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Understanding effects of seller's and bidder's characteristics on Internet auction applications

Chu-Fen Li *

Graduate Institute of Business and Management, Department of Finance, National Formosa University, Huwei, Yunlin 63201, Taiwan, ROC

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ABSTRACT

This paper discusses the effects of factors on Internet auctions. The anonymity of online auctions is convenient and stressless. However, trust becomes an important issue. Bidders need to feel safe about the reliability of the seller for placing bids on an auction. Seller's characteristics could affect the evaluation and the deal of the online auctions. This study employs collected eBay data set to analyze the effects of factors, bidders' and sellers' characteristics on the final price and the duration of the auction. Important factors are recognized by a probit model. Seller's items for sale (SIFS), bidder's lifetime positive feedback (BLPF), and seller's lifetime positive feedback (SLPF) are the most important factors identified by the probit analysis. Furthermore, impacts of important factors and their interactions are studied by factorial design approach. The results of the study reveal that SLPF plays a major role in affecting the final price (51.2%) and both SIFS and BLPF are the critical roles (20.1% and 28.1%, respectively). Furthermore, the interaction of BLPF and SLPF also are important to affect the final price (4.5%). Consequently, the final price heavily depends on the bidder and seller ratings. For the duration of the auction, SLPF explains most of the variations (62.8%). Seller's reputation is decisive no matter in performance on the duration of the auction or final price.

1. Introduction

Internet that facilitates with information and shopping flexibility is attractive to customers (Kocas, 2005). Electronic commerce becomes more and more important in daily life. Especially, online auctions are a critical market mechanism for customer-to-customer business with online auction companies, such as eBay, Yahoo, Overstock, etc. (Assael, 1995; Ba, Kalakota, & Whinston, 1997; Baty & Lee, 1995; Beale & Wood, 1994; Cobb-Walgren, Ruble, & Donthu, 1995; Segev, Wan, & Beam, 1995), being popular to provide versatile products for sale. In traditional markets, a bidder can investigate the seller's physical producing facility and factory. For example, before a bidder wants to buy bottles of wine, he could inspect the vintage plate and the vineyard. In addition, a seller built his reputation usually over a long period. The seller's physical facility, vineyard, and his long-term brand provide a sign to keep him honest and truthful. Online marketing lacks of these methods to evaluate the reputation. A bidder cannot see any physical facility or factory of the seller. Even worse, a bidder could only feel about the quality of the sale item. It is almost impossible to touch the sale item, to observe the production procedure, or to evaluate the composition. Furthermore, no seller has been long enough in the recent booming Internet market. A pure Internet trustable brand does not exist for the short history of Internet shopping, even worse for online auction sellers.

Some sellers exhibit reputations from the physical world. However, in online auction, thousands of sellers have no other means to provide trust or reputation. In such circumstances, the persuasion to sellers to disguise sale items is most likely. Moreover, the tendency to inertia, to ship slowly after receiving payment, is also possible. These behaviors would reduce the willingness of bidders to trade, since the quality of the good or the transaction may be problematic. Unless Internet market could provide bidders a tool to get sufficient information about sellers, sale item quality and trust in transaction fulfillment, bad sellers will force those of good behaviors out of the market. Nowadays, only a tool, called reputation rating, exists in online auctions. Bidders could observe the historic ratings of sellers from the other bidders with successful transactions to get confidence about sellers.

Online auctions exhibit the following characteristics. Sellers first list a great diversity of goods they wish to sell. The prices of goods on sale range from pennies to millions of dollars. The sellers specify different base prices and may hold a secret reserve price – below which they will not be willing to sell the item. The bidders also display significant variance in their willingness to pay and in participation strategies (Ariely & Simonson, 2003; Ravi, Paulo, & Alok, 2005).

* Tel.: +886 5 6315756; fax: +886 5 6331950.
E-mail address: cfli@nfu.edu.tw

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This research focuses on final price and the duration of the auction in online auctions. This study attempts to answer the following questions. What drives bidders pay more for the same kind of products in a short the duration of the auction? Which factors critically influence their bidding behavior? The important factors may be related to bidders' and sellers' characteristics, commodity feature, or market mechanism. Bidders' or sellers' characteristics include experience to buy or to sell, reputation rating, items for sale, age, and gender. Commodity feature covers product's condition (used or new), look and feel (rated by the seller), and warranted or not. Market mechanism contains payment choice (cash equivalents or credit cards), starting price, and buy-it-now (BIN) option. Among these characteristics, seller or bidder rating and items for sale are much easy to quantify. A seller with lots of positive comments is more likely to be trustworthy. In addition, a seller is expected to be much more likely to care about his/her fame if having large or numerous items for sale. Bidders should be very cautious with auctions started by the sellers who have no transaction record and sellers should take heed of bids from the bidders with no trading history. These could be viewed as a warning sign to indicate that an auction is not genuine. Reputation and past behaviors are important for a successful and fair trade in an online auction, since they will affect the seller's ability to transaction in the future.

Previous studies (Lian & Lin, 2008; Zhang & Li, 2006) used the questionnaire approach to investigate the auction performance. This kind of methodology is subjective, partial and not scalable. This paper tries to evaluate the effects of sellers' and bidders' characteristics on final price and the duration of the auction by probit analysis and factorial design based on a data set collected from eBay auctions. The data trace method used is more objective and scalable. As a result, the conclusions based on the study are more convincible than the questionnaire approach.

The major contribution of the paper is the empirical validation of the importance of reputation rating system. Through data set collection and factorial design, this work shows the efficacy and impact of the reputation rating system on the performance improvement and enhancement of the auctions. The proof offers very helpful information for auction companies to enhance the bid performance by maintaining and improving the RSS.

The study unfolds as follows. Section 2 reviews the works related to the study. Section 3 depicts the collected data set from eBay. In Section 4, the probit analysis for online auctions is described, and important factors are identified by the analysis. Six hypotheses related to the seller or bidder characteristics are examined. Section 5 reports and discusses the results of factorial design. Finally, Section 6 presents the conclusions.

2. Review of related work

The auction has a long history, dating back literally thousands of years (Anderson, Taylor, & Holloway, 1966), and the previous research on the theory of auctions is abundant. In addition, studies on Internet auction are very popular recently since auction becomes an important business means in today's net life. Revenue maximization, price optimization, or the duration of the auction minimization are important issues in the study of online auctions. The revenue of sellers could augment under various scenarios. By simple modeling and a bounded number of bidders, sellers could benefit by using the information disclosed in the first auction (Kauffman & Wang, 2001; Kirkegaard & Overgaard, 2003). When facing risk-averse bidders, they could also advance expected profit (Hidvuegi, Wang, & Whinston, 2006). Turocy analyzed the Bayes–Nash equilibrium prediction for seller revenue in auctions (Bapna, Jank, & Shmueli, 2008), and conceived that the second-price auction is susceptible to lost revenue than the first-price auction in the auction game. Gupta claimed that the existence of both time-sensitive sellers and bidders is an important reason in online auctions (Gupta (2006)). The observation was confirmed by an eBay study. Reducing waiting time is the major reason for both sellers and bidders to complete deals with BIN auctions.

Stafford and Stern (2002) examined the bidding behavior and the reasons for using auction sites. Three reasons specified are acceptance of technology, involvement with auctions, and affinity for computers. Li, Liu, Wu, and Zhang (2006) studied the final price prediction by collecting large amounts of historical exchange data from Eachnet in China. The prediction was made by traditional statistical methods to forecast the final prices of auction items. Bapna et al. (2008) used functional data modeling to investigate the final price process in online auctions by exploring the price evolution with its first and second derivatives. The results showed that the incremental impact of an additional bidder's arrival becomes smaller at the end of a bid period. Moreover, higher seller ratings affect the price dynamics in a positive way. The effect is, however, not important for a long auction, and the price level is negatively related to the duration for a low-rated seller, and in contrary, positively for a high-rated seller. Zhang and Li (2006) analyzed online payment choices with a probit model using survey data collected from eBay users. Payment choices were considered from the perspective of risk, convenience as well as cost dimensions. The influences of product quality, trader characteristics, and payment attributes on payment choice were discussed. The results exhibited that uncertain product quality has a stronger influence on payment choices than trader characteristics do, and the reputation rating does not affect payment choices. Chan, Kadiyali, and Park (2007) measured a bidder's willingness to pay (WTP) based on two bidding conditions: no bids more than his or her WTP, and a bidder allowing no rival to win at a price more than his or her WTP. The study modeled WTP as a pure product feature component with the auction market environment, including bidder experience, seller reputation, and measures for competition among bidders and items, such as a "BIN" mechanism. The results demonstrated that market thickness is important for WTP and more extensive site surfing and bidding histories lead to a lower WTP. Furthermore, BIN willingness could be modeled as a cumulative function.

The previous literature (Zhang & Li, 2006) looked into the factors possibly affecting the price determination and the duration of the auction with time-sensitive bid arrivals, and pointed out that important factors would be payment choice, starting price, seller reputation rating, BIN price as well as item information disclosure. The more information about the bid item, bid history and reputation of the seller could be possibly linked to a higher final price (Klemperer, 2004). The impact and interaction of these factors have, however, not yet been well studied.

Sellers' characteristics include selling experience, buying experience, reputation rating (Rosnick, Zeckhauser, et al., 2006), items for sale, age, and gender. Commodity feature covers product's condition (used or new), look and feel (rated by the seller), and warranted or not. Market mechanism contains payment choice (cash equivalents or credit cards), starting price, and BIN option. This study employs a collected data set from eBay. Then, these data are employed to fit in a probit model (Collett, 1991; Steinbrecher & Shaw, 2008) to find influential factors. These factors are further analyzed by factorial design to examine the impact and interaction of these factors. Instead of using the questionnaire approach, this study analyzes real-world data to find the important factors and their impacts on final price and the duration of the auction in online auctions. This approach is more general and scalable, and the results are more convincible.