Empirical analysis of online auction fraud: Credit card phantom transactions ☆

Byungtae Lee [a], Hyungjun Cho [b], Myungsin Chae [c], Seonyoung Shim [d,*]

[a] Graduate School of Management, Korea Advanced Institute of Science and Technology, 207-43 Cheongryangri-dong, Dongdaemun-gu, Seoul, Republic of Korea
[b] SamSung Electronics Co. Ltd., Samsung Main Bldg., Taepyung-Ro, Jung-Gu, Seoul, Republic of Korea
[c] Seoul University of Venture and Information, Seochodong, Seochogu, Seoul, Republic of Korea
[d] Department of Business Administration, College of Social Science, Seoul Women's University, Gongreungdong, Nowongu, Seoul, Republic of Korea

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ABSTRACT

Online auctions allow buyers to find a wider variety of items and help sellers to reach literally millions of buyers. Auctioning over the internet gives a variety of opportunities that are not offered for consumers offline. However, on the other hand, it also provides good conditions for opportunistic behaviors because of the high degree of information asymmetry. To prevent online auction fraud, preventative controls verifying the identities of auction users can be imposed. However, these measures can adversely affect the potential user-base of online markets. In this paper, we examine the ex-post detection of online fraud. Among examples of serious online fraud prevalent in auctions, we investigate the factors necessary to detect "online credit card phantom transactions," which are fake transactions for illegal loan sharking through the collusion of the seller (creditor) and buyer (debtor). In this paper, we develop a plausible detection methodology for online fraud. In addition, employing a data collection agent, we demonstrate cost-efficient ways of data collection. Auctioneers, e-business firms with fraud-related problems, and regulatory agencies can all take advantage of this methodology. Academically, we believe that our research is a new addition to the body of empirical studies on online auction fraud.

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1. Introduction

Online auctioning is a well-known business model that shows how business can be changed with the aid of new technologies. Through successful services for C2C transactions, the online auction has grown remarkably to become one of the most important channels for consumers (Bandyopadhyay & Wolfe, 2000). There is no doubt of this, in terms of the number of items registered and traded, the amount of sales, and trading profits. For example, eBay, which serves 24 international markets, reported a net revenue of $6.0B, a net income of $1.1B and a GMV (Gross Merchandise Volume) of $52.3B for the year 2006. With total of 221 million registered eBay users, it generated 610 million item listings (eBay, 2006).

This example of dramatic growth in the online auction setting comes from a variety of opportunities that are not offered for consumers offline. The Internet provides buyers and sellers easy access to various items ranging from pennies in cost to a million dollars. However, it is also prone to fraud with the special characteristic of auctioning over the internet (Wang, Hidvegi, & Whinston, 2001). In an online auction, the sellers can easily hide their identity, which causes considerable information asymmetry between sellers and buyers, hence giving sellers the opportunity to cheat buyers. Buyers have a great deal of difficulty predicting a seller's behavior. According to the IC3 (Internet Crime Complaint Center) annual report for 2007, auction fraud was the most reported online offense, comprising 35.7% of the 206,884 complaints (Internet Crime Complaint Center, 2006). The total reported dollar loss from online auction fraud reached $14.35M in 2007. The NCL (National Consumers League)'s Internet Fraud Center also reported "auction fraud" as the top online scam of 2006 (National Consumers League, 2006). The average loss reported due to auction fraud was $3547 (Internet Crime Complaint Center, 2006).

Among many examples of serious online auction fraud, we examine a very unique variety, online credit card phantom transactions (OCCPT), which are easily observed in Korean auction sites. OCCPT is a kind of illegal usury service that issues a fake credit card bill based on a fictional transaction of items. Online auctions provide excellent conditions for phantom credit card transactions. First, for issuing fake credit card bills, fraudsters do not need to set up paper companies. Moreover, detection probability is also quite low compared to the offline setting because of the anonymity and the tremendous transaction volumes in online markets. Because of storage problems and the cost of maintenance, transaction records in online auctions are expunged from the auctions

after a set number of days. For example, eBay-US deletes transaction records every 30 days (Albert, 2002).

OCCPT has become prevalent in Korean auction sites and seriously damaged the reputation of auction sites. It is reported that in the largest Korean online auction site (www.ebay.co.kr), the proportion of OCCPT once reached 25% of total transactions. Due to the prevalence of OCCPT, users perceived that the auctions in eBay-Korea were not safe, which was directly reflected in the evaluations in stock markets. The revenue and stock price of the auction site have rapidly dropped.[1]

For the prevention of OCCPT, online auctioneers have introduced policies such as monitoring systems and seller and buyer credit evaluation systems. These strategies had an effect on the removal of OCCPT to some extent. However, with some loopholes in these strategies, OCCPT still survives, especially in the less known online auctions, which operate without prevention measures due to the high cost of investment in such measures. It is also noteworthy that many preventative controls can reduce the attractiveness of online transactions by increasing the psychological burden for auction users who have great concern for their privacy; e.g., for real name authentication, users' private information could be exposed. One solution to this problem has been the introduction of the digital certificate as verification of identity. Once users are issued a digital certificate on their PC, their transactions are limited to that PC, hence reducing users' freedom to perform transactions. For this reason, although it seems to contribute to the prevention of OCCPT in the short term, restrictive preventative controls may reduce the online user-base in the long run. Therefore, in order to protect normal users and promote online transactions, in addition to the careful imposition of preventative controls, development of efficient deterrent controls for the detection and punishment of fraud is required.

However, a serious problem in the deterrence of this kind of crime is that the low detection rate makes it more difficult to utilize statistical analysis or artificial intelligence based on previously detected cases (Johnson, Grazioli, Jamal, & Berryman, 2001). Even strict punishment can be ineffective for the deterrence of crime if the detection probability is quite low, as the economics of crime literature shows (DePaulo & Pfeifer, 1986; Johnson et al., 2001). Thus, the improvement of detection methods is very important for the control of online fraud, despite difficulties caused by anonymity and the extremely high volume of transactions in online markets.

Bajari and Hortaçsu's study (2004) shows the importance of seller reputation in resolving the problems of information asymmetry in online markets. They suggest an evaluation system of sellers' credit in both prevention and detection of online fraud. However, with the exception of the studies on the shilling (Kauffman & Wood, 2001, 2003), there are few empirical studies on online auction fraud detection. Moreover, to the best of our knowledge, there is no study on OCCPT. Therefore, in this paper, we empirically investigate the factors for identifying OCCPT. The paper is organized as follows. In Section 2, we examine the characteristics of online auction fraud, including OCCPT, and illuminate the importance of online fraud detection from a criminal sociology perspective. We also examine the theoretical background for our OCCPT detection model from MIS studies on the behavior characteristics of online auction participants. In Section 3, we provide the research model, hypotheses and methodology of data collection. Analysis is provided in Section 4. In Section 5, we summarize

the analysis results and test our hypotheses. Finally, the implications and limitations of this research are discussed.

2. Theoretical background

2.1. Internet environment and online auction fraud

Online auction fraud occurs both during and after auctions. It involves (1) misrepresentation of items, (2) illegitimate bidding to preserve a low price (bid shielding), (3) intentional fake bidding by the seller to drive up the item price (shilling), (4) adding hidden charges for an item by separating the postage, handling, and shipping charges (fee stacking), (5) non-delivery of items, (6) offering black market goods, and (7) online credit card phantom transactions (OCCPT) (King, Lee, Warkentin, & Chung, 2002). We are focusing on the latter in this paper.

The fundamental reason that the online market is more convenient for opportunistic behaviors is the separation of product and information (Lee, 1998). Online buyers are greatly dependent on information provided by the seller, which makes it easier for the seller to deceive them (Klein & Leffler, 1981). Opportunistic behaviors are initiated by this information asymmetry. As an example, it is possible to post the same item on several online sites. The seller can easily conjecture the highest price he/she can get through the comparison of prices from several sites, and, using the shilling strategy, increase the successful bid price. On the other hand, buyers can also compare prices of one item from several sites; an increase in price from one site can affect the buyers' price expectation on other sites. In a weakly controlled distributed computation environment, variable pricing can be executed. Kauffman and Wood's study (2001) reported that 10% of the bidding on rare coins that took place on eBay in 2000 was just for shilling.

Moreover, the anonymity of online buyers and sellers (Wang et al., 2001) increases the possibility of opportunistic behaviors in the online market. Honest auction users may appreciate this characteristic for the protection of their privacy. Most online customers do not want to reveal their private information. They worry about the uncontrollable reuse of their private information by other online companies. Although it is effective for the prevention of online fraud, if an online auction site obligates customers to enter their real names or to use accredited digital certification, it increases the complexity of the auction registration process. Customers are also reluctant to reveal their private information, which in turn reduces the size of the user-base.

2.2. Online auction fraud and online credit card phantom transactions (OCCPT)

In order to understand why this unusual type of fraud, OCCPT, rampages in Korean auction sites, we must examine the credit card system and related financial market structure of this country. Several Asian countries suffered foreign currency crises in the later 1990's. Aggressive bad loans started the problem, and led to more sub-prime or defaulting customers. Hence, regulatory bodies have imposed strict policies to curb bad loans. One such measure is discouraging cash advances from credit cards. As a result, the credit limit of cash advances is far lower than that of purchases. Hence, unlike most other countries, Korean credit card companies have dual credit limits. For example, a credit card holder with a credit limit of $10,000 may have only a $3000 credit limit for cash advances. In addition, the loan period is much shorter than that incurred by purchases.

There are two main reasons why sub-prime customers with an urgent need for cash may participate in fraud using credit cards. First, in some countries, there is no good financial market for

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