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RESEARCH ARTICLE

EVIDENCE OF THE EFFECT OF TRUST BUILDING TECHNOLOGY IN ELECTRONIC MARKETS: PRICE PREMIUMS AND BUYER BEHAVIOR[1]

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Abstract

Despite the wide use of reputational mechanisms such as eBay's Feedback Forum to promote trust, empirical studies have shown conflicting results as to whether online feedback mechanisms induce trust and lead to higher auction prices. This study examines the extent to which trust can be induced by proper feedback mechanisms in electronic markets, and how some risk factors play a role in trust formation. Drawing from economic, sociological, and marketing theories and using data from both an online experiment and an online auction market, we demonstrate that appropriate feedback mechanisms can induce calculus-based credibility trust without repeated interactions between two transacting parties. Trust can mitigate information asymmetry by reducing transaction-specific risks, therefore generating price premiums for reputable sellers. In addition, the research also examines the role that trust plays in mitigating the risks inherent in transactions that involve very expensive products.

Keywords: Trust, credibility, reputation, information asymmetry, price premiums, feedback mechanisms, electronic markets, online risks

ISRL Categories: AI0105, AI0104, AM01

Introduction

In the past decade, there has been a rapid increase in online commercial activities enabled

[1]Cynthia Beath was the accepting senior editor for this paper.

by the Internet. This revolution in the business world is due primarily to an explosion in information technology (IT) development and the resulting emergence of electronic commerce (Shaw et al. 1997).

Electronic commerce is a new form of online exchange in which most transactions occur among entities that have never met. As in traditional exchanges, trust has been considered crucial in the online transaction process (Ba et al. 1999; Brynjolfsson and Smith 2000), perhaps more so given the impersonal nature of the online environment. The lean nature of the electronic environment relative to the traditional face-to-face market leads to transaction risks rooted in uncertainty about the identity of online trading parties or product quality. As captured by the famous *New Yorker* cartoon tag line, "on the Internet, no one knows you are a dog," online trading parties can easily remain anonymous or change their identities. For example, in an auction market where numerous individuals participate in transactions, it is very difficult to bind one identity to one trader. Most auction sites identify sellers or bidders by e-mail addresses, which can be easily obtained for free from multiple sources. Without proper security measures (e.g., seller authentication), it is very easy for a dishonest seller to masquerade as an honest one, luring an unsuspecting buyer into a fraudulent transaction (Neumann 1997).

Uncertainty about product quality can also be a problem for buyers in the online environment. In a traditional business setting, people get to know the quality of products by "kicking the tires." But when bidders view a product listing at an online auction site, for example, they may not have easy access to information regarding the true quality of the product and therefore may be unable to judge product quality prior to purchase (Fung and Lee 1999). The difference between the information buyers and sellers possess is referred to as information asymmetry. Buyers in online marketplaces have to rely on electronic information without having the ability to physically inspect the product; hence, they are vulnerable to additional risks because of potentially incomplete or distorted information provided by sellers (Lee 1998). Recognizing the difficulty of guaranteeing product quality, eBay excuses itself from the responsibility in its User Agreement by claiming that they "have no control over the quality, safety or legality of the items advertised, the truth or accuracy of the listings."[2] Without a doubt, any information asymmetry resulting from the impersonal nature of the online market exposes electronic market participants to more risks associated with fraudulent transactions.

Information asymmetry may give rise to opportunistic behavior such as misrepresentation of product quality, which could lead to mistrust or even market failure (Akerlof 1970). Therefore, opportunism could erode the foundations of electronic markets and jeopardize the proliferation of the electronic economy. In an effort to reduce the number of fraudulent transactions, many online services have emerged that provide information on sellers' reputation, such as Bizrate.com, eBay's Feedback Forum, and the product review site Epinions.com. Online feedback mechanisms allow buyers to publicize their transaction experiences with sellers by posting comments and rating the quality of the service provided by the sellers. These services and mechanisms help build trust among the potential trading parties in an online community (Walden 2000).

Trust is a catalyst in many buyer-seller transactions, and it can provide buyers with high expectations of satisfying exchange relationships (Hawes et al. 1989). Koller (1988) argues that trust is a function of the degree of risk inherent in a situation. Trust is especially critical when two situational factors are present in a transaction: uncertainty (risk) and incomplete product information (information asymmetry) (Swan and Nolan 1985). Many researchers have argued that an understanding of trust is essential for understanding interpersonal behavior in economic exchanges (e.g., Doney and Cannon 1997, Eisenstadt 1986, Hirsch 1978, Shapiro 1987).

[2]Directly quoted from eBay's User Agreement: http://pages.ebay.com/help/community/png-user.html, accessed on June 21, 2002.

Despite the wide use of reputational mechanisms such as eBay's Feedback Forum to promote trust, there has been little empirical evidence as to whether these mechanisms actually induce trust or create any desirable outcomes such as increased bidding or higher final prices. This study examines the extent to which trust is induced by specific feedback mechanisms in electronic markets and how some risk factors play a role in trust formation. Drawing on economic, marketing, and sociological theories, and using data from both an online experiment and an Internet auction market, we attempt to answer the following questions:

(1) Do appropriate feedback mechanisms induce trust in buyer-seller relationships?

(2) How do positive and negative feedback ratings affect trust formation?

(3) Does trust promote price premiums?

(4) What are the moderating effects of certain risk-inducing product characteristics, such as being very expensive, on the relationship between trust and price premiums?

The rest of the paper is structured as follows: the next section reviews the current literature on trust and how trust develops in an environment that involves potential risks. The third section presents a research model that examines the effects of feedback mechanisms and trust on a seller's performance in electronic transactions. The methodology, results, hypothesis testing, and discussion for studies 1 and 2, respectively, are then presented. The paper concludes by discussing the theoretical and managerial implications of this study, and offering suggestions for future research.

Background on Trust

Most buyer-seller relationships are characterized by information asymmetry since the seller usually possesses more information than the buyer does about the quality of the product or the service (Mishra et al. 1998). The fact that buyers do not have complete information about sellers' actions creates the well-known problem of information asymmetry (Akerlof 1970), which may give rise to opportunistic behavior. Williamson (1985, p. 47) defines opportunism as "self-interest seeking with guile." In buyer-seller relationships, examples of opportunistic actions could include misrepresentation of the true characteristics of a product or service, incomplete disclosure of information, actual quality cheating, contract default, or failure to acknowledge warranties (Mishra et al. 1998). In online auctions, opportunism may take the form of unjustifiable delay in product delivery, receiving payment without delivering a product, and other forms of illegal activity and fraud. Fears of such opportunistic behaviors could result in the buyers' mistrust in online products and services, jeopardizing electronic markets (Choi et al. 1997; Jarvenpaa and Tractinsky 1999; Jarvenpaa et al. 2000). To promote trust and reduce opportunism in the electronic market, credible signals should be provided to differentiate among sellers and give them incentives to be trustworthy.

Following Gambetta (1988), Bhattacharya et al.(1998), and McKnight and Chervany (2000), we define trust as the subjective assessment of one party that another party will perform a particular transaction according to his or her confident expectations, in an environment characterized by uncertainty. This definition captures two important attributes of trust: first, the confident expectation encompasses a possibility of a (mutually) beneficial outcome, and second, the uncertain environment suggests that delegation of authority from one party to another may have adverse (harmful) effects on the entrusting party. While trust could greatly improve the effectiveness of the market (Adler 2001), lack of trust in a market, particularly in one characterized by dishonesty and cheating, could lead to market failure (Granovetter 1985).

Three sources of trust are important in the business world (Coleman 1990; Williamson 1993): familiarity, calculativeness, and values (Table 1).

Table 1. Sources of Trust

Source of Trust	Explanation
Familiarity	Repeated interaction that leads to trust or mistrust
Calculativeness	A subjective assessment (calculation) of the costs and benefits to the other party of cheating
Values	Institutional structures that encourage confidence in trustworthy behavior and goodwill

Table 2. Types of Trust

Types of Trust	Explanation
Benevolence	The belief that one partner is genuinely interested in the other partner's welfare and has intentions and motives beneficial to the other party even under adverse conditions for which a commitment was not made.
Credibility	The belief that the other party is honest, reliable, and competent.

Familiarity or repeated interaction, which can lead to trust or mistrust, is not present in most one-time electronic transactions. Institutional structures in the online world are not yet well-developed (Fung and Lee 1999). This would suggest that the most prevalent source of trust in non-repeated online exchanges is probably calculativeness: Trading parties form their trust perceptions based on a sober assessment (a calculation) of the other party's costs and benefits of cooperating versus cheating (Dasgupta 1988; Hart and Saunders 1998; Williamson 1993). When agents have a reputation of being trustworthy, they can expect to receive benefits for their investment in reputation.

The marketing literature argues that there are two distinct types of trust: benevolence and credibility (Doney and Cannon 1997; Ganesan 1994) (Table 2). Those who form credibility based trust expect that the other party can perform the job effectively and reliably, will acknowledge contracts, and will fulfill implicit and explicit requirements of an agreement. This form of trust is usually impersonal and relies on reputation information and economic reasoning. The management literature has predominantly focused on benevolence based trust (also referred to as goodwill trust; see Sako 1992) rooted in repeated buyer-seller relationships (Ring and Van de Ven 1992; Zaheer et al. 1998). Ganesan (1994) investigated the two types of trust independently and concluded that they did demonstrate different relationships with other variables.

Benevolence does not readily apply to the context of this study since it requires familiarity and prior interaction, whereas the online auction market is characterized by one-time transactions. Resnick and Zeckhauser (2001) report that during their five-month eBay data collection period, 89.0% of all seller-buyer pairs conducted just one transaction, and 98.9% conducted no more than four. Many buyers and sellers are new entrants to the marketplace without established brand name or recognition. Consequently, this paper investigates credibility based trust, which originates from a subjective calculation of the costs and benefits of the other party's cheating, subject to the other party's reputation as it is perceived by a network of market participants.

Conceptual Development

An important part of any transaction model is feedback, described as creating an opportunity to react quickly to signs that have been put out by

others (Schramm 1973, p. 51). Given the risk inherent in online auctions, a variety of trust-promoting mechanisms have been proposed and adopted by practitioners. But how important is trust and how effective are these feedback mechanisms? Do feedback mechanisms lead to higher auction prices? In this section, we will develop a model to explain the mediating role of trust on the relationship between feedback mechanisms and price premiums. In addition, we will also explore how certain risk-inducing product characteristics, such as price, affect trust formation.

Feedback Mechanism

Feedback mechanisms are widely used in online auctions, one example being eBay's Feedback Forum, a place where users leave comments about their buying and selling experiences at eBay and their evaluations of the buyers and sellers with whom they transact. The Forum is a market signaling mechanism in a world with uncertainty and risk. It accumulates and disseminates feedback about past trading behaviors of buyers and sellers, helping eBay's users decide whom to trust and discouraging opportunistic behaviors. Game theory analysis suggests that self-interested agents tend to cooperate given higher payoffs from cooperation than from cheating (Milgrom et al. 1990). An incentive for cooperation is more likely to arise if there are repeated transactions (Kreps 1990). In one-time transactions, self-interested, profit-maximizing agents have incentives to cheat. However, with an appropriate feedback mechanism, each agent's behavior will have reputational consequences. Buyers are informed about the past behavior of all available sellers, and they are able to choose. Hence, it is presupposed that for all sellers, the probability of finding a buyer depends on their past behavior. On the basis of this dependency, only cooperative conduct pays in the long run; hence, rational sellers tend to act in a trustworthy manner. The possible sanctions from buyers resulting from a bad reputation discourage dishonest and opportunistic behaviors. The trust-building process, therefore, is driven by the buyer's calculation that the costs of the seller acting in an untrustworthy manner exceed the benefits of such actions. In short, from game theory (Greif 1989; Milgrom et al. 1990), good feedback will lead buyers to trust sellers; not only does good feedback provide a signal of trustworthiness to potential buyers, but sellers also have incentives to guard their good feedback profile.

Feedback usually consists of negative as well as positive ratings. According to Sundaram and Webster (1998), negative messages have a detrimental effect on unfamiliar brands. Lee et al. (2000) report that higher negative feedback ratings lead to lower bidding prices in Internet auctions. Given that most sellers have not established any name recognition, negative feedback is likely to have a very strong negative effect on a buyer' trust perceptions, which is most likely to supersede the effect of positive feedback.

> **Negative Rating Hypothesis (H1)**: Negative ratings have a greater opposing weight than positive ratings in shaping buyers' trust in a seller's credibility.

Following the same argument, buyers should eminently value a long and unblemished rating profile. Buyers will calculate that a more reputable seller is less likely to destroy a good name to exploit a single transaction (Scott and Derlaga 1983). They will assume that sellers who have accumulated a good reputation would incur a high cost from cheating behaviors, and thus would be less likely to act opportunistically.

> **Positive Rating Hypothesis (H2)**: A greater number of positive ratings induces stronger buyers' trust in the seller's credibility when there is no negative feedback.

Price Premiums

The economics literature defines price premiums as prices that yield above-average profits (Klein

and Leffler 1981; Shapiro 1983). In this context, we define a price premium as the monetary amount above the average price received by multiple sellers for a certain matching product. It is crucial to clarify that price premiums do not imply that auction sellers receive higher prices than from other selling channels. In fact, Kauffman and Wood (2000) show that prices in Internet auctions are significantly lower than standard retail values. A major reason for the existence of price premiums is the need to compensate the seller for reducing transaction risks (Rao and Monroe 1996). Therefore, in an efficient market with dynamic pricing, we argue that buyers are willing to compensate reputable sellers with price premiums to assure safe transactions. On the other hand, buyers will penalize sellers of questionable reputation with a price discount because they must assume above average transaction-specific risks. In summary, differences in perceived reputation and credibility cause price premiums and discounts. Based on this argument, a buyer's trust in a seller's credibility reduces perceived transaction-specific risks, allowing the seller to obtain price premiums.

> **Price Premium Hypothesis (H3)**: Higher trust in the seller's credibility results in higher price premiums for an identical product or service.

Product Prices

As elaborated earlier, price premiums may be viewed as compensation to sellers for promoting trust by reducing transaction risks in an uncertain environment. On the other hand, price discounts are viewed as compensation to buyers for bearing higher than average risk. Therefore, transactions involving riskier products should result in higher price premiums for reputable sellers. For example, a transaction involving an expensive product such as a $1,200 camcorder would be considered riskier than that involving a $15 CD. The more expensive a product is, the less incentive the seller will have to cooperate since the benefits of cheating are greater, and the higher the potential for loss a buyer faces. In our research context, whether a product is considered expensive or not is determined by its market price. Given the greater risk inherent in the exchange of expensive products, buyers would seek more trustworthy sellers with whom to conduct business. Consequently, how expensive a product is should have a moderating effect on the relationship between trust and price premiums.

> **Expensive Product Hypothesis (H4)**: The relationship between trust and price premiums is stronger for expensive products than for inexpensive products.

Figure 1 presents the research model for the study. In summary, the model hypothesizes that buyers' trust in the sellers' credibility, based on the sellers' feedback profiles as reflected in a feedback mechanism, affects their willingness to pay a price premium. In addition, the willingness to pay a price premium is also contingent upon the characteristics of the product, such as how expensive a product is.

Motivations for Using Auction Markets

This study employs online auction markets to test the proposed hypotheses. Online auctions have a number of characteristics that make them particularly suitable for examining the research model in this paper. First, online auctions have become extremely popular with many buyers and sellers, and many products are available. Second, most sellers in online auction markets have not established name recognition, nor have they formed long-term ongoing relationships with their customers (Resnick and Zeckhauser 2001). Therefore, we can safely assume that brand names and familiarity (benevolence or goodwill trust) are absent from these markets. Third, despite some norms and regulations, there are few well-established institutional rules and contracts governing online transactions, and this gives rise to opportunism. Fourth, the feedback mechanism available in eBay—the Feedback Forum—although not ideal, possesses most char-

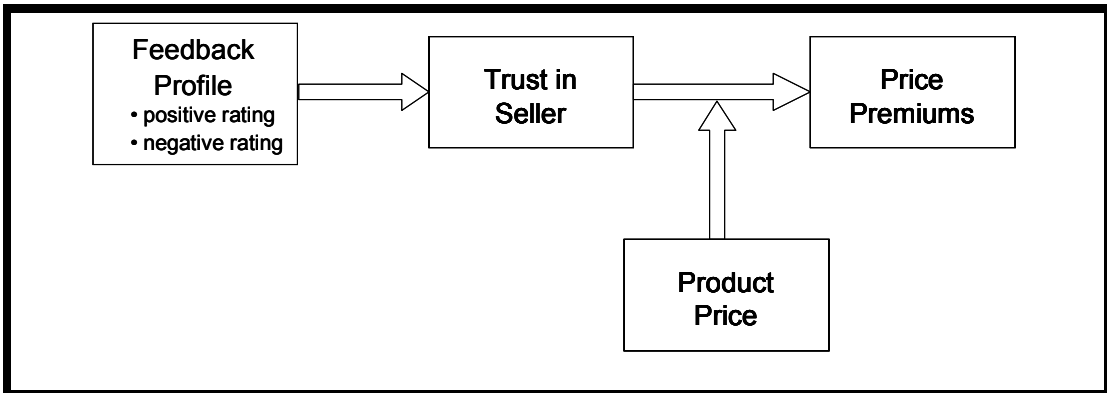

Figure 1. Research Model

acteristics of a credible reputation-creating mechanism (Resnick et al. 2000). Finally, auctions provide a dynamic pricing mechanism that allows final prices to be determined by the buyer. The final prices will, therefore, reflect the buyer's sensitivity to the seller's reputation. To adequately address the research model in Figure 1, we conducted two studies. The first study is an online experiment that allows us to explicitly measure trust by manipulating feedback profiles and product price. The second study uses field data to externally validate the experimental results, which suffer from the constraint that they do not involve actual monetary transactions.

Study 1: Online Field Experiment

Study 1 uses an online field experiment to explore the existence of trust and price premiums in online auction markets resulting from various combinations of feedback profiles. In addition, the study also examines the moderating effect of product attributes on the relationship between trust and price premiums by varying product price.

Experimental Tasks

An online experiment was posted at our research lab's web site where five different feedback profiles were constructed by varying the number of positive and negative ratings in a format similar to the well-established online auction market eBay. The participants were first presented with a web page that described all five sellers' feedback profiles (randomly listed). The participants were asked to indicate how much they trusted each seller. Upon hitting the submit button (when they were done with this page), they were presented with another page that again listed the five seller profiles, each followed by the descriptions of the same four products. The descriptions were taken from real eBay auctions. The participants were asked to provide the maximum bid they were willing to give on each product associated with each seller. The participant's assessment of each seller's trustworthiness was based solely on his or her impressions of the feedback profiles. The feedback profiles, i.e., the number of positive and negative ratings, were controlled to reflect different levels of feedback. However, we did not provide specific "feedback comments" beyond the overall "positive" or "negative" rating.

Procedures

In order to construct meaningful and realistic feedback profiles, we examined the profiles of 937 randomly selected actual eBay sellers. On average, these sellers had a mean of 172 feedback comments (std. dev. = 300), with 170 positive and two negative responses. Therefore, the ratio of

positive to total responses was approximately 99%. Based on an overall evaluation of the 937 profiles, seller profiles were constructed to reflect the typical profiles in eBay's Feedback Forum: a long selling history at eBay would generate approximately 470 responses, and a short selling history would produce about 33 responses. Similarly, a high percentage of positive comments would be 100%, whereas a low percentage would be 92%. Consequently, four of the profiles were $S_{445,0}$, $S_{33,0}$, $S_{34,3}$, and $S_{447,39}$, where S is seller and the first subscript refers to the number of positive ratings and the second the number of negative ratings. Finally, a control profile was constructed with neither positive nor negative ratings ($S_{0,0}$), which consists of about 10% of the 937 sample profiles we examined.

Four products were selected for the experiment that varied in terms of their average price across many completed auctions (see Study 2). That is, the basis for selecting these items was the difference in price ($1,200 versus $15). A music CD and a computer Modem (Motorola 56K PCI Speakerphone Modem) are inexpensive, whereas the Windows server software CD and a Canon digital camcorder are much more expensive.

The experiment was pre-tested in two phases. At the initial phase, four subjects completed the experiment in the presence of one of the authors. All four subjects were graduate students who had experience with the Internet and understood how an online auction works without any explanation from the authors. They commented on every item and justified their answers. Post-experimental inquiries assessed whether these subjects guessed the study's purpose and true hypotheses. Their responses did not suggest that they had faithfully captured the research hypotheses, rendering support that there was no significant demand bias in this experiment (Page 1973). Feedback from this phase determined the format of the design and the questionnaire used in the experiment.

The experiment was then further pre-tested with eBay users. An e-mail invitation was sent to a random sample of 60 eBay users, asking them to visit the web site and participate in the experiment. A field at the end of the questionnaire allowed them to post their comments and suggestions. Seven users participated and, based on their suggestions, the experiment was considerably shortened.

For the actual experiment, an e-mail notice was sent to 414 eBay users. These users were randomly selected from eBay users who had completed at least five transactions. The reason for selecting users with some experience was twofold. First, the pretest indicated that users with some auction experience found it easier to understand and complete the experiment compared to users with minimal exposure to auctions. Second, veteran auction participants seemed likely to be more interested in participating in an auction-related experiment, thus increasing the response rate. The e-mail notice informed them of the purpose of the study and asked them to reply if they did not want to participate. A total of 21 users replied and expressed their unwillingness to participate, leaving 393 users who received an e-mail telling them how to access the web site and participate in this experiment. The invitees were informed that the goal of the survey was to understand the concepts of reputation and trust in online auction markets, and they were assured that the results would be reported in aggregate to guarantee their anonymity. To motivate individuals to respond, we offered an incentive in the form of a report summarizing the results of the experiment, and a chance in a $100 lottery to be drawn among all participants. In addition, we compiled for the participants many resources about online auctions.

Measures

Scales to measure each of the constructs in the model were developed based on previous literature and existing scales were used where possible. In particular, measures of trust based on credibility were synthesized from Ganesan (1994), Sako (1992), and Sako and Helper (1998). Participants were asked to complete a three-item, nine-point Likert-type scale measuring trust in the seller's credibility.

Response Rate and Nonresponse Bias. Out of 393 possible responses, 95 were received, for an effective response rate of 24%. All responses were received within one week from the day the invitation was sent, and more than half (53%) of the participants completed the experiment in the first day. The response rate is considered high compared to similar studies, which we attribute mainly to the invitee's interest in online auctions. In fact, 81% of the respondents requested the results of the study. Further tests also indicate that nonresponse bias does not seem to be a major concern in this study.[3]

Two methods for assessing discriminant validity of the measures were used. First, exploratory factor analyses were conducted using orthogonal (varimax) rotation to ensure high loadings on hypothesized factors and low cross-loadings. Second, all eigenvalues associated with the factors were set to be greater than unity, and the seven items in the questionnaire were reduced to two principal constructs (trust and price premiums). All items loaded on their hypothesized factors, and the estimates were positive and significant, which provides evidence of convergent validity (Bagozzi and Yi 1988). The factor solution for trust is shown in Table 3. The overall factor solution has an acceptable loading pattern and explains 86% of the variation. Therefore, the statistics support construct validity in this study. Moreover, reliability analysis of these two scales shows a Cronbach's alpha of 0.98 for trust and 0.82 for price premiums. These reliability values are well above the value of 0.7 that was suggested by Nunnally (1978) for basic research. Therefore, the items corresponding to each variable could be averaged to create an overall measure for each variable.

[3]T-tests with respect to "Age" (t = 1.17, p = .25), "Sex" (t = 1.54, p = .13), and "Income" (t = 1.34, p = .19) were conducted to examine differences between early and late respondents (Armstrong and Overton 1976; Heide and Weiss 1995). The null hypothesis of equal means across the early (n = 50) and late (n = 45) (received after the first day) respondents could not be rejected.

Results

Testing of the Structural Model

Key descriptive statistics for the trust and price premium variables are shown in Table 4.

In order to examine the effect of feedback profiles (i.e., positive and negative ratings) on trust perceptions, multivariate regression analysis was performed with trust as the dependent variable. The independent variables were the logarithm of the number of positive ratings (PR) and negative ratings (NR), adding 1 to avoid the possibility of taking the log of 0. The logarithmic transformation was used because we believe trust is a concave function of the number of positive ratings, that is, when a seller already has many positive ratings, the marginal benefit of an additional positive rating should not be as big as that for a seller who has no or very few positive ratings. With the same reasoning, trust is a convex function of the number of negative ratings. The variable trust was normalized by removing the corresponding mean from each value and dividing it by its standard deviation.

Table 5 displays the correlation matrix. The correlation between positive ratings and negative ratings seems high. Therefore, the regression also included a formal multicollinearity test. Table 6 shows the results of this regression. A multicollinearity diagnostic returns a tolerance value of .76, well above the common cutoff threshold of .10 (Hair et al. 1998), indicating that multicollinearity is not a concern.

From Table 6, we can see that the multivariate regression shows a relatively high R^2 (0.57) and both positive and negative ratings determine the formation of a buyer's trust in a seller, with negative ratings having an opposing effect. The coefficients of regression indicate a higher weight for negative (b_2 = -.856) compared to positive (b_1 = .541) ratings. A t-test was performed to compare the weight of the negative versus the positive ratings and the result indicates that the coefficient of regression for negative ratings was significantly higher than the positive rating coefficient (t-value = 6.15, p < .000). This supports the

Table 3. Measurement Instrument

Measures and Items	Cronbach's Alpha	Source
Trust in Seller's Credibility[a]	**.98**	
1. I think this seller is honest.		Ganesan (1994)
2. I believe this seller will deliver to me the product I purchase according to the posted delivery terms and conditions.		Sako (1992)
3. I believe this seller will deliver to me a product that matches the posted description		Sako and Helper (1998)
Price Premium[b]	**.82**	
1. If you want to bid on this product available from the above seller, what is the maximum bid you are willing to submit to win this auction?		

[a]Response scale: 1 = strongly disagree; 5 = neither agree nor disagree; 9 = strongly agree.
[b]Responses to this question were in terms of percentages above or below a stated price. Subjects provided responses for four products. The Cronbach alpha is based on these four responses.

Table 4. Descriptive Statistics: Trust and Price Premiums

	Trust	Price Premiums (%)				
		PP	PP_{modem}	PP_{music_CD}	$PP_{camcorder}$	$PP_{Windows\_CD}$
$S_{445,0}$	8.4 (1.1)	11.9 (19.4)	12.6 (28.1)	-2.8 (29.0)	21.5 (26.5)	16.1 (36.2)
$S_{33,0}$	7.6 (1.2)	5.7 (18.7)	10.3 (26.7)	-8.3 (27.0)	16.4 (31.9)	4.4 (35.8)
$S_{0,0}$	5.3 (0.9)	-15.9 (26)	-7.4 (30.1)	-20.0 (26.0)	-17.0 (36.9)	-19.0 (37.8)
$S_{34,3}$	5.3 (1.7)	-21.3 (27.3)	-9.0 (30.4)	-21.0 (28.0)	-26.7 (35.1)	-28.7 (36.5)
$S_{447,39}$	3.9 (2.0)	-32.6 (30.7)	-22.0 (37.1)	-30.5 (33.0)	-40.0 (35.7)	-38.0 (40.4)
Overall	6.1 (2.2)	-10.4 (29.9)	-3.1 (33.2)	-16.5 (30.0)	-9.1 (41.2)	-13.0 (42.3)

S refers to seller profile, where the first subscript refers to the number of positive ratings, and the second the number of negative ratings. Price premium without subscripts is the simple average of the price premiums for all four products. Numbers without parentheses are the means, numbers in parentheses are the standard deviations. N = 95.

Table 5. Correlation Matrix of the Variables

	Log(Positive Ratings)	Log(Negative Ratings)
Log(Positive Ratings)	1.00	
Log(Negative Ratings)	0.48	1.00
Trust	0.12	-0.59

Table 6. Results of Regression Analysis for Trust in Seller's Credibility

	R^2 (adjusted)	F-value	b_i	t-value	Tolerance Value
Regression	0.57	244.447***			
Log(PR)			0.541	13.787[a]	0.763
Log(NR)			-0.856	-21.812[a]	0.763
Constant				35.976[a]	

PR = Positive Ratings; NR = Negative Ratings. $N = 475$.
[a] $p < 0.001$

negative rating hypothesis (H1), which argued that negative ratings would have a greater opposing effect than the positive ratings when a buyer forms his level of trust in a seller's credibility based on feedback information.

To check how a feedback profile with only positive ratings affects a buyer's trust formation, we compared the three profiles without negative ratings ($S_{0,0}$, $S_{33,0}$, and $S_{445,0}$). The mean level of trust for the three different sellers is 5.3, 7.6, and 8.4, respectively. An analysis of variance indicates that the between-group means are significantly different from each other ($F = 175.9$, $p < .000$). In addition, since the means for seller $S_{33,0}$ and seller $S_{445,0}$ are close, we performed a paired-samples t-test to compare these two means. The result indicates that these two means are also significantly different ($t = 8.226$, $p < .000$). All of the above support the positive rating hypothesis (H2), which argued that when there is no negative rating, a greater number of positive ratings induces a higher level of trust in the seller's credibility.

To examine the relationship between a buyer's trust level in a particular seller and the price premium the buyer is willing to pay for the seller's product, we regressed the normalized values of trust (the independent variable) against the normalized price premiums (the dependent variable). The results for the four different products and their means are shown in Table 7. Since regression analysis was performed on normalized values, the standardized coefficient of regression was equal to the correlation between trust and price premiums. All coefficients were significant ($p < .000$) and positive, demonstrating the effect trust has on price premiums. Therefore the price premium hypothesis (H3) is supported. In addition, a scatterplot of the standardized residuals on the standardized predicted value was done to test for heteroskedasticity. The plot shows no evidence of heteroskedasticity.

To test for the mediating effect of trust, the following series of regression models was estimated (Baron and Kenny 1986):

Table 7. Results of Regression Analysis for Price Premium by Product

	Independent Variable: Trust			
Dependent Variable	**R^2**	**F-value**	**b**	**t-value**
PP_{modem}	0.196	88.3[a]	0.442	9.40[a]
PP_{music_CD}	0.107	43.49[a]	0.327	8.16[a]
$PP_{camcorder}$	0.259	127.2[a]	0.509	11.28[a]
$PP_{Windows\_CD}$	0.155	66.6[a]	0.394	8.16[a]

PP = price premium. N = 475.
[a] $p < 0.001$.

Table 8. Testing the Mediating Effect of Trust

Regression Equation	Dependent Variable	R^2 (adjusted)	F-value	b_i	t-value
Equation (1)	Trust	0.572	244.447[a]		
Log(PR)				0.541	13.787[a]
Log(NR)				-0.856	-21.812[a]
Equation (2)	PP	0.302	79.763[a]		
Log(PR)				0.361	7.207[a]
Log(NR)				-0.630	-12.569[a]
Equation (3)	PP	0.326	59.569[a]		
Log(PR)				0.230	3.771[a]
Log(NR)				-0.422	-5.624[a]
Trust				0.244	3.690[a]

PR = Positive Ratings; NR = Negative Ratings. N = 475.
[a] $p < 0.001$

$$Trust = \beta_0 + \beta_1 \cdot Log\,(PR) + \beta_2 \cdot Log\,(NR) + \varepsilon \quad (1)$$

$$PP = \beta_0 + \beta_1 \cdot Log\,(PR) + \beta_2 \cdot Log\,(NR) + \varepsilon \quad (2)$$

$$PP = \beta_0 + \beta_1 \cdot Log\,(PR) + \beta_2 \cdot Log\,(NR) + \beta_3 \cdot Trust + \varepsilon \quad (3)$$

Table 8 indicates that all the coefficients are significant, satisfying the conditions needed to establish mediation (Baron and Kenny 1986). That is, trust indeed mediates the relationship between feedback profile and price premiums.

Testing of the Moderator

We hypothesized that product price would moderate the relationship between trust and price premiums. To test the hypothesis, we included an additional variable: product price, which is the actual retail price of the product. The moderated

Table 9. Results of Moderated Regression Analysis for Study 1

Regression Equation	Dependent Variable	R^2 (adjusted)	F-value	b_i	t-value
Equation (4)	PP	.172	304.34[a]		
Trust				0.416	17.445[a]
Equation (5)	PP	.185	111.192[a]		
Trust				0.414	17.349[a]
Price				-0.004	-.186
Equation (6)	PP	.195	71.655[a]		
Trust				0.247	5.824[a]
Price				-0.004	-0.168
Trust · Price				0.07	2.269 [b]

N = 475
[a]$p < 0.01$, [b]$p < 0.05$

regression analysis technique was used (Sharma et al. 1981). In other words, the following regressions were performed:

$$PP = \beta_0 + \beta_1 \cdot Trust + \varepsilon \quad (4)$$

$$PP = \beta_0 + \beta_1 \cdot Trust + \beta_2 \cdot Price + \varepsilon \quad (5)$$

$$PP = \beta_0 + \beta_1 \cdot Trust + \beta_2 \cdot Price + \beta_3 \cdot Trust \cdot Price + \varepsilon \quad (6)$$

Table 9 shows that product price is a pure moderator, indicating that the relationship between trust and price premiums is contingent upon product price. Thus hypothesis 4 is supported. Figure 2 demonstrates the moderating effect of product price. It is a plot for expensive as well as inexpensive products. The results reveal that at a lower level of trust, buyers demand a greater price discount for expensive products than for inexpensive products (a negative price premium means price discount). When trust reaches a rather high level (7.2 on a 9-point scale), buyers appear to be willing to pay a higher price premium for expensive products. For inexpensive products, however, the relationship between trust and price premiums is not as pronounced. Even at a very high level of trust, buyers still would not be willing to pay a high price premium.

Discussion

As with all experimental studies, this field experiment may potentially suffer from demand bias, especially since it was performed outside the laboratory, giving the experimenters limited control over the participants' behavior (Shimp et al. 1991). In order to reduce the effect of demand bias, several precautions had been taken following the recommendations of Sawyer (1975) and of Greenberg and Folger (1988). First, we used natural surroundings to conduct the experiment, replicating eBay's auction interface to the extent possible. Second, we provided very little information about the intent of the study in the experiment's instructions and questionnaire items. In doing so, we minimized potential demand cues that might have alerted the participants to our research objectives. Third, we used a form of deception by providing two different web pages and asking the most important questions on the second page, thus diverting the subjects from understanding the study's objectives. These precautions seemed to keep the four participants in the pretest from inferring the study's true hypotheses in a post-experimental inquiry. In general, given that demand bias is almost impossible to diminish completely, we are confident that our methods have reduced demand bias to a degree that the study's findings are not affected.

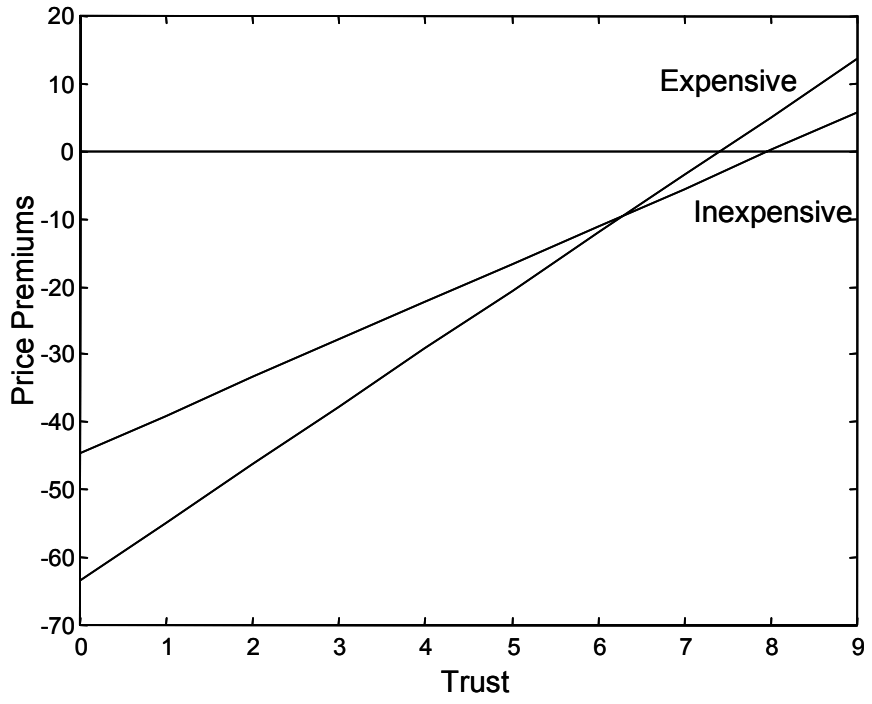

Figure 2. The Moderating Effect of Product Price on the Relationship between Trust and Price Premiums

A main limitation of the study is that we manipulated feedback only by varying the *number* of positive and negative feedback ratings. Many feedback mechanisms, including eBay's Feedback Forum, also provide a section for comments where buyers can explain the reasoning behind their rating. Much information about sellers is available in these comments; for example, one negative rating might be due simply to a delay in the delivery, while others might be due to more egregious failures, such as a misrepresentation of product characteristics, or even a complete failure to deliver the product. Therefore, comments would be an important complement to this study. In fact, some participants suggested that comments about sellers would be extremely helpful in determining their trust perceptions.

In summary, this study is an attempt to examine from the seller's side whether it is rewarding to establish a good reputation and whether trust affects buyer behavior. Our analyses indicate that the four hypotheses are supported. However, we still do not know whether a good feedback profile really converts into price premiums in a real auction setting. Critics of experimental work argue that external validity is not preserved in this type of study. That is, differences in feedback ratings might not generate price premiums in actual market settings. In fact, empirical evidence has shown conflicting results regarding the effectiveness of these systems in real online environments (Kauffman and Wood 2000; Lee et al. 2000). Therefore, a good feedback profile may not translate into price premiums at all: there may be some buyers who value a product highly and do not consider the feedback profile when bidding. Examining the feedback-price premiums relationship in a real auction market thus seems particularly important. Study 2 is designed to address this issue.

Study 2: Field Data from eBay.com

Study 2 used field data to examine whether a good feedback profile leads to price premiums in real auction settings. In addition, the moderating effect of product price was also evaluated using field data.

Method

Data were collected from eBay's Feedback Forum. eBay—one of the most popular auction marketplaces—was selected to ensure a high number of transacting parties and products. Its Forum allows buyers to leave comments about sellers with whom they have transacted, rating them as positive, negative, or neutral. From January 25 to March 10, 2000, we collected data from 682 completed auctions for 18 different products. Data included the final winning auction price and the feedback profile of each seller. All products were examined to insure they were identical in order to avoid price differences rooted in product-related variations, such as differences in brand names. Two researchers examined these products' descriptions to insure that they were identical products, all brand new, sealed, and not refurbished. Completed auctions whose products did not clearly possess these characteristics were not included in the final sample.

Because there is no direct measure of trust in the eBay data, the research model in Figure 1 had to be modified. Instead of testing the relationship between trust and price premiums, we tested a direct relationship between feedback profiles and price premiums, plus the moderating effect of product price on that relationship. Thus H1, H2, and H4 were correspondingly modified, using feedback profile as a proxy for trust.

To test the relationships between feedback ratings and price premiums, multivariate regression analysis was performed for each product, with the independent variables being the logarithm of the number of positive and negative ratings, consistent with Study 1. The dependent variable was the price premium developed by subtracting the mean price from the final price of each product divided by its mean price.

$$PP = \beta_0 + \beta_1 \cdot Log\,(PR) + \beta_2 \cdot Log\,(NR) + \varepsilon$$

The moderated regression analysis technique was again used to test the moderating effect of product price, with the interaction terms *Log(PR)*Price* and *Log(NR)*Price*. Product price was operationalized as the average price of each product across all completed auctions.

Results

Table 10 shows the descriptive statistics of the price variable for the 18 products.

We expected to find that more positive ratings would lead to higher price premiums, whereas negative ratings would have a stronger opposing effect. The relationship between feedback profiles and price premiums should also be stronger for expensive products.

Table 11 presents the regression results between feedback profile and price premiums for all 18 products. Regression analysis found significant correlation between positive ratings and price premiums for 13 out of the 18 products. This provides evidence that buyers do take into account reputational indicators such as a seller's feedback rating and do reward trustworthy sellers with price premiums. Therefore, field data provide support for our theoretical argument that better feedback profiles induce higher trust which in turn leads to higher price premiums, confirming H2 in the research model. However, contrary to our expectation theorized in H1, negative ratings only had a significant negative impact in two of the tests.

Table 12 shows the results of the moderated regression analysis, which indicate that product price acts as a moderator on the relationship between negative ratings and price premiums. This finding is consistent with Study 1: higher pro-

Table 10. Descriptive Statistics: Auction Winning Price for Each Product

Product Description	N	Mean	Standard Deviation
3Com Web Camera	18	100.5	9.2
Adobe Photoshop	54	353.6	68.7
Canon Camcorder	20	1140.2	82.5
Canon Scanner	25	235.6	24.0
Celine Dion CD	58	9.6	1.8
Compaq Memory	31	422.6	55.6
Gran Turismo 2	67	28.8	3.1
HP Laser Printer	25	285.4	33.2
Motorola Modem	53	16.8	5.3
Palm V Organizer	35	262.9	28.4
Pokemon Gold	47	39.8	7.2
QuickenPro 2000	31	41.7	5.3
Santana CD	54	8.5	1.2
Sony Camera	30	808.3	47.9
Sony DVD S330	32	251.0	18.4
Sony DVD S530D	31	321.2	23.2
Windows 2000	57	181.3	27.5
Windows Server	14	1413.9	199.6
All Products	682	232.3	305.6

duct price accentuates the relationship between negative ratings and price premiums. That is, for a certain number of negative ratings, the higher the product price, the larger the price discount. However, the tests failed to show any effect of price on the relationship between the positive ratings and price premium.

Discussion

Study 2 was carried out in a real-life environment in which actual buyers generate price premiums as a result of differences in sellers' feedback profiles. Moreover, real-life transaction-specific risks incurred by certain product characteristics are reflected in this study, addressing the limitations associated with Study 1 that are inherent in any experimental study. The price premiums in Study 2 are measured from the market's perspective, that is, the materialized value the sellers actually received with dynamic pricing. The finding that sellers with stellar reputations receive price premiums has also been observed in auctions of coins (Lucking-Reiley et al. 2000) and computer equipment (Houser and Wooders 2000). Our study examines a greater number of products compared to previous studies, and it also attempts to make theoretical inferences about the moderating role of product prices.

A major limitation of Study 2 was the use of secondary data, which did not allow us to measure trust perceptions. Moreover, the written

Table 11. Results of Regression Analysis by Product
Independent Variables: Log(PR), Log(NR); Dependent Variable: PP

Product Description	R^2	F-value	b_{PR}	t_{PR}	b_{NR}	t_{NR}
All Products	.14	54.069[a]	.343	8.379[a]	.051	1.236
3Com Web Camera	.40	6.576[a]	.363	1.326	.373	1.365
Adobe Photoshop	.36	15.919[a]	.624	5.522[a]	-.273	-2.416[b]
Canon Camcorder	.85	55.234[a]	.974	9.836[a]	-.107	-1.083
Canon Scanner	.20	3.999[b]	.095	.357	.444	1.672
Celine Dion CD	.06	2.895[c]	.302	2.271[b]	.023	.172
Compaq Memory	.37	9.749[a]	.549	2.184[b]	.109	.435
Gran Turismo 2	.22	10.306[a]	.530	4.199[a]	-.082	-.649
HP Laser Printer	.18	3.676[b]	.310	1.205	.233	.907
Motorola Modem	.19	6.964[b]	.445	2.473[b]	.030	.164
PalmV Organizer	.14	3.700[b]	.476	2.702[b]	-.152	-.865
Pokemon Gold	.11	3.857[b]	.373	2.360[b]	.026	.166
QuickenPro 2000	.17	4.044[b]	.392	1.571	.102	.410
Santana CD	.05	2.407[c]	.196	1.270	.141	.912
Sony Camera	.67	30.46[a]	.895	7.503[a]	-.172	-1.444
Sony DVD S330	.33	8.770[a]	.703	2.890[a]	-.116	-.478
Sony DVD S530D	.44	12.898[a]	.895	4.935[a]	-.427	-2.352[b]
Windows 2000	.14	5.542[a]	.416	2.827[a]	-.005	-.037
Windows Server	.55	8.881[a]	.556	2.121[b]	.288	1.099

Multicollinearity checks for the 18 regressions all returned a tolerance value above .70. A scatterplot of the standardized residuals on the standardized predicted value was done to test for heteroskedasticity. The plot shows no evidence of heteroskedasticity.

[a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.1$

Table 12. Results of Moderated Regression Analysis for Study 2

Independent Variables	Dependent Variable	R^2 (adjusted)	F-value	b_i	t
Regression 1	PP	.13	54.069[a]		
Log(PR)				.343	8.379[a]
Log(NR)				.051	1.236
Regression 2	PP	.13	27.070[a]		
Log(PR)				.342	8.185[a]
Log(NR)				.055	1.279
Price				.021	.510
Regression 3	PP	.14	14.267[a]		
Log(PR)				.797	1.202
Log(NR)				.195	.289
Price				.004	.043
Log(PR)*Price				.108	.886
Log(NR)*Price				-.146	-1.657[b]

PR = Positive Ratings; NR = Negative Ratings. N = 682.
[a]$p < 0.01$, [b]$p < 0.05$

comments, which accompanied sellers' ratings, were not evaluated and used in assessing the degree of price premiums. Buyers' comments do offer notable information that cannot be captured by simple ratings. There is a significant difference between a negative comment suggesting a delay as opposed to fraud. More careful analysis of written comments may reveal new information about the role of feedback mechanisms. For example, detailed comments may suggest that other types of trust (e.g., benevolence as opposed to credibility) are at play. However, the amount of subjectivity involved in the process of analyzing such comments and the huge number of comments for each of the 682 sellers (mean = 172 comments) prevented such an evaluation. Future research could analyze the role of written comments in determining trust and price premiums and specify the relative importance of different types of negative comments as opposed to simple ratings.

Implications and Conclusion

The primary contribution of this research is that a set of interrelationships between important factors that tend to be associated with trust and trust building technologies in electronic markets was specified. The results from the two studies provide substantial support for the research model in Figure 1. Our framework proposes several important considerations for the mediating role of trust in electronic markets. Another contribution of this research is the analysis of the credibility type of trust. While the extant literature has paid particular attention to benevolence as the most important type of trust, this research shows that in online transactions, credibility trust is also a very important predictor of positive economic outcomes. In fact, our results broadly support the thesis that positive economic outcomes such as increased

Table 13. The Key Findings of the Studies

Research Questions	Experimental Study	Field Setting
Do feedback mechanisms induce trust?	• Better feedback profiles induce higher level of trust	• Trust not explicitly measured
How do positive and negative feedback ratings affect trust formation?	• More positive ratings lead to higher level of trust • Negative ratings have a stronger negative impact on trust than positive ones	• Trust not explicitly measured • Positive ratings show a strong impact • Negative ratings fail to show significant impact
Does trust promote price premiums?	• Higher level of trust leads to higher price premiums	• Positive ratings lead to higher price premiums • Negative ratings fail to show significant impact
What is the moderating effect of transaction risks (product price)?	• For expensive products, relationship between trust and price premium is stronger	• For expensive products, negative ratings suppress price premiums

price premiums are based to a considerable degree on buyers' trust in sellers' credibility. Therefore, this type of trust undoubtedly commands further research effort with regard to its role in electronic markets.

Key Findings

This study is one of the first to address the importance of impersonal trust in online transactions from the consumers' point of view. Our hypotheses are largely supported and suggest that a seller's reputation, reflected in his feedback profile, plays a very important role in buyers' willingness to pay premium prices.

To answer the research questions raised in the introduction, we summarize the key results from the two studies in Table 13. The results confirm that buyers develop trust in sellers' credibility partly as a result of feedback mechanisms, and that trust has a substantial effect on the transaction by generating price premiums. The research model is strengthened by the identification of one variable that moderates the interrelationships. The study provides evidence that riskier transactions are likely to generate more pronounced price premiums for reputable sellers. Expensive products are believed to have higher transaction-specific risks because the seller has higher incentives to cheat.

A surprising difference between the two studies is the effect of negative ratings: contrary to our theoretical argument and results obtained in previous studies (Lee et al. 2000), negative ratings by themselves didn't show much impact on price premiums in the eBay data. In fact, the only time negative ratings were significant was when expensive products were involved in the transactions. We believe that the difference between our study and the study of Lee et al. is the result of product selection: our study included only brand new products, whereas the other study also included used and refurbished products. When a product is used or refurbished, the quality variance might increase significantly, which means that the risk level for the buyer also increases. Negative ratings in this case would weigh more heavily as opposed to when a brand new product is involved.

In addition, several other reasons might contribute to the result of negative ratings not being significant. First, our study examined only completed auctions. Auctions run by sellers with many negative ratings tend not to be completed (they do not receive bids). Therefore, although these sellers essentially obtained a great price discount (by not receiving any bids at all), our sample did not capture these incomplete auctions. Second, from a statistical point of view, given the small number of negative ratings compared to the total (1%), their effect might not be as detrimental as we originally theorized. The much greater number of positive ratings might simply supersede the effect of negative ratings and reduce their damaging potential. It is worth pointing out that eBay strongly encourages buyers to negotiate and try to work out their problems before resorting to leaving negative comments. Hence, these efforts reduce the actual number and impact of negative ratings in real-world auctions. Finally, when a seller receives a high number of negative ratings, eBay prevents the seller from selling at the site. Therefore, the vast majority of sellers do have very good ratings. Indeed, it is possible that there is a threshold level for negative ratings (in other words, a tolerance level from buyers) under which buyers do not mind doing transactions with the seller. To summarize, both studies indicate that positive ratings have a strong impact on price premiums. However, the effect of negative ratings is not conclusive.

Theoretical Implications

Our conclusions are in agreement with the findings of Lee (1998), who examined the electronic auction marketplace AUCNet for used cars in Japan. Both papers address the issue of increased quality uncertainty and risk associated with online transactions. Lee focuses on uncertainty regarding product quality, whereas we examine uncertainty related to seller credibility. Both forms of uncertainty have a similar negative impact on the buyer's expected utility. Vehicle quality uncertainty in AUCNet is addressed by an accreditation mechanism where AUCNet mechanics inspect all vehicles and provide a rating. While accreditation may be regarded as a viable trust-building mechanism that reduces information asymmetry, Lee noted that this costly policy (among other factors) has contributed to significantly higher average prices in the AUCNet marketplace compared to those in traditional automobile auctions. On the contrary, feedback mechanisms reduce uncertainty regarding seller quality without increasing the average prices of products, which are significantly lower compared to traditional markets (Kauffman and Wood 2000). Therefore, a significant advantage of employing feedback mechanisms lies in the low cost for their implementation. Furthermore, accreditation mechanisms similar to AUCNet's quality inspection prevent a market for "lemons" by providing a rating indicative of the car's quality. Similarly, feedback mechanisms also avoid a market with "lemon" sellers by providing a rating that is indicative of the seller's quality.

Although some researchers suggest that among the different levels of trusting relationships, calculus-based trust in one's credibility is the most fragile (Granovetter 1985, Lewicki and Bunker 1995), this paper provides theoretical evidence that credibility trust is not so fragile and can be built without familiarity and personal interactions. In fact, it can be a powerful form of trust to facilitate electronic transactions, given a robust feedback mechanism. Since a growing number of electronic transactions will take place without personal interactions, the role of credibility trust will consequently become more important.

By including product price as a moderating variable in the research model, we extended the current literature that looks at trust in the online market—the extant research mainly focuses on the consequences of trust. We have demonstrated in this paper that transaction-specific risks are highly intertwined with trust. Building trust alone is a necessary, but not a sufficient, condition to generating a positive economic outcome. In addition to a good reputation, other factors will affect the relationship between trust and price premiums, therefore warranting future theoretical investigations.

Implications for Practice

One important insight that comes out of this research is that it is indeed possible to create credibility trust without prior interactions, encouraging firms to expand their business horizons and explore new opportunities. The recent stock market shake-up in the Internet sector and continuous reports on Internet frauds have raised questions about the viability of electronic commerce (Economist 2001). Many firms consequently may scale back their online activities, resorting to old transaction models in which they deal with only a handful of business partners. This research indicates that proper mechanisms can be set up to induce trust, even between business parties that have never transacted with each other before, and to produce a favorable economic outcome.

This study highlights the role of product characteristics in increasing transaction-specific risks. Perceived risk factors have been considered important in online transactions (Jarvenpaa and Tractinsky 1999; Jarvenpaa et al. 2000). This study provides empirical evidence that accumulating positive feedback ratings is only one part of the trust building process. Sellers—online companies in general, for that matter—need to be aware of how certain product characteristics such as product price affect transaction-specific risks and buyer behavior and structure their online product offering strategy accordingly to mitigate those risks. For example, they might offer a better warranty policy for expensive products. This result sheds light on why some dot.com companies were never able to attract enough transaction volume to stay in business: differences in transaction-specific risks between the online environment and the physical market demand different trust building efforts. Firms venturing into the online market need to be aware of the sources of transaction risks and tailor their market strategy accordingly. For example, when a firm first starts online retailing, what products should they offer? All products are not equal. There are different degrees of information asymmetry associated with different products. Wrong initial product offerings could jeopardize the firm's chance to succeed in the online market. However, once the firm has established a solid reputation, information asymmetry may no longer pose as big a risk to a consumer. The consumer may be more willing to buy products that previously were considered "too risky." In short, companies planning to compete in the electronic market need to carefully devise their strategy based on their product offerings and provide information that is designed to help consumers understand their transaction risks.

A good reputation, and the trust associated with it, works not only in the market where it is originally generated. Research has shown that trust is transferable (Lewicki and Bunker 1995). Sellers could use an accumulated positive reputation to receive economic advantages in different settings. The online market makes this transfer process extremely easy. For example, BestPriceAudio Video.com advertises on its own website its feedback profile accrued in eBay's auctions and Bizrate.com. By having a link to the other websites where its reputation is shown, BestPriceAudio Video.com transfers its reputation to its own storefront in hope of establishing trust and gaining price premiums. Therefore, online feedback profiles may be viewed as readily transferable sources of trust which could lead to economic advantages.

At the aggregate level, the Feedback Forum at eBay has become a competitive advantage for the company. For example, Amazon.com attempted to boost its own auction marketplace by allowing sellers to import their feedback profiles from eBay to Amazon. However, eBay strongly objected to such an attempt, arguing that the Feedback Forum is its own asset. Even though this dispute never reached legal jurisdiction that would provide evidence for the perceived value of eBay's feedback mechanism, it is evident that there is a practical economic value attached to the institution of trust-building technologies.

Our research also provides insights into ways of building a better feedback mechanism. Currently, eBay shows a member's feedback summary in the aggregate form: the number of positive ratings

minus the number of negative ratings. Our experimental study indicates that negative ratings carry a much stronger effect than positive ones on a buyer's trust level and consequently the price premium he or she is willing to pay. Reporting the feedback in the aggregate form minimizes the impact of negative ratings, thus lowering the effectiveness of the mechanism.

An examination of the actual feedback profiles from eBay reveals that the overall number of negative ratings is extremely low, contradictory to reports that online auctions account for 87% of all Internet frauds (Internet Fraud Watch 2000). One explanation is that there is no anonymity when giving negative ratings at eBay: the user ID is always associated with each rating and comment. Since the negative ratings carry a heavy weight, leaving negative ratings may cause retaliation. Therefore, many members may be reluctant to leave negative ratings, fearing the action may endanger their own feedback profile. An alternative explanation for the low number of negative ratings is that when a member receives several bad ratings, he may abandon his online identity and re-enter the market under a new identity. Currently, auction sites do not have strong authentication methods to prevent such a behavior, and the cost of obtaining a new online identity is close to zero. Consequently, the auction market may appear to have fewer lemons than it actually does. Without appropriate corrective measures, the long term viability of the electronic market may be in question.

Suggestions for Future Research

There are several ways in which future research could strengthen the results of this study. First, the results and implications of this research may be constrained by the research context of the auction mechanism. Although our findings support the general theoretical framework, it is also possible that a different sequence of relationships is acting simultaneously. Similar to all cross-sectional studies, longitudinal research can further enhance or refute our empirical findings. In addition, the dynamic and constantly changing context of the online auction environment may affect the nature of electronic markets in the future. Therefore, longitudinal studies will probably be the research method of choice for understanding the role and nature of trust in electronic markets.

It should be clear that this research examined only a subset of the many possible relationships between trust and its antecedents, consequences, and moderating variables. Future research should take a more extensive approach to cover all possible positive and negative antecedents of trust in electronic markets. In addition, many other constructs may act as moderators in the causal relationship proposed by our conceptual development, such as product type. For example, products whose quality can only be assessed after purchase (the so called "experience products") inherently have a higher level of information asymmetry, which possibly implies more risks for buyers. How does the relationship between trust and price premiums change when transactions involve this type of products? While there is substantial support for our hypothesized model, direct effects between the antecedents and consequences of trust may exist that were not directly tested by the nature of our statistical analysis.

While our research model proposes that trust induces price premiums, we do recognize the possibility that price premiums may also be affected by other factors, such as buyers' personal preference, socio-economic status, past experience with online auctions, private valuations, etc. There is much unexplained variance in both trust and price premiums. Future research should include more control variables to pinpoint the relationship between trust and price premiums.

Our argument suggests that trust reduces the effect of transaction-specific risks on price premiums, thus extracting some social welfare. Moreover, price premiums suggest that sellers absorb at least some of this welfare as rents. However, compared to traditional markets, credibility could be quickly generated on the Internet given appropriate feedback mechanisms, allowing room for more intense competition

among sellers. According to economic theory, this competition would eventually give some of the price premiums back to the consumers, passing some of the benefits of trust back to them. It is beyond the scope of this research to give a definite answer on the nature of this social welfare and its allocation. Nevertheless, the fact that trust creates some surplus for the sellers suggests that markets can gain (in aggregate) from the existence of trust in exchange relationships. Therefore, future research should attempt to provide more specific answers to the positive outcomes of trust.

While a perfectly guarded feedback mechanism could build trust and bring favorable economic and social benefits, fears of opportunism could erode the foundations of this trust-building technology. For example, the business press shows a plethora of cases where opportunistic individuals committed fraud by attempting to manipulate their feedback profile on eBay (Industry Standard 2001), despite eBay's claim that there have only been very few fraudulent auctions. Kauffman and Wood (2000) argue that many instances of opportunism have been detected in auctions of collectible coins, and Resnick et al. (2000) describe several problems associated with effecting a proper trust-building technology. Therefore, while this paper focuses on the issue of whether a buyer trusts a seller or not based on the seller's feedback profile, another important question is whether a buyer should trust the seller's feedback profile and the entire feedback mechanism. According to Shapiro (1987), the guardians of a feedback mechanism have to be trusted for the mechanism itself to be trusted. Therefore, the guardians of feedback mechanisms, similar to sellers, should also try to build buyer's trust. Consequently, an important question arising from this research is whether trust in the institution of a feedback mechanism could also result in positive economic and social outcomes, and how such trust could be created.

As the economy transforms into an electronic marketplace with the proliferation of electronic commerce and interorganizational trading exchanges, information asymmetry and opportunism could increase as more transactions take place among many anonymous agents across the Internet. Therefore, basic trust in a partner's credibility that is induced by appropriate IT-driven feedback mechanisms will become an important component of electronic exchange relationships. Trust could generate positive outcomes by reducing transaction risks, augment the extent of electronic markets, and assist the proliferation of the electronic economy.

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