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Li, Lingfang (Ivy)

Shanghai University of Finance and Economics

November 2008

What is the Cost of Venting? Evidence from eBay

Lingfang (Ivy) Li *
Department of Economics
University of Louisville

November 12, 2008

Abstract

This paper uses data collected from eBay's website to identify why buyers fail to leave (negative) feedback in online markets. Empirical results confirm that the fear of retaliation may be an important motivation for buyers not to leave (negative) feedback, while the time and effort cost of reporting *may be not*.

keywords: reputation, feedback, asymmetric information
JEL classification: L81; L86

Introduction

Reputation systems rely on voluntary feedback from traders to reduce information asymmetry and sustain trust, especially in online markets. Understanding participants' feedback behaviors helps improve reputation systems and sheds light on a broad range of observed behaviors (e.g., teaching evaluations, recommendation letters, and referee reports.)

Several authors find that buyers on eBay leave feedback about half the time. Moreover, in eBay's bi-lateral feedback system where both buyers and sellers can leave feedback after transactions, negative feedback is less frequent than positive feedback . Dellarocas and Wood (Forthcoming) and Klein et al. (2005) suggest fear of retaliation against the buyer who leave negative feedback may be a reason for missing negative feedback. Thus, buyers' concern about their own reputations keep them silent even if they are willing to spend time and

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*Tel.: 502-852-2342; fax: 502-852-7672. *e-mail: ivy.li@louisville.edu.*

effort on reporting their poorly performing counter parties. Another explanation of the lack of feedback may be the time/effort nuisance cost: feedback is a public good (not previously tested empirically.) For example, the participation rate in teaching evaluations drops after changing from in-class paper evaluations to online.

In experimental economics, Fehr and Gchter (2000) and Nikiforakisy (2007) find that people are willing to bear costs to punish deviators, but are less likely to punish when counter-punishment is possible. If buyers' feedback-leaving behaviors are consistent with the lab findings, we will see that buyers are willing to bear the nuisance cost of leaving negative feedback (i.e., cost to punish deviators), but are less likely to leave negative feedback when facing retaliation from strategic sellers (i.e., counter punishment.)

First, by examining *both* nuisance cost *and* fear of retaliation concerns in bi-lateral systems, this paper adds to previous research by *directly* addressing the question of why people do not leave feedback. Second, instead of using a lab experiment, I compile a unique data set using eBay's 2003 policy change to identify whether nuisance cost is a consideration for buyers' decision to leave feedback.[1] Third, I develop a novel model to analyze traders' decisions dealing with the issues that arise when actual quality of products/services are not observable.

The empirical results suggest that although fear of retaliations may be an important motivation for buyers' reluctance to leave feedback, time and effort costs of reporting may be *not* important. Thus, further research on reducing nuisance costs may be a less fruitful approach to improving feedback mechanism design. These findings are relatively consistent with punishment and counter-punishment behavior in lab experiments.

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[1] In 2003, eBay introduced an additional page that members with feedback scores ≤ 10 must read prior to leaving neutral or negative feedback. On average, it takes 5 or 6 minutes to complete it. See http://pages.ebay.com/help/tutorial/feedbacktutorial/js_tutorial.html

Data

The data set contains information on 6609 successful eBay transactions for the iPod Nano MP3 player during September 1-30, 2006.[2] The data contains auction information, general information about seller and buyer information, and feedback information of each transaction. Figure 1 shows the summary of all feedback behavior and timing. The percentage represents the proportion of transactions in each feedback timing pattern. The number below the percentage represents the number of transactions in each pattern. Among the 116
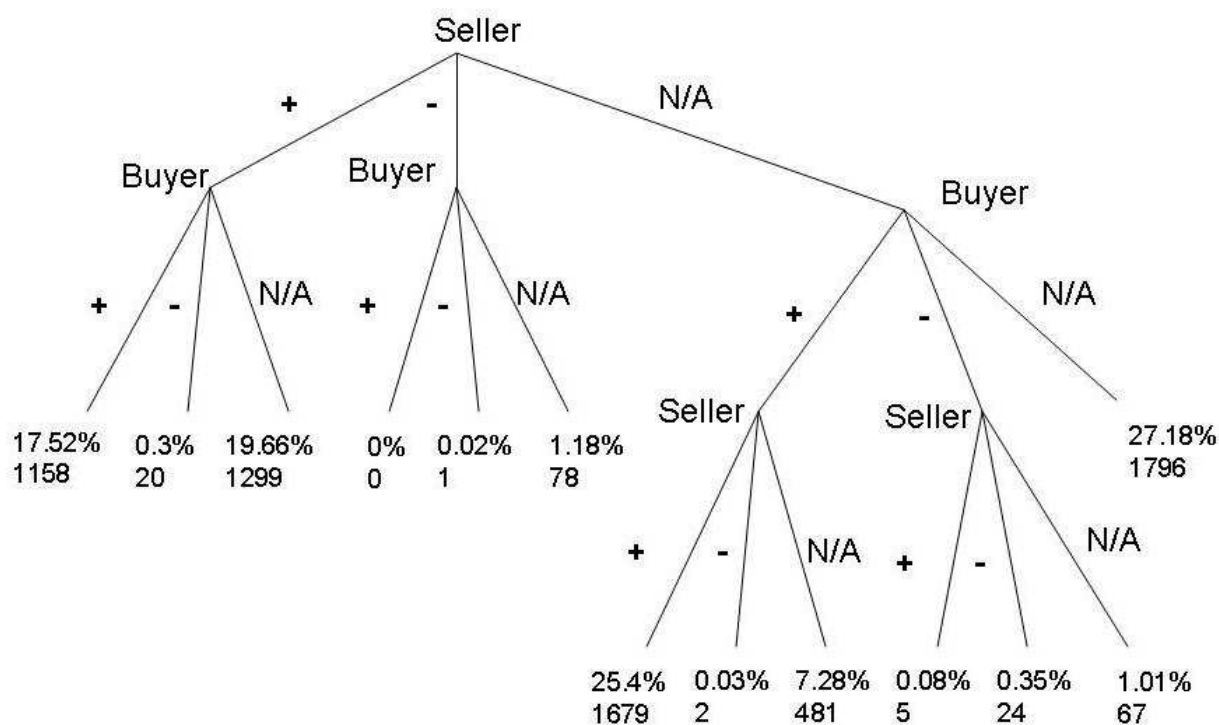

Figure 1: Feedback Decision Tree with Data

cases where buyers left negative feedback, 73 were left by experienced buyer and 43 by inexperienced buyers.[3] Figure 1 appears to suggests that buyers are concerned about retaliation and the extra time cost, which may deter buyers from leaving negative feedback.

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[2]IPod Nano was in the 3rd most popular items on eBay during this period.

[3] On eBay, traders can also leave neutral feedback. Researchers usually consider neutral feedback equal to negative feedback (Cabral and Hortaçsu (2006); Resnick and Zeckhauser (2002)). To be consistent with eBay's education site policy, I define members with feedback scores ≤ 10 as "inexperienced," "experienced" otherwise.

Analytical Framework

To identify whether nuisance costs and fears of retaliation are reasons for buyers not to report, we test:

(1) Are buyers more likely to remain silent if sellers do not report first?

(2) Are inexperienced buyers more likely to remain silent than experienced buyers?

(3) If sellers do not report first, are buyers more likely to be silent when receiving low quality products/services versus high quality ones?

(4) Are inexperienced buyers more likely to remain silent than experienced buyers when receiving low quality products/service versus high quality ones?

To capture unobserved binary transaction outcomes, I build an empirical model that captures the sequence of events: transaction outcomes are selected by sellers first, then buyers choose whether to leave feedback. I use maximum likelihood method to simultaneously estimate the two equations in the model. The following binary choice model represents a buyer's decision to leave feedback:

$$
Y_i = \begin{cases} 1 & \text{(No Report), if } Y_i^* > 0 \\ 0 & \text{(Report), otherwise} \end{cases}
$$

where the latent variable, Y_i^*, represents a buyer's indirect utility from remaining silent. It is estimated by:

$$
Y_i^* = \beta_0 + X_{1i}'\beta_1 + \beta_2 X_{2i} + \beta_3 D_{3i} + \beta_4 D_{3i} X_{2i} + \beta_5 D_{5i} + \beta_6 D_{5i} X_{2i} + \varepsilon_i \tag{1}
$$

where X_{1i} is a vector of buyer characteristics and auction information, including age on eBay, reputation score, positive feedback percentage, number of negative feedback received, price, number of bids, duration of the auction. X_{2i} is an index of unobserved transaction quality, either high quality (HQ) or low quality (LQ). If a buyer is satisfied with the seller, then the transaction is HQ and $X_{2i} = 1$, otherwise it is LQ and $X_{2i} = 0$. D_{3i} is a dummy variable

representing whether a buyer is inexperienced or not. If a buyer's reputation score is ≤ 10, he is an inexperienced trader, with $D_{3i} = 1$. D_{5i} is a dummy variable indicating whether a seller has left feedback. If a seller does not report first, $D_{5i} = 1$.

The latent value of the true binary transaction outcome index, X_{2i}, is estimated from seller characteristics:

$$X_{2i} = \begin{cases} 1 & \text{(HQ), if } X_{2i}^* > 0 \\ 0 & \text{(LQ), otherwise} \end{cases}$$

where the latent value of X_{2i} is estimated by the following equation:

$$X_{2i}^* = Z_i'\alpha + \eta_i. \tag{2}$$

Z_i is a vector of a constant along with characteristics of the seller, including age and historical feedback profile.

I estimate the coefficients using maximum likelihood method with the likelihood function

$$L(Y;\theta) = \prod_{Y_i=1} Pr(Y_i = 1) \prod_{Y_i=0} [1 - Pr(Y_i = 1)] \tag{3}$$

where

$$
\begin{aligned}
Pr(Y_i = 1) &= Pr(X_{2i} = 1)Pr(Y_i = 1|X_{2i} = 1) + Pr(X_{2i} = 0)Pr(Y_i = 1|X_{2i} = 0) \\
&= Pr(X_{2i}^* \geq 0)Pr(Y_i^* \geq 1|X_{2i} = 1) + [1 - Pr(X_{2i}^* \geq 0)]Pr(Y_i^* \geq 1|X_{2i} = 0).
\end{aligned}
$$

The marginal probability for a buyer to remain silent is the product of the probability "to report" conditional on the transaction outcome and the probability of the transaction outcome. Then, we calculate the conditional probability given the transaction outcome is

LQ or HQ. When the transaction outcome is LQ,

$$Y_i^*|_{X_{2i}=0} = \beta_0 + \beta_3 D_{3i} + \beta_5 D_{5i} + X'_{1i}\beta_1 + \varepsilon_i \tag{4}$$

and when the transaction outcome is HQ,

$$Y_i^*|_{X_{2i}=1} = (\beta_0 + \beta_2) + (\beta_3 + \beta_4)D_{3i} + (\beta_5 + \beta_6)D_{5i} + X'_{1i}\beta_1 + \varepsilon_i \tag{5}$$
$$= \delta_0 + \delta_1 D_{3i} + \delta_2 D_{5i} + X'_{1i}\beta_1 + \varepsilon_i \tag{6}$$

I assume the error terms, ϵ_i and η_i, are independent and follow logistic distributions with $F(z) = 1/(1 + e^{-z})$.[4] Thus,

$$Pr(Y_i = 1|X_{2i} = 1) = F(\delta_0 + \delta_1 D_{3i} + \delta_2 D_{5i} + X'_{1i}\beta_1), \tag{7}$$

$$Pr(Y_i = 1|X_{2i} = 0) = F(\beta_0 + X'_{1i}\beta_1 + \beta_3 D_{3i} + \beta_5 D_{5i}), \tag{8}$$

and

$$Pr(X_{2i} = 1) = F(Z'_i\alpha). \tag{9}$$

Thus, the marginal probability for a buyer to report equals

$$\begin{aligned} Pr(Y_i = 1) &= Pr(X_{2i} = 1)Pr(Y_i = 1|X_{2i} = 1) + Pr(X_{2i} = 0)Pr(Y_i = 1|X_{2i} = 0) \\ &= F(Z'_i\alpha)F(\delta_0 + \delta_1 D_{3i} + \delta_2 D_{5i} + X'_{1i}\beta_1) \\ &+ [1 - F(Z'_i\alpha)]F(\beta_0 + X'_{1i}\beta_1 + \beta_3 D_{3i} + \beta_5 D_{5i}). \end{aligned} \tag{10}$$

I substitute (10) into (3) and estimate all parameters. Using this empirical model, even though we do not observe the actual transactions qualities, we are still able to estimate the

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[4]I make this assumption since we cannot observe actual transaction qualities.

parameters of interests. Finally, $\hat{\beta}_4 = \hat{\delta}_1 - \hat{\beta}_3$ is

$$(\text{an inexperienced buyer's propensity to be silent} - \text{an experienced buyer's}|HQ)$$
$$-(\text{an inexperienced buyer's propensity to be silent} - \text{an experienced buyer's }|LQ), \quad (11)$$

and $\hat{\beta}_6 = \hat{\delta}_2 - \hat{\beta}_5$ is

$$(\text{a buyer's propensity to be silent when the seller does not report first}$$
$$-\text{his propensity to be silent when the seller reports first}|HQ)$$
$$-(\text{a buyer's propensity to be silent when the seller does not report first}$$
$$-\text{his propensity to be silent when the seller reports first}|LQ). \quad (12)$$

Results

The results in Table 1 show $\hat{\beta}_3$ is positive at the 1% level: inexperienced buyers are more likely to keep silent than experienced buyers when transaction outcomes are LQ. $\hat{\beta}_4$ is negative but insignificant. $\hat{\beta}_5$ is positive and significant at the 10% level: buyers are more likely to remain silent when sellers do not report first. The effect on buyers' propensity to remain silent when sellers report first is lower for HQ transactions than LQ ones, since $\hat{\beta}_6$ is negative at the 1% level.

Thus, the extra time and effort needed to leave negative feedback may be a concern for inexperienced buyers reporting when the transaction outcomes are LQ. However, inexperienced buyers may be more likely to keep silent than experienced buyers when the transaction outcome is HQ. The difference-in-difference is not statistically significant. Therefore, the nuisance cost may not be a motivation for buyers failing to leave feedback. Moreover, when sellers do not reports first, buyers are more likely to remain silent. The difference in buyers' propensity to remain silent, given that sellers do not report, are higher when the outcome is

HQ. This suggests that fear of retaliation discourages buyers reporting to a greater degree when transaction outcomes are LQ than when transaction outcomes are HQ.

Conclusion

These findings on feedback behavior suggest that fears of retaliation may be a concern for buyers. This provides empirical support for eBay's May 2008 policy change to ban sellers leaving negative feedback for buyers. This paper demonstrates that at least eBay's attempt to solve the fear of retaliation problem in the feedback system is a step in the right direction (although the policy implication needs more detailed investigation.) More importantly, we also show that nuisance costs may *not* be important. Both findings from real-world evidence are consistent with lab experiments: traders are willing to bear costs to punish deviators but are less likely to punish when counter-punishment is possible.

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Table 1: Estimation Results

Main Variables	coeff. estimation (std.)
dummy to indicate inexperienced buyer ($\hat{\beta}_3$)	0.7998 (0.0314)***
inexperienced buyer × indicator for high quality outcome ($\hat{\beta}_4$)	-0.1602 (0.1303)
dummy to indicate seller does not report first ($\hat{\beta}_5$)	0.1051 (0.0547)*
seller does not report first × indicator for high quality outcome ($\hat{\beta}_6$)	-3.3144 (0.1510)***
Control Variables	
item price	-0.0004 (0.0000)***
auction duration (in minutes)	-0.0001 (0.0000)***
bid count	0.0074 (0.0027)***
how long the buyer has been on eBay (days)	0.0000 (0.0000)
buyer's feedback score	-0.0012 (0.0005)**
buyer's all positive feedback	0.0007 (0.0003)***
buyer's unique negative feedback	0.0996 (0.0240)***
buyer's positive feedback percentage	-0.0042 (0.0004)***
seller's positive feedback percentage	-0.014 (21.144)
seller feedback score	0.213 (7.055)
seller's all positive feedback	0.043 (1.440)
seller's unique negative feedback	0.802 (27.169)

Note: ***, **, * represents significance at 0.01, 0.05, and 0.10 level, respectively. All numbers are saved up to four digits after the decimal point.