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PERCEIVED RISK AND ESCROW ADOPTION: AN ECONOMIC ANALYSIS IN ONLINE CONSUMER-TO-CONSUMER AUCTION MARKETS

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Extended Abstract[1]

INTRODUCTION

Online escrow is an emerging trust service in consumer-to-consumer auction markets for protecting online traders from Internet fraud. Although the process of online escrow services (OES) ensures its effectiveness i blocking Internet frauds, its adoption rate is still surprisingly low relative to the increasing Internet fraud (Fraud.org 2001; Wolverton 2001). This paper intends to study the effect of traders' perceived risk (Kahneman and Tversky 1979; Weber and Milliman 1999), defined as perceived risk rate (PRR), on the adoption of online escrow service. The research applies economic modeling and computer simulation approaches, following the literature and methodology in Hu et al.(2001).

THREE LEVELS OF MODELS FOR ONLINE C2C AUCTION MARKETS

The first level is a system dynamics model for an online C2C auction market with escrow services (Figure 1). Three types of agents are identified in the system: honest trader, cheater, and OES provider. They are associated to three feedback loops, respectively: L1—cheater's expected utility maximization loop; L2— honest trader expected utility maximization loop; and L3—OES provider profit maximization loop.

Assuming the OES provider service fee rate is not affected by other system state variables, the system dynamic behavior becomes the function of two exogenous inputs: cheater fraud rate and OES fee. This system dynamics model provides a basis for further modeling and the guideline for simulations.

The second level of the model is a pair of decision-making models for cheater and honest trader. Under rational expectation and risk-neutrality assumptions, the utility maximization solutions for two types of traders show that PRR critically affects trader's decision-making. A cheater's decision on whether or not to cheat depends on the comparison between the expected utilities from these two actions. His optimal strategies are: (1) to cheat if OES is not adopted by trading partner; or (2) to quit from cheating if the trading partner adopts OES. An honest trader will adopt OES: (1) when she is a buyer and $p(V^b/M - d) \geq r$, or (2) when she is a seller and $p \geq r$. In these criteria, p is the value of PRR, M is the transaction amount, r is OES fee rate, V^b is the buyer's perceived value of the merchandise, and d is an estimate of merchandise quality.

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[1]**Keywords:** Escrow service, online C2C auctions, Internet fraud, perceived risk, system dynamics, decision making.

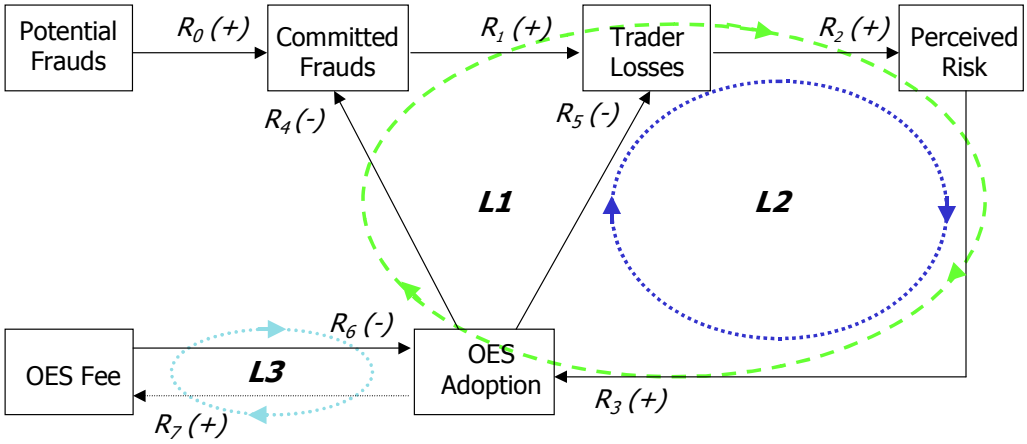

Figure 1. Three Feedback Loops in the Online Auction Market with OES

The third level of the model is focused on PRR calculation, which is the key issue in simulation system design and experiment conduct (Williamson 1993). The value of PRR is flavored by two ingredients: one is *base PRR* which is irrelevant to a specific trade, and the other is *dynamic PRR* which is affected by trader knowledge about current trades, such as trading partner reputation. Figure 2 is a causal diagram for a trade-specific PRR, where three sets of factors are used in a two-step PRR calculation. Four criteria have been proposed in the paper for verifying the feasibility of calculative formulas.

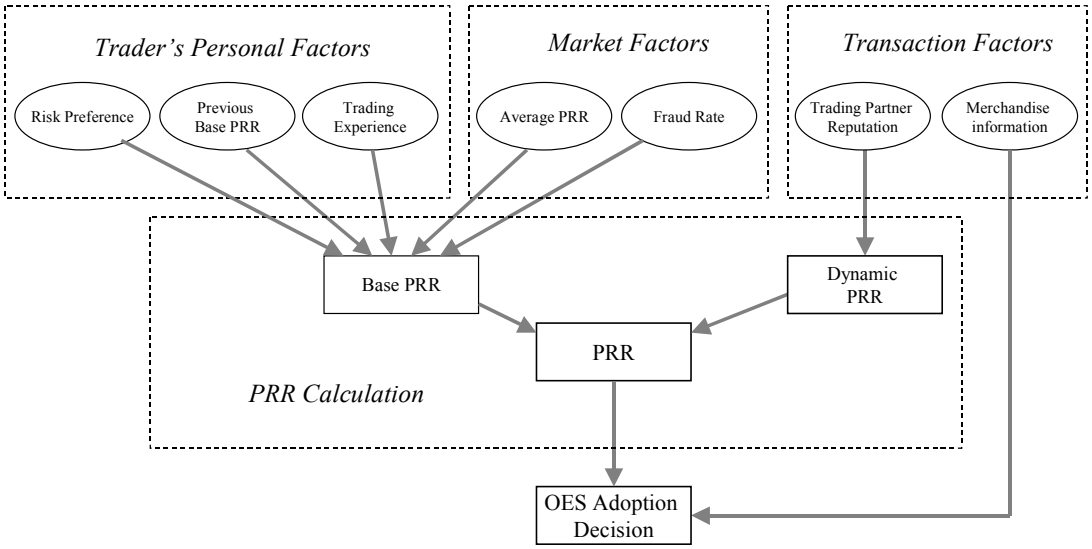

Figure 2. A Calculative Model for PRR

SIMULATION RESULTS

In a typical experiment using the computer-based simulation system, each trader is uniformly assigned an initial base PRR and Internet frauds are randomly generated among trades. Traders, either sellers or buyers, decide the adoption of online escrow if they are of honest type. Then PRR values are recursively calculated.

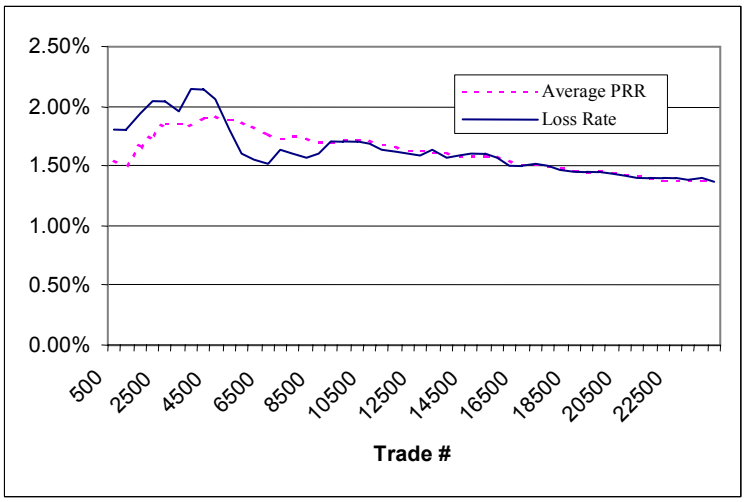

Figure 3. The Average of Base PRR Converges to Loss Rate
(Fraud Rate = 2%; OES Adoption Rate = 21%

Figure 3 shows that *base PRR* converges to *loss rate*. Two histograms of *base PRR* over the trader pool demonstrate a similar shape of distribution (Figure 4). This gives the intuition that PRR could follow an asymmetric normal-like distribution in a finite interval *[0, 1]*.

With proper calibrations for the simulation, we obtained the following findings:

- Finding 1: *Trader loss rate is a concave function of fraud rate.*
- Finding 2: Average base PRR is an increasing linear function of fraud rate, and it positively affects OES adoption rate.
- Finding 3: *Fraud blocking rate (the percentage of the frauds blocked by OES with regard to all frauds) is higher than OES adoption rate when the latter is at a lower level.*
- Finding 4: *Raising the OES fee rate dramatically decreases OES adoptions and result in a much lower fraud blocking rate.*
- Finding 5: *The experiment outcomes show that buyers are more likely to adopt OES than sellers under current simulation settings, which is consistent with the theory.*

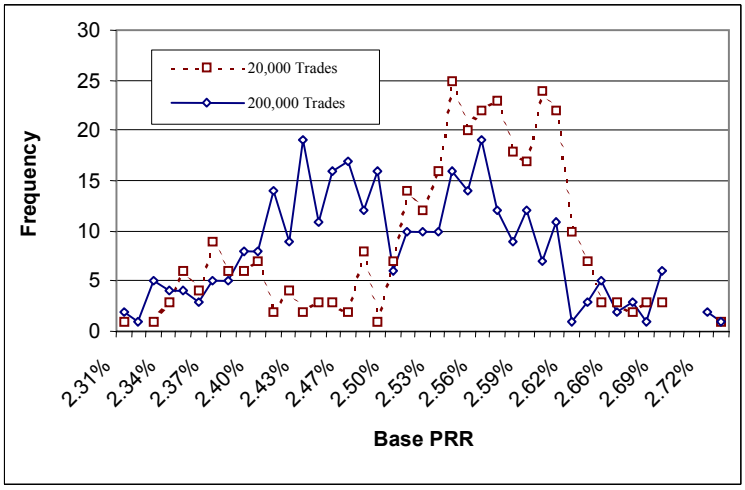

Figure 4. Base PRR Distributions
(Number of traders: 320)

FUTURE RESEARCH

The effect of PRR on OES adoption is tested using simulation techniques. However, from the behavioral viewpoint, a promising outcome may need actual empirical study. The future research will conduct experiments using human subjects and then calibrate parameters for the computer-based simulation. Meanwhile, the exploration in substitution effect between OES and other insurance programs remains untouched. Since insurance is becoming more available in online C2C auctions, revealing the inter-relation between these services will help design a better mechanism for fraud-free online marketplaces.

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