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The Effect of Choice Deferral on Consumers' Free-Riding Behavior

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Abstract: ***With the advent of the Internet era, information asymmetry forms the phenomenon of free riding, and consumers' choice deferral in the case of information asymmetry will result in substantial free riding behavior.Using mathematical modeling method, this paper analyzes the impact of choice deferral on consumers' free-riding behavior, and further analyzes the impact on merchants' prices and profits.The results show that consumers' choice deferral will lead to the emergence of free-riding behavior, which is beneficial to the revenue of online platforms and will reduce the total revenue of merchants.The total profits of merchants and platforms will rise or fall depending on the hassle cost of buying online and the extent to which the information provided by the platform changes consumers' perception of the product.***

Keywords: choice deferral, free-riding behavior, information asymmetry

1. Introduction

With the improvement of science and technology innovation and living standard, the era of experience economy has come on a global scale.People's consumption concept is changing along with the change of economic form from product economy to service economy and then to experience economy, and the emphasis on user experience is the most prominent feature of experience economy [1].

In the early days of the popularization of the Internet, consumers were more accustomed to shopping in physical stores. As the Internet brought more information, information asymmetry formed, which brought motivation to consumers' free-riding behavior in the early stage. From this behavior, users who are good at using the Internet brought extra utility to themselves.

With the advent of the Internet era of big data, it has become a habit to search online whenever and wherever you encounter problems.

Previous studies on free-riding behavior are all about the channel selection of purchasing an item through different online and offline channels. However, there are few studies on free-riding behavior in the consumption of service products that need to be consumed in stores (such as eating, KTV singing, etc.).

When consumers search and analyze relevant information on the third-party platform online, if they make a purchase directly, they may worry about the trouble of refund if they find dissatisfaction in the store. At this time, they will choose to delay the choice and make online purchase after on-the-spot investigation. At this time, the physical store acts as an exhibition hall.If consumers directly buy goods in offline stores after on-the-spot inspection, the online platform will act as an exhibition hall.

This case, the consumer consumption object of online payment is the same business, the free-rider behavior would be the number of consumers to the merchants themselves eating or synergies and sales margins, and at the same time also will affect the platform, so, in this case, the delay is how to affect the free-rider behavior of consumers, will affect the pricing of the online merchants, consumer quantity and profit?And how does it affect platform revenue?

Along with the development of the Internet era, mobile network and mobile devices of convenience for the consumer in the electronic commerce provides the possibility of a free-rider behavior [2], the free-rider phenomena can be divided into two cases: the first is called showrooming, namely the consumer in the store to understand the product information, and to use or experience, which evaluate the product and determine whether to meet their own needs, but in the end chose at a lower price from online channels to purchase, then store is equivalent to have played an important role in an exhibition hall; The second, called "webrooming," is the opposite of the first, in which consumers first gather and analyze information about a product online to evaluate it, but ultimately pay for it in offline stores instead.The main reason for these free-riding behaviors is the existence of asymmetry of product retail information [3].

Theoretical research on consumer free-riding behavior was first started by Telser [4] [5]. Later, a large number of scholars conducted relevant studies, which can be divided into several types.Firstly, the influence of free-riding behavior is studied [2, 6-8].Secondly, the factors affecting hitchhiking behavior are studied.Product price [9];Product characteristics [10];Consumers' perceived risks to products [11];The additional experience services provided by merchants will have a certain impact on consumers' free-riding behavior.Finally, the effectiveness of measures to deal with free-riding behavior is studied.Many scholars have studied whether various measures to deal with free-riding behavior (opening online stores, return policies [2], online and offline same-price, differentiated product allocation strategies [4], etc.) can produce effects.

Most of the above researches on free-riding behavior focus on physical products, which are physical goods that need to be delivered by logistics [2], such as electronic products [6] and clothing, etc. Few studies consider service products, which are service products that consumers must go to stores to enjoy.This study mainly focuses on service products, namely products that consumers must consume in stores.

Choice Deferral refers to the decision not to make a Choice while making a Choice, including deferring a Choice (e.g., choosing a deferred option) or refusing to select an option among alternatives [12].There are mainly two hypotheses for the factors affecting delayed choice. The first is the preference uncertainty hypothesis. Starting from the cognitive factors affecting delayed choice, it is believed that in the current decision-making situation, if consumers are difficult to determine their preferences, in this case, consumers are more inclined to delay choice [13-15].The second is the hypothesis of negative emotion avoidance. Starting from the emotional factors that affect delayed choice, it is believed that in the current decision-making situation, if the choice will bring negative emotions to consumers, in order to avoid or reduce negative emotions, consumers will delay the choice [12].

To sum up, this article in view of the need to store enjoy products and services, the business online, offline sales products at the same time, delay of consumers choose to free riding behavior, the influence of the analysis of this case online merchants different channels of the optimal pricing, quantity and profits gained by the consumer, and platform margins change.

2. Model

Assume that there is a third party platform and a merchant on the listing market, denoted by P and T respectively. If the product fully meets the needs and expectations of consumers, the utility brought to consumers is v .When consumers conduct a simple online information search and have a certain understanding of the selected merchants, their uncertainty about the product will be resolved. Therefore, the probability that the product meets the needs of consumers is λ , $0 \le \lambda \le 1$. When consumers search deeply online for product information and conduct analysis, the probability that the products they choose to buy meet their needs will increase, and the degree of increase is set as θ , $\theta > 1$. It just represents the extent to which the probability of a product meeting consumer demand increases, but the probability will never exceed 1. So $\theta\lambda < 1$. The price of the product online is p_O, and the price in the physical store is p_T , $p_T \ge p_O$. Consumers directly buy online, because may produce the product is not satisfied, thus refund procedures trouble;The products purchased online may have applicable conditions and fail to meet the demand in actual consumption. Therefore, consumers who directly purchase online without on-site investigation may incur a troublesome cost in the future h. When consumers purchase products from merchants through the platform, the platform will charge a commission ratio of a , $0 < a < 1$. Since all consumers in this paper need to go to the store eventually, transportation costs are not taken into account. Due to ease of use, the age of the Internet network consumers in the online search the basic information of the products or businesses (such as location, provide product variety, product price and other information) is almost do not need to pay any cost, assumes that all consumers to purchase before basic information on the online search, however, when consumers want to through the online platform to provide the information such as the product introduction and comment on, carries on the analysis judgment, the sifting conforms to the demand of their products, and looking for more satisfactory terms are need to pay a certain amount of time, search costs, such as mental analysis, set to S. Because each person's ability to search deeply and analyze product information is different, assume that S is evenly distributed in [0,1].

2.1 Benchmark Model

Consumers conduct in-depth information collection and analysis online, directly purchase online, and then go to the store to enjoy the service. The utility obtained is $U_O = \theta\lambda v - p_O - h - s$; After a simple online search of basic information, consumers visit the store for consumption, and the utility obtained is $U_T = \lambda(v - p_T)$.

When $U_O > U_T$, $s < (\theta - 1)\lambda v + \lambda p_T - p_O - h$

When $(\theta - 1)\lambda v + \lambda p_T - p_O - h < 0$,

$h > (\theta - 1)\lambda v + \lambda p_T - p_O$, $U_T > U_O$ always true, consumers will always simply search for information, go directly to the physical store to inspect and pay for the purchase offline, because the hassle and cost of online purchase is too high.

When $(\theta - 1)\lambda v + \lambda p_T - p_O - h > 0$,

$h < (\theta - 1)\lambda v + \lambda p_T - p_O$,

$[0, (\theta - 1)\lambda v + \lambda p_T - p_O - h]$ Consumers will search and analyze online and purchase directly, and the online demand is $D_O = (\theta - 1)\lambda v + \lambda p_T - p_O - h$; Profit is $\pi_O = [(\theta - 1)\lambda v + \lambda p_T - p_O - h] p_O$;

$((\theta - 1)\lambda v + \lambda p_T - p_O - h, 1]$ Consumers will simply search for information, then go directly to a physical store to inspect and pay for it offline. Offline demand is $D_T = \lambda[1 - (\theta - 1)\lambda v - \lambda p_T + p_O + h]$; The profit of offline payment is $\pi_T = \lambda[1 - (\theta - 1)\lambda v - \lambda p_T + p_O + h] p_T$.

The equilibrium price is $p_O^* = [1 + (\theta - 1)\lambda v - h]/3$,

$p_T^* = [2 - (\theta - 1)\lambda v + h]/(3\lambda)$; Equilibrium profit is

$\pi_O^* = \left[1+(\theta-1)\lambda v-h\right]^2/9$,

$\pi_T^* = \left[2-(\theta-1)\lambda v+h\right]^2/9$; The profit gained by the platform is $\pi_P = a\left[\left[1+(\theta-1)\lambda v-h\right]^2/9\right]$; The sum of online and offline profits of merchants is $\pi_B = (1-a)\left[1+(\theta-1)\lambda v-h\right]^2/9+\left[2-(\theta-1)\lambda v+h\right]^2/9$; The total profit of merchants and platforms is $\pi = \left[1+(\theta-1)\lambda v-h\right]^2/9+\left[2-(\theta-1)\lambda v+h\right]^2/9$.

When h increases, merchants' profits from online channels decrease, while those from offline channels increase, while those from platform decrease. When θ increases, the profits gained by merchants through online channels increase, while the profits from offline channels decrease, and the profits gained by platforms increase.

2.2 Add choice deferral to the model

When consumers want to get the preferential price online and do not want to bear the subsequent troublesome costs caused by direct purchase, they may make the decision to postpone the purchase and postpone the online payment operation until they have visited the merchants on the spot. In this case, the utility consumers get is $U_O^D = \theta\lambda(v-p_O)-s$.

$$U_O > U_T \Leftrightarrow s < (\theta-1)\lambda v+\lambda p_T-p_O-h$$
$$U_O^D > U_O \Leftrightarrow \mathrm{h} > (\theta\lambda-1)p_O$$
$$U_O^D > U_T \Leftrightarrow \mathrm{s} < (\theta-1)\lambda v-\theta\lambda p_O+\lambda p_T$$

$\theta\lambda<1$, so $\mathrm{h} > (\theta\lambda-1)p_O$. So instead of just searching, analyzing and buying online, consumers will always defer the choice of buying until they actually get to the store.

At this time, consumers have only two options: Conduct in-depth online search and analysis, and purchase at the price of p_O online after arriving at the store; r directly visit the store and buy the goods in the physical store at the price of p_T .

$\left[0,(\theta-1)\lambda v-\theta\lambda p_O+\lambda p_T\right]$ Consumers choose online search and analysis, and purchase online at the price of p_O after arriving at the store.

$\left[(\theta-1)\lambda v-\theta\lambda p_O+\lambda p_T,1\right]$ Consumers directly go to the store for inspection and buy in the physical store at the price of p_T .

The demand for purchases through online channels is $D_O^D = \theta\lambda\left[(\theta-1)\lambda v-\theta\lambda p_O+\lambda p_T\right]$; The demand for purchases through offline channels is $D_T^D = \lambda\left[1-(\theta-1)\lambda v+\theta\lambda p_O-\lambda p_T\right]$; The profit of purchase and payment through online channels is $\pi_O^D = \theta\lambda\left[(\theta-1)\lambda v-\theta\lambda p_O+\lambda p_T\right]p_O$; The profit of purchase and payment through offline channels is $\pi_T^D = \lambda\left[1-(\theta-1)\lambda v+\theta\lambda p_O-\lambda p_T\right]p_T$.

The equilibrium price is $p_O^* = \left[1+(\theta-1)\lambda v\right]/3\theta\lambda$, $p_T^* = \left[2-(\theta-1)\lambda v\right]/3\lambda$; Equilibrium profit is $\pi_O^* = \left[1+(\theta-1)\lambda v\right]^2/9$, $\pi_T^* = \left[2-(\theta-1)\lambda v\right]^2/9$; The profit of the platform is $\pi_P^D = a\left[\left[1+(\theta-1)\lambda v\right]^2/9\right]$; The total profit of merchants online and offline is $\pi_B^D = (1-a)\left[1+(\theta-1)\lambda v\right]^2/9+\left[2-(\theta-1)\lambda v\right]^2/9$; The total profit of merchants and platforms is $\pi^D = \left[1+(\theta-1)\lambda v\right]^2/9+\left[2-(\theta-1)\lambda v\right]^2/9$.

3. Analysis

3.1 The effect of choice deferral on free-riding behavior

Compared with the benchmark model, fewer consumers buy directly through offline channels; Original online search directly online consumers buy disappear after analysis, through online sales channels are all customers to the store again after buy products online, that is, through online sales channels of consumer delay choice, all this store serves as a exhibition hall, the role of consumers through online channels to purchase all performed a free-rider behavior. The number of free-riders is $D_O^{D*} = \theta\lambda\left[(\theta-1)\lambda v+1\right]/3$.

3.2 The impact of choice deferral on merchants' online and offline equilibrium price, the number of consumers from different channels and profits

When $0<h<(\theta-1)\lambda v+1$, Consumers have two options: direct online search for payment and direct physical store inspection of offline payment. In this case, the equilibrium price of online and offline channels is $p_O^* = \left[1+(\theta-1)\lambda v-h\right]/3$, $p_T^* = \left[2-(\theta-1)\lambda v+h\right]/(3\lambda)$; Equilibrium demand is $D_O^* = \left[(\theta-1)\lambda v-h+1\right]/3$, $D_T^* = \lambda\left[h-(\theta-1)\lambda v+2\right]/3$; Equilibrium profit is $\pi_O^* = \left[1+(\theta-1)\lambda v-h\right]^2/9$, $\pi_T^* = \left[2-(\theta-1)\lambda v+h\right]^2/9$; The total profit obtained is $\pi_B = (1-a)\left[1+(\theta-1)\lambda v-h\right]^2/9+\left[2-(\theta-1)\lambda v+h\right]^2/9$

In the case of delayed selection, consumers always have only two options: After online search and analysis to the store,

purchase online with p_0. Go directly to the store for inspection and buy in the physical store at the price of p_T.

In this case, the equilibrium price of online and offline channels is $p_O^* = [1+(\theta-1)\lambda v]/3\theta\lambda$, $p_T^* = [2-(\theta-1)\lambda v]/3\lambda$; Equilibrium demand is $D_O^{D*} = \theta\lambda[(\theta-1)\lambda v+1]/3$, $D_T^* = \lambda[2-(\theta-1)\lambda v]/3$; Equilibrium profit is $\pi_O^* = [1+(\theta-1)\lambda v]^2/9$, $\pi_T^* = [2-(\theta-1)\lambda v]^2/9$; The total profit obtained is $\pi_B^D = (1-a)[1+(\theta-1)\lambda v]^2/9+[2-(\theta-1)\lambda v]^2/9$.

Compared with the two, when there is choice deferral, the online equilibrium price of merchants increases, while the offline equilibrium price of brick-and-mortar stores decreases. Fewer consumers through offline channels; Profit gained through online channels increased, profit gained through offline channels decreased, and total profit gained online and offline decreased.

3.3 The impact of choice deferral on platform profits

When there is no choice deferral, consumers have two options: Search online and pay directly, Direct physical store inspection and offline payment. At this time, the profit obtained by the platform is $\pi_P = a\left[[1+(\theta-1)\lambda v-h]^2/9\right]$.

When there is a choice deferral, $h>(\theta\lambda-1)[(\theta-1)\lambda v+1]/3\theta\lambda$ always true, the consumer has two options: Online search and analysis, purchase online with p_0 after arriving at the store; Go directly to the store for inspection and buy in the physical store at the price of p_T. At this time, the profit obtained by the platform is $\pi_P = a\left[[1+(\theta-1)\lambda v]^2/9\right]$.

In the presence of choice deferral, the platform will gain more profit than without delayed selection. This is different from our conventional idea that choice deferral may damage the interests of the platform. In fact, in this case, the platform's profit is not affected by h.

Of course, this is when consumers can always enjoy the products and services at the price of P online after offline inspection, and merchants do not have the background setting of paying offline prices.

3.4 The impact of choice deferral on merchant and platform total profits

When $0<h<(\theta-1)\lambda v+1$, consumers have two options: search online and pay directly; isit physical stores directly and pay offline. In this case, the total profit of the platform and merchants is $\pi = [1+(\theta-1)\lambda v-h]^2/9+[2-(\theta-1)\lambda v+h]^2/9$.

When there is a delayed choice, consumers have two options: search online for analysis, go to the store and buy online for p_0 price, Go directly to the store for inspection and buy in the physical store at the price of p_T. In this case, the total profit of the platform and merchants is $\pi^D = [1+(\theta-1)\lambda v]^2/9+[2-(\theta-1)\lambda v]^2/9$.

There's a difference of $2h(2\theta\lambda v-h-2\lambda v-1)/9$.When $h<2\lambda v(\theta-1)-1$, in the presence of choice deferral, total merchant and platform profits increase; When $h>2\lambda v(\theta-1)-1$, in the presence of choice deferral, merchant and platform total profits are reduced.

4. Conclusion

When online discounts are always available, consumers will choose to delay their purchases after online search, thus all of them are free riders.

In the presence of choice deferral, the platform will gain more profit than without choice deferral, which is different from our conventional thinking that choice deferral may damage the interests of the platform. In fact, in this case, choice deferral will lead to free-riding behavior, which will increase the platform's revenue instead.Platform measures to reduce the cost of hassle for consumers increase profits only when consumers cannot delay their choice, and they are useless when consumers delay their choice.

In the case of choice deferral, the online equilibrium price increases while the offline equilibrium price decreases.Fewer consumers through offline channels;Profit gained through online channels increased, profit gained through offline channels decreased, and total profit gained online and offline decreased.Merchants can formulate some measures to reduce consumers' delayed choice behavior, such as providing more detailed product information and limiting the preferential prices online.

In the presence of choice deferral, the businessman and platform depends on the problems of online purchase cost increase or decrease of the total profits and platform to provide information to consumers about the product changes in cognitive degree, when trouble cost is low, consumers' understanding of the products more, merchants and platform may increase the total profit, when trouble cost is higher, the lower level of consumer understanding of product difficult to determine the accurate products and the demand of compatibility, merchants and platform could reduce total profits.

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Author Profile

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