

Analysis of Buyer and Seller's Decision under New Online Auction

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Abstract. Online transactions have become increasingly crucial in worldwide social and commercial activities as the Internet has risen in popularity. The online auction has gradually developed into a major trade mode as an effective technique of online trading. This paper mainly studies the factors that influence the decision of buyers and sellers in the new online auction of the group-buying auction, reverse auction, and buy-it-now auction. It is found that psychological factors often affect consumers' entry time in online group-buying auctions, and sellers' use of static public reserve prices or secret reserve prices will lead to different results. In an online reverse auction, buyers can improve their own interests by colluding, while sellers' expectations of buyers and information processing ability have certain effects on the present and future decision-making. In an online buy-it-now auction, consumers' risk sensitivity will affect buyers' strategy, while sellers' price-setting strategy will affect their own earnings. This paper aims to comprehensively analyze and summarize the strategies of buyers and sellers in each online auction, hoping to provide useful information for participants in the online auction.

Keywords: Online auction; group-buying auction; reverse auction; buy-it-now auction.

1. Introduction

1.1 Research background of the online auction

With the rapid expansion of the Internet and electronic commerce, online transactions have been recognized as a crucial mode of market transaction. The reason why online auction is so important is that it has the unique advantages of the traditional auction: high transparency of information, saving a lot of transaction costs and time costs, improving market matching, etc. For example, on the basis of detailed research of 142 distinct Internet auction sites, David, etc., traced the evolution of online auctions. Because of the large amount of price and quantity information that online auctions inherently disclose, they discovered that they are easier to complete than almost any other type of business transaction [1].

On the contrary, there is a common problem in various online auctions: information asymmetry. In online auctions, the seller can strategically raise the price and increase the expected price of the buyer so as to gain profits while the buyer suffers from the "winner's curse." Bajari etc., used eBay to conduct a common value auction of coins of collector value, demonstrating that online auctions with common value features indeed have the winner's curse problem [2].

1.2 The significance of research

In addition to the traditional British and Dutch online auctions, in recent years, based on the characteristics of the Internet, in order to meet the various needs of consumers, new online auctions: group buying auction, reverse auction, buy-it-now auction has gradually entered people's vision.

There are presently few researches on multiple forms of online auctions, and most of them are focused on a single sort of online auction. Furthermore, the main reason why buyers and sellers are not willing to trade on the Internet is their lack of understanding of online auctions, which reduces their willingness to trade on the platform.

As a result, the purpose of this work is to outline the characteristics of group-buying auctions, reverse auction, buy-it-now auction in the new online auction so that readers can gain a better grasp of the network auction so as to promote the participation rate of the online auction. Moreover, the

purpose of this study is to summarize and analyze buyer and seller behavior and strategy in each type of online auction in order to provide helpful information to online auction participants.

1.3 paper organization

The following sections will be used to narrate his paper: 1. Introduction to the online auction. 2. An overview of the online group-buying auction and an examination of the buyer and seller strategies. 3. Introduces the online reverse auction and examines buyer and seller decisions. 4. Introduction of the online buy-it-now auction and analysis of auctioneers' and consumers' decision-making. 5. Summary and discuss the flaws in this research and future research directions.

2. Online Group-buying Auction

2.1 The basic structure of the group-buying auction

The group-buying auction is a typical dynamic pricing model, that is, to gather all the customers who want to buy a particular product or service within a specified period and obtain a better price by integrating their purchasing power. To be more specific, when more people join in group buying, the price will progressively decrease according to a pre-determined price change trajectory, but there will normally be a reserve price to protect sellers' profits. In addition, auctions usually end when the number of bidders reaches, or the pre-specified auction cycle mark is reached.

The group-buying auction is often referred to as a win-win-win strategy. Consumers can use online middlemen to get goods from companies at low wholesale prices, while for suppliers, the middlemen earn the bid-ask difference by speeding up inventory turnover [3]. However, due to cognitive limitations, most consumers are temporarily unable to accept online group-buying auctions. As a result, retailers are unable to gather consumers in the auction cycle to achieve the critical mass to lower the price, which greatly reduces the convenience brought by online group-buying auctions.

2.2 Research on buyers

Generally speaking, rational consumers will choose to enter the auction market as soon as their expected auction price is reached. However, through research, it is found that consumers' psychological factors often affect buyers' behavior and decision-making, and factors are divided into external factors: group mentality and internal factors: participation externality effect, and risk sensitivity.

(1) Exterior factor—The concept of network externality indicates that as the number of consumers increases, each user will get higher utility, so the increased product demand will also increase the buyer's willingness to pay. Therefore, we know that an increase in the number of current or expected buyers in an on-line group-buying auction will attract more potential consumers and increase the likelihood that they will participate in the auction. The group mentality influences the strategy in potential auctioneers through such conformity.

(2) Interior factors—there is a common phenomenon in group-buying online auctions: even though the initial auction price may be higher than consumers' expectations, buyers still enter the auction market. This is because consumers have general psychology: having the anticipation of a price drop, which means more orders in the future will lead to lower prices in the auction cycle. Kauffman and Wang found a price drop effect based on MobShop.com. When the order quantity is large enough to approach the next price drop level, the transaction price level will decrease in the near future [4]. If the number of consumers who enter the next rung of the price ladder is not met, the buyer will pay more than expected and lose money. Therefore, although the expectation of price reduction will lead consumers to enter the auction market in advance, this potential risk will also impede consumers' decision to enter.

(3) Interior factors—the risk sensitivity of consumers affects the decision to enter the market. For the risk-averse consumer, they tend to be more conservative, waiting until the number of people reaches the next lower price ladder to enter the auction and less likely to enter the market early, known

as the before-price-drop effect. On the contrary, those who are risk-neutral and risk-seeking will enter the auction market and make a purchase decision before the next price drop, which is also known as the after-price-drop effect (see Fig. 1).

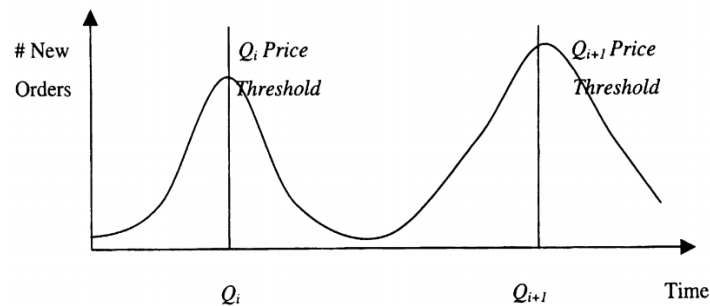


Fig 1. The after-price drop effect and the before-price-drop effect.

2.3 Research on sellers

On the surface, everything in a group-buying auction appears to be set by the bidder's offer, and the seller can only hope to make a profit by obtaining a profitable auction price. However, in order to avoid a series of bad results such as low-profit sales and excessive competition, the seller can choose to reserve price to protect their interests. In fact, in the online group-buying auction, the seller's choice of the static public reserve price or secret reserve price can lead to different results.

(1) Static public reserve price—The static public reserve price is that the seller can directly announce the pre-set low price at the beginning of the auction, but the reserve price will not be adjusted during the whole auction. Generally speaking, the reserve price can reflect the real price of an auction item to a certain extent and provide useful information for buyers. But in order to increase revenue, sellers may strategically set their static public reserve price higher than the lowest they are willing to accept, giving consumers a signal to raise their expected price, thus subjecting buyers to the "winner's curse."

(2) Secret reserve price—A high public starting price tends to alienate potential bidders, which can result in the product not being sold in a suitable situation. Instead, the strategy of using lower starting bids and secret reserve prices encourages more bidders to engage in online group-buying auctions. A large number of buyers will push prices up to the reserve price in order to obtain items while allowing buyers to make more profit. However, Rama and David found by studying the eBay example that using secret reserve prices actually harms sellers' income compared to using public no-reserve minimum prices [5]. So in different situations, buyers are supposed to assess the costs and benefits of their secret reserve price strategy.

3. Online Reverse Auction

3.1 the basic structure of the online reverse auction

In an online reverse auction, the seller with the lowest bid wins the order after the buyer bids the highest price, and the seller competes with each other to lower the price. In other words, buyers in reverse auctions are in a great position to get the best deal.

When compared to traditional auctions, using an online reverse auction not only reduces the purchase price but also saves transaction and time costs, thus enhancing the efficiency of procurement. For example, in January 2006, Fuyao glass first tried the online reverse auction method to purchase materials and found a cost savings of 13.91 percent [6].

3.2 Research on buyers

Although the range of suppliers is increased for consumers in the online reverse auction, consumers are sometimes unwilling to take the potential risks brought by new suppliers, so they may

make strategies to break auction rules. In detail, buyers conspire with previous suppliers to seal deals before the auction for stability so that even the lowest bidder in an online reverse auction can't get a deal. At this time, the reason for buyers to participate in the online reverse auction is to use the bid to determine the market tendency and price information, and then the bidding price information is used to reduce the transaction price with the pre-determined suppliers and save their own costs.

3.3 Research on sellers

In the online reverse auction, sellers often need to evaluate competitive prices reasonably to avoid losses. However, studies show that psychological factors and information processing ability often affect sellers' decisions.

(1) Sellers' psychological factors——in the online reverse auction, sellers often compete fiercely for consumers. Larry et al. discovered that one of the main reasons sellers participate in reverse auctions is to expand their business. At this point, under the dual effect of goal setting and psychological reasons, the seller may win the auction with an unreasonable low price or even lower than the cost and win customers [7]. In general, under the influence of such competitive psychology, sellers tend to change their strategy of earning profits to one of sacrificing profits in order to compete for customers.

(2) Sellers' psychological factors——Sellers are not inclined to make a long-term investment of human resources and capital in the online reverse auction [8]. This is because sellers in reverse auctions are actually sacrificing high profits for the benefit of expanding new business and accelerating inventory turnover, so merchants have no incentive to make long-term investments in low-margin projects. Moreover, suppliers may believe that buyers use online reverse auctions to force them to make price concessions to reduce their profit margins, which will worsen the relationship between the two parties and reduce the seller's willingness to continue the transaction, so they will not invest in the project for the long term.

(3) Seller's information processing ability——in the online reverse auction, the ability to process information will also affect the seller's strategy. Jap found that if information cannot be effectively managed, trade opportunities will be missed, and resources will be wasted, rendering the reverse auction mechanism useless [9]. On top of that, the information challenge was evaluated by Chaitanya, et al., from information deficiency, Information violation, and Information anarchy, who found that the information challenge could lead to program failure [10]. Therefore, whether the seller can carry out efficient information processing in the auction will directly affect whether an effective strategy is made in the online reverse auction. Proper information analysis will enable sellers to understand the cost structure of the existing market and the products or services to be offered so as to have the lowest reasonable price and avoid losing their own interests due to excessive competition. However, the chaotic and invalid information analysis will not only lead to the reduction of the seller's profits but also destroy the trading relationship between the two parties.

4. Online Buy-It-Now Auction

4.1 the basic structure of buying-in-now auction

The buying-in-now auction is an auction mechanism widely used in online auctions. According to eBay's 2007 annual report, the buying-in-now auction was offered in about half of eBay Auctions, and its sales accounted for 40% of total revenue. Given the widespread usage of buy-it-now auctions, a deeper theoretical and administrative grasp of how it works is necessary.

In the buying-in-now auction, a price is a predefined price set by the vendor; the customer cannot bargain and must pay according to the pre-determined price.

According to the second-hand car auction data of eBay and the dynamic Bayesian game model, Han empirically analyzed the auction situation of multiple homogeneous goods and revealed that, as compared to a pure auction, the buy-it-now auction could boost not only the likelihood of products being sold but also the expected revenue of sellers [11] (see Table I).

In addition, Mathews proposed that when both the buyer and the seller or either of them has a waiting time cost, the seller can reduce the time cost and improve the expected income by setting a buy-it-now price [12].

Table I: Descriptive Statistics Of Transaction Results.

Auction type	All	Pure auction	Buy-it-now auction
Observation of the number	10086	3780	6306
Probability of trading	10.87%	10.58%	11.04%
Transaction price	10746	8801	11864

4.2 Research on buyers

In the buy-it-now auction, although the price is set in advance by the seller, it is found through research that the risk sensitivity of the buyer actually affects the seller's profits.

The risk sensitivity of buyers impacts whether investors seek or avoid risks, resulting in differing decisions, returns, and outcomes. Surprisingly, Hidvegi, etc., pointed out that when risk averters make transactions, the buy-it-now auction can reduce transaction risks and thus increase the expected returns of sellers [13]. The reason is that risk-averse buyers in the online buy-it-now auction are more likely to pay high prices than risk-neutral buyers or risk-seeking buyers in order to reduce the risk of a transaction failure, a strategy that allows buyers to benefit by getting a higher auction price.

4.3 Research on sellers

Due to information asymmetry, sellers have more valuable information than buyers in the auction. In this case, various pricing strategies of sellers can cause different auction results.

Usually, the reasonable price set by the seller can reflect the value of the auction item to a certain extent and provide reference information for the buyer. Veciana proved that under the buy-it-now auction mechanism, the buyer has reference-dependent preferences. That is, the buyer will form the evaluation of commodities by referring to the buy-it-now price set by the seller [14]. Furthermore, Leszczyc, etc., discovered that the reference value effect of buy-it-now has a positive effect on buyers in both permanent and temporary price mechanisms, particularly when the difficulty of valuation is high and the product value is high [15].

On the contrary, in order to obtain a higher yield, the seller may set a higher price than the minimum acceptable price to give the buyer a signal to raise the expected price, thus paying the seller a higher price in the auction, while the consumer suffers from the "winner's curse."

To sum up, the seller can provide information to the buyer by setting a reasonable price and then conducting a normal online auction or setting a high price that hurts the buyer but benefits the seller. In addition, if the price is set too low, although it can attract a large number of buyers, buyers will always close the deal at the buy-it-now price, which can cost the seller profits.

5. Conclusion

5.1 Conclusion of key findings

This paper examine buyer and seller strategies in three new types of online auctions: group-buying auction, reverse auction, and buy-it-now auction.

In the online group-buying auction, this research discuss the influence of different factors on consumers' strategy to enter the auction market. For external factors: Group mentality has a positive influence on the entry strategy of potential consumers. In terms of internal individual elements, the externality effect of participation will allow consumers to join the auction market ahead of time, but at the same time, they will also be exposed to the risk of not lowering the price. In addition, the risk sensitivity will affect whether consumers enter the auction before or after lowering the price. For sellers, the strategic increase of static public reserve price will increase their profits, while the use of

secret reserve price will lead to more buyers entering the market, but may damage the interests of sellers.

In the online reverse auction, although the transaction is led by the seller, the buyer may conspire with the previous supplier to ratify the transaction in advance for the reliability of the business transaction, and then use the price information mastered in the reverse auction process to increase their own interests. For sellers, this paper proposes the influence of psychological factors and information processing ability on sellers' strategies. Sellers' competitive psychology can force sellers to develop a low-price strategy, and negative assumptions about buyers can hinder sellers' long-term transaction strategy. In addition, an inability to process large amounts of complex information can lead to a flawed auction strategy.

In the online buy-it-now auctions, consumers' risk sensitivity also has a certain influence on their strategies. For example, People who are risk averse are willing to pay a higher price to reduce the chance of a transaction failing. As for sellers, different pricing strategies will provide different effects for sellers: appropriate pricing will provide consumers with valuable price information, setting a high price will increase sellers' revenues, and setting a low price will attract consumers while causing sellers to lose money.

5.2 Limitations and future studies

Firstly, this paper focuses solely on the buyer and seller behaviors and strategies in online auction transactions. The biggest difference between the online auction and the traditional auction is that online auctions use third-party trading platforms as the basis of online trading. This research ignores the importance of third-party platforms as the mediating effect and the impact of cross-network externalities on bidder and seller strategies, hence influencing transaction outcomes. Therefore, the characteristics of different trading platforms should be considered in the subsequent research to affect the strategies of both parties.

In addition, the online auction is actually a dynamic multi-round transaction activity, while this paper focuses more on the different influencing factors of buyers and sellers' decisions under the current single round auction, and rarely analyzes the buyers and sellers' decisions under different auction methods from the perspective of long-term interests. This is an area of research that needs to be supplemented in the future.

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