customers can search for local carry-out restaurants and place orders for home delivery. Participating restaurants can advertise or send promotions to platform users via push notifications to their smartphones. This study analyzes the effectiveness of these in-app promotions and their impact on future orders across three customer categories: loyal customers of a focal restaurant, loyal customers of competing restaurants, and switching customers.

Keywords: Online platforms, multi-sided markets, competitive promotions, mobile coupons.

1 Introduction

Online multi-sided markets or platforms have revolutionized the way people conduct their daily transactions and transformed the competitive landscapes of many markets. In the conventional business model, customers search for products and make transactions directly with the seller's store or website. Now, with online platforms, especially those available as smartphone applications, people can browse a wide variety of products offered by competing sellers within a single marketplace. Sellers join these platforms to take advantage of large pools of potential buyers who use the platforms to browse diverse products and receive additional services such as convenient online ordering and payment processing. Besides having all restaurant options in one place, one of the main selling points of these platforms is their own home delivery service, which tends to be faster and includes live tracking—a feature that was not provided by restaurants at the time. Also, these platforms offer estimated delivery times based on multiple factors such as restaurant busyness, location, and road conditions, providing extra information that helps customers make more informed decisions. Therefore, online platforms provide sellers with significant growth opportunities.

However, when a seller enters a platform, many of its existing customers may decide to make their transactions through the platform instead of using direct channels such as the seller's website or offline store. This shift exposes these customers to competitors within the platform, increasing the risk that they may be attracted to alternative options offered by other sellers. Consequently, sellers face the potential loss of their existing customer base to competitors. This introduces new challenges for sellers, who must compete for buyers with different tastes and purchasing experiences within one marketplace. Sellers need to develop marketing strategies to attract new customers while retaining and maximizing profits from their existing customers. One key marketing decision for such sellers is how to advertise and offer price

promotions to this diverse set of buyers. This study addresses the following research question: How effective are platform-enabled price promotions (coupons) in stimulating future purchases from three different segments of customers: the focal seller's loyal customers, its competitors' loyal customers, and switching customers?

This paper contributes to the literature on competitive promotions, mobile coupons, and online platforms. Although many studies have examined competitive promotions in both offline and online contexts, this study is one of the few that uses the context of an online two-sided market to analyze how sellers use price promotions sent through the platform to strategically target a diverse pool of platform users with varying purchasing preferences and patterns. The online platform setting provides a unique perspective on how heterogeneous users react differently to coupons, offering valuable business implications for sellers and platform sponsors.

We utilize transaction data from an online food ordering platform to explore the impact of platform-enabled promotions on different customer segments. Customers use these platforms to browse local restaurants and place orders through their smartphones for pick-up or home delivery. The platform can send notifications, advertisements, or promotional offers to any user who has downloaded the app via push notifications. Our objective is to measure the varying reactions to these promotions among three distinct customer segments: loyal customers of the focal restaurant, loyal customers of competing restaurants, and switching customers (i.e., those who frequently alternate between different restaurants). For this study, we analyze promotions sent to platform users on multiple occasions in 2018, specifically offering free delivery for all orders placed on selected days from one particular restaurant. We employ longitudinal regression analysis to investigate how users from these different segments respond to the promotions over time.

In the following sections, we review the relevant research and demonstrate how this study contributes to the existing literature. Then, we explain the research methodology and present the results. Finally, we conclude with the study's theoretical and practical implications.

2 Literature Review

This study relates to three streams of literature: (1) competitive promotions, (2) mobile coupons, and (3) online two-sided markets.

2.1 Competitive Promotions

The literature on competitive promotions has a long and rich history and remains an active area of research (Fong et al. 2015). Early studies in this field analyzed the optimal ways firms can use promotions strategically against their competitors' customers and other switching customers, while also examining how these promotions might cannibalize profit from their loyal customers. Most of these studies use theoretical models that implement game-theoretic analysis in oligopolistic markets. The primary advantage of coupons is that they allow sellers to price discriminate by separating market segments with different degrees of consumer brand loyalty (Bester and Petrakis 1996). Ideally, sellers can offer their product to 'high value' customers at higher prices while providing discounts to those with a lower valuation of the products.

Moraga-González and Petrakis (1999) present an analytical model that shows, in equilibrium, sellers always send out coupons to distant locations to attract consumers from their rivals' markets, thus increasing their profits by price-discriminating between coupon holders and non-holders. Additionally, Narasimhan (1988) analyzes two key decisions regarding competitive promotions: the depth of discounts away from the regular price and the frequency of deals. He discusses how these decisions vary with the size of the loyal markets and the behavior of the switching population. Simester (1997) finds that firms prefer to offer deeper promotions on products for which switching customers have stronger demand than loyal customers and for which the price sensitivity of demand is high. Furthermore, Agrawal (1996) explores the role of brand

loyalty in the optimal advertising and trade promotion policies for two manufacturers. The study concludes that advertising can be viewed as a 'defensive' strategy used to build brand loyalty and retain loyal consumers, while price promotions are seen as an 'offensive' strategy used to attract loyal consumers away from rival brands. Finally, Shaffer and Zhang (1995) examine the fraction of coupons that should be sent to rival's customers (offensive targeting) to increase sales and the fraction that should be sent to one's own customers (defensive targeting) to preempt rivals' coupon promotions. Their results support the view that coupons should be directed at rivals' customers to increase brand sales. In addition, they show that when rival firms target their coupon promotions at brand switchers, the outcome is a 'prisoner's dilemma' in which the net effect of targeting is merely the cost of distribution plus the discount given to redeemers.

Among empirical studies that differentiate between competitive promotions—those aimed at consumers who did not purchase the focal brand—and loyalty promotions—those aimed at consumers who did purchase the focal brand—is the field study by Zhang and Wedel (2009). They find that optimal loyalty promotions are more profitable than competitive promotions. The optimal promotion frequency and depth are lower for loyalty promotions than for competitive promotions. In addition, they show that loyalty promotions are more profitable in online stores than in offline stores, whereas the opposite holds true for competitive promotions.

2.2 Mobile Coupons

Since this study investigates the effect of promotions sent over a mobile-based platform, we review existing studies on mobile coupons. Most of these studies either implement randomized field experiments or use econometric models on large-scale field observational data.

Many studies on mobile promotions focus on geographical targeting enabled by the location services of mobile devices. For example, Molitor et al. (2017) examine how the effectiveness of location-based advertising for mobile coupons is influenced by the provision of distance information and the distance-based ranking of mobile coupons. Luo et al. (2013) find that both temporal targeting and geographical targeting increase sales purchases. Additionally, Fang et al. (2015) suggest that location-based mobile promotions have a strong impact on both contemporaneous (same-day) and delayed purchases.

Fong et al. (2015) is particularly relevant to this study as it examines the competitive impact of mobile coupons. Specifically, the study explores competitive locational targeting, which is the practice of promoting to consumers near a competitor's location. They show that competitive locational targeting is more effective than targeting a neutral third location. Furthermore, they demonstrate that high discounts are optimal for the competitive location, while medium discounts are optimal for the focal location to avoid profit cannibalization.

This study differs from theirs in several key aspects. First, although they examine coupon interventions enabled by mobile push technology, their focus is on offline shopping in traditional shopping malls. In contrast, our research studies the effect of mobile promotions on online platform users, whose shopping behavior and decision-making processes are substantially different. Additionally, Fong et al. (2015) differentiate between the focal business's customers and those of competitors through their geographical location. Our study, on the other hand, uses actual past purchases to assess customer loyalty and switching behavior. Finally, in the context of Fong et al. (2015), rival consumers are subject to switching costs (i.e., traveling from a competitor's location to the focal firm's location), whereas in our study, switching costs are much lower since all sellers are virtually located in one place.

2.3 Online Platforms

This study is also relevant to the fast-growing literature on online platforms. Online multi-sided platforms are electronic marketplaces that facilitate transactions between two separate groups such as buyers and

sellers (Hagiu and Wright 2015). Some studies in this stream of literature have examined the competition between sellers in platform and the factors that determine buyers' decisions to choose sellers (Hagiu 2009, Tucker and Zhang 2010). However, to our knowledge, no study has examined how sellers utilize coupons or price promotions to attract or retain customers and how the effectiveness of these promotions varies for different buyer segments in terms of brand loyalty and switching behavior.

We believe that studying competitive promotions in the context of online two-sided markets provides new insights that cannot be explored in classic direct-transactional markets. First, in contrast to conventional buyer-seller transactions, platform-based marketplaces offer sellers the opportunity to encounter a large pool of buyers interested in similar products. These customers vary in their loyalty to different sellers and their tendency to switch sellers for frequently purchased products or services. By sending promotions to platform users, sellers can target a diverse pool of potential customers who may be interested in their offerings but differ in terms of their loyalty and familiarity with the focal seller's products. In other contexts, sellers might be able to specifically target their loyal customers or those of their rivals using location-based technologies or keywords submitted to search engines by potential customers. However, platform-based marketplaces typically do not allow sellers to send ads or promotions specifically to their rivals' customers. Instead, they can advertise or send coupons generically to all platform users. Consequently, sellers cannot use targeted coupons for price discrimination in such platforms, which increases the risk of profit cannibalization. This adds an extra challenge for sellers. Moreover, this study's context enables us to understand consumer behavior in mobile two-sided markets. For example, if consumers join the platform specifically to order from one seller, will they be open to trying other sellers if they receive the right promotion with the right message?

3 Study Context and Data

To explore the impact of online platform-enabled promotions on different customer segments, this study uses purchasing data from a smartphone-based food ordering platform in a Middle Eastern country. Online food ordering platforms allow customers to search for local carry-out restaurants and place orders online through their smartphones for pick-up or home delivery. These platforms started to receive more attention worldwide with increased smartphone penetration and the growth of the sharing economy. The global food delivery market has exceeded $150 billion, more than tripled in size since 2017. In the United States, the market has more than doubled during the COVID-19 pandemic (Ahuja et al. 2021).

Food ordering platforms provide a suitable context to study the effectiveness of mobile promotions on buyers with different purchasing patterns and histories. Unlike many studies on mobile promotions that use location to differentiate between a focal firm's customers and their rivals' customers, this study takes advantage of transaction history to categorize customers. All buyers and sellers on a platform are virtually located in one place, eliminating travel costs. In addition, customers typically place fast food orders frequently and can easily switch between different restaurants. This presents both a great opportunity and a challenge for restaurants to repeatedly advertise or send promotions. Finally, sellers on online food ordering platforms can target consumers who are closer to making purchase decisions because they reveal their interest by downloading and using the app. This makes it easier for sellers to target all customers interested in fast food offerings, including their own customers and their rivals' customers.

This study collaborates with a smartphone-based food ordering platform available on both Apple and Android application stores. The app was launched in April 2017. During our study period between February and June 2018, the platform received 50,896 orders (an average of 344 orders per day) from 18,822 unique customers. Although these orders were made for 304 different food providers, the top two restaurants received 67% of the orders. This significant market share is due to the popularity of these two restaurants and their exclusive online presence on the platform during this period. Our study focuses on how customers

loyal to each of the two leading restaurants, as well as switching customers, react to price discounts applied exclusively to one of the restaurants. One of the leading restaurants is a fast-food chain focused on chicken-based meals (referred to as "Chick Express") that joined the platform in August 2017, and the other is a burger-based fast-food chain (referred to as "Burger Y") that joined in February 2018. We analyze the impact of promotions where the platform offered free delivery for all orders made exclusively for Burger Y. These offers were sent through push notifications to all users and occurred four different times during our study period. By the end of the study period, 9,887 customers had made more than one order. Among these repeat customers, 1,828 (18%) ordered only from Chick Express, 1,554 (16%) ordered only from Burger Y, and 987 (10%) ordered from both leading restaurants.

4 Preliminary Analysis and Results

The objective of this study is to examine the impact of price discounts on three different customer segments: loyal customers of the focal restaurant benefiting from the promotion, loyal customers of the competing restaurant, and switching customers. To isolate the impact of promotions on customer decisions, our dataset consists of all promotion days along with the week surrounding each promotion day. This allows us to compare purchasing decisions on promotion days with those on non-promotion days.

As a result, our study examines whether each customer purchased from Burger Y over a total of 24 days surrounding the promotions. On each day, we recorded all purchases previously made by the entire panel of customers after filtering out any customers with fewer than two previous orders. Based on their purchasing history, we classified customers into three categories: (a) 'Burger Y Loyal,' customers who exclusively ordered from Burger Y, (b) 'Chick Express Loyal,' customers who exclusively ordered from Chick Express, and (c) 'Switching,' customers who previously ordered from both restaurants[1]. This classification is updated periodically and can change depending on customers' previous orders. We use the following econometric equation:

$$\text{OrderedBurgerYit} = \alpha + \beta_1 \cdot \text{Promotion}_t + \beta_2 \cdot \text{BurgerYLoyal}_{it} + \beta_3 \cdot \text{ChickELoyal}_{it} + \beta_4 \cdot \text{Switching}_{it} + \beta_5 \cdot \text{TotalOrders}_{it} + \beta_6 \cdot \text{Promotion}_t \cdot \text{BurgerYLoyal}_{it} + \beta_7 \cdot \text{Promotion}_t \cdot \text{ChickELoyal}_{it} + \beta_8 \cdot \text{Promotion}_t \cdot \text{Switching}_{it} + \beta_9 \cdot \text{WeekDay}_t + \varepsilon_{it}$$

The dependent variable, $\text{OrderedBurgerY}_{it}$, is a binary variable indicating whether customer i ordered from Burger Y on day t. The right side of the equation consists of a set of customer-level and time-level independent variables. Promotion_t indicates whether there was a free-delivery promotion on orders made for Burger Y on day t. The variables BurgerYLoyal_{it}, ChickELoyal_{it}, and Switching_{it} are three dummy variables representing the segment to which customer i belongs on day t. The base category consists of customers who are neither loyal to the two leading restaurants nor switch between them. Since the main purpose of this study is to measure how the presence of promotion for the focal restaurant impact the purchasing decisions of different customer categories, we are primarily interested in the interaction between Promotion_t and the three customer segments. The coefficients of the promotion indicator (β_1) and the interaction terms (β_6, β_7, and β_8) reveal how each customer segment responds to the promotion, with the combined effects (i.e., $\beta_1 + \beta_6$, $\beta_1 + \beta_7$, and $\beta_1 + \beta_8$) indicating the specific impact on each segment.

In addition, our model controls for the number of orders made by each customer before day t (TotalOrders_{it}). Finally, our model includes dummy variables for days of the week, with Sunday is the base dummy.

Due to the longitudinal nature of our sample, we used a random-effects model to control for customer-level heterogeneity. Preliminary results in Table 1 show that when there is no promotion, different customer

[1] As an alternative way to define loyal customers, we also included all customers who made at least two-thirds (66%) of their orders from a specific restaurant. Models using this alternative measurement produced very similar results to those shown in this paper.

segments have varying tendencies to purchase from the focal restaurant, Burger Y. As expected, Burger Y loyal customers and switching customers are more likely to buy from Burger Y than the base category. In contrast, customers loyal to Chick Express are less likely to buy from Burger Y. Furthermore, the promotion has a statistically significant positive effect on the ordering behavior of Burger Y loyal customers, with a combined coefficient estimate of 0.0057 ($p < 0.0001$). This indicates that the promotion successfully increased orders among this segment. In contrast, the promotion did not have a significant impact on the ordering behavior of Chick Express loyal customers (estimate = 0.0001, $p = 0.93$) or switching customers (estimate = 0.0008, $p = 0.65$), suggesting that these segments were not influenced by the promotional efforts.

Independent Variables	**Coefficients (Std. Errors)**
Promotion	0.00005 (0.0008)
ChickELoyal	-0.0050*** (0.0008)
BurgerYLoyal	0.0216*** (0.0009)
Switching	0.0050*** (0.0011)
TotalOrders	0.0016*** (0.0001)
Promotion · ChickELoyal	0.00005 (0.0015)
Promotion · BurgerYLoyal	0.0057*** (0.0016)
Promotion · Switching	0.00075 (0.0019)
Observations F Statistic	205,785 1,279.809***

*Table 1. Results of the random-effect model (Note: * p < 0.1; ** p < 0.05; *** p < 0.01)*

5 Discussion

The objective of this study is to explore the effectiveness of price promotions in the context of platform-based marketplaces that mediate transactions between buyers and sellers. We examine how these promotions encourage future purchases from different customer segments, namely, those loyal to the promoting seller, those loyal to rival sellers, and switching buyers. We hypothesized that different customer

segments would react differently to the presence of promotions. Previous studies on competitive advertising in traditional settings indicate that rivals' customers react more positively to coupons as long as the benefit from the promotion exceeds switching costs, which could be due to travel costs or other costs associated with changing products. Since in our context there is no virtual distance between sellers and switching is costless, we expected that rivals' customer would find it easier to switch and take advantage of the promotion. Therefore, our initial findings indicating that customers not loyal to the focal restaurant were not influenced by the promotion might be surprising and warrant additional examination with more detailed analysis. Additionally, further analysis is needed to clarify whether the extra purchases made by loyal customers on the promotion day were cannibalizing profits or bringing additional revenue.

In addition to the theoretical contributions of this research, this study provides practical implications for sellers in platform marketplaces and for platform owners. First, as sellers in such marketplaces are sometimes unable to target their promotions to specific buyer segments, they need to be careful in setting their promotion strategy, as these promotions might cannibalize the profits from their loyal customers. Second, in many platforms, most transactions come from a small set of large sellers, while most sellers receive a small portion of transactions—a phenomenon known as the Pareto principle or the 80/20 rule. Over-reliance on big sellers can put platform owners at great risk if those sellers decide to leave the platform, leading to a subsequent loss of many buyers. Platform owners can use potential insights from this study to use coupons effectively to direct buyers to smaller sellers, thereby reducing the reliance on big sellers.

References

Agrawal, D. (1996) "Effect of brand loyalty on advertising and trade promotions: A game theoretic analysis with empirical evidence", *Marketing Science,* 15(1), 86-108.

Ahuja, K., Chandra, V., Lord, V. and Peens, C. (2021) "Ordering in: The rapid evolution of food delivery", *McKinsey and Company*, September 21,

Bester, H. and Petrakis, E. (1996) "Coupons and oligopolistic price discrimination", *International Journal of Industrial Organization,* 14(2), 227-242.

Fang, Z., Gu, B., Luo, X. and Xu, Y. (2015) "Contemporaneous and delayed sales impact of location-based mobile promotions", *Information Systems Research,* 26(3), 552-564.

Fong, N. M., Fang, Z. and Luo, X. (2015) "Geo-conquesting: Competitive locational targeting of mobile promotions", *Journal of Marketing Research,* 52(5), 726-735.

Hagiu, A. (2009) "Two-sided platforms: Product variety and pricing structures", *Journal of Economics & Management Strategy,* 18(4), 1011-1043.

Hagiu, A. and Wright, J. (2015) "Multi-sided platforms", *International Journal of Industrial Organization,* 43, 162-174.

Luo, X., Andrews, M., Fang, Z. and Phang, C. W. (2013) "Mobile targeting", *Management Science,* 60(7), 1738-1756.

Molitor, D., Reichhart, P., Spann, M. and Ghose, A. (2017) "Measuring the effectiveness of location-based advertising: A randomized field experiment", *SSRN Electronic Journal*.

Moraga-González, J. L. and Petrakis, E. (1999) "Coupon advertising under imperfect price information", *Journal of Economics & Management Strategy,* 8(4), 523-544.

Narasimhan, C. (1988) "Competitive promotional strategies", *Journal of Business*, 427-449.

Shaffer, G. and Zhang, Z. J. (1995) "Competitive coupon targeting", *Marketing Science*, 14(4), 395-416.

Simester, D. (1997) "Note. Optimal promotion strategies: A demand-sided characterization", *Management Science*, 43(2), 251-256.

Tucker, C. and Zhang, J. (2010) "Growing two-sided networks by advertising the user base: A field experiment", *Marketing Science,* 29(5), 805-814.

Zhang, J. and Wedel, M. (2009) "The effectiveness of customized promotions in online and offline stores", *Journal of Marketing Research,* 46(2), 190-206.