Reputation in Online Markets:

Some Negative Feedback

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February 2006

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We thank Steven Tadelis and Ryan Kellogg, as well as participants at the Berkeley CED Executive Session, for their helpful comments. The first author gratefully acknowledges the financial support of the Institute for Business and Economic Research (IBER) at the University of California, Berkeley. The second author gratefully acknowledges the financial support of the National Science Foundation.

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1 Introduction

While measuring the Internet's reach is far from an exact science, no online census reports would dispute claims that hundreds of millions of individuals across the world are active Internet users. Internet traffic rankings suggest that these users conduct online searches—Yahoo!, Microsoft, MSN and Google take the top four spaces in terms of unique visitors.[1] But many of these users do more than simply surf the web—they participate as buyers and sellers in a vast, global bazaar. Two online marketplaces, eBay and Amazon, are among the top 10 most visited sites on the Internet and, indeed, more than 627 million people globally shopped online in 2005.[2]

EBay is a giant in the online marketplace. With 135 million registered users listing more than 1.4 billion items in 2004 alone, eBay dominates the online auction industry.[3] From its humble origins as a marketplace for Pez dispensers, eBay has grown to be the fifth most visited web property in the US.[4]

Throughout its relatively short history, eBay has faced serious challenges to its preeminence in the US. Its most notable rivals, Amazon and Yahoo, entered the online auction space in the late 1990s, undercutting eBay's fees and using their considerable online presence to promote their auction sites. EBay continues to face stiff competition worldwide—for example, Yahoo is the principle online auction site in Japan, and a host of local competitors as well as Yahoo in the emerging Chinese market.

How was eBay able to survive these early challenges and expand its market share to 64.3 percent by 2001?[5] What enabled eBay to grow into such a dominant player? What does the future hold for eBay and online marketplaces more generally?

Online auctions are what economists term "two-sided markets"—the greater the number of buyers and sellers using the exchange platform, the more valuable the market. An online seller's revenue increases with the number of interested bidders, while an online buyer benefits both in terms of increased product variety and price competition with more sellers. Because service

provision entails large fixed costs, yet low variable costs, platforms for online auctions exhibit strong "network effects". The economics are similar for a wide range of other online platforms including Amazon marketplace, Google Adwords, as well as price comparison sites such as Shopper.com and MySimon.com,

Other markets exhibit similar network effects—consider the markets for online search, operating systems, and office software suites. However, unlike these markets, electronic marketplaces face an enormous "trust problem" which may limit their growth. Specifically, a buyer in an online marketplace faces the risk that the seller will deliver an item which differs substantially from what was promised in the item description, or not deliver a product at all. The ease with which sellers can set up and take down virtual "storefronts" only exacerbates the trust problem. Thus, bidders in online auctions will discount their bids in anticipation of such undesirable events. This problem was even more pronounced when access to digital photographs for item listings was limited. Moreover, early in eBay's history, the majority of items for sale were used. The trust problem is apparent—only sellers of poor quality items would be interested in the discounted bids offered by eBay buyers. Those with high quality used items would prefer to sell elsewhere. Thus, eBay faced a key challenge in establishing a successful marketplace for online auctions: how to solve the trust problem.

The trust problem was not eBay's only worry; eBay's first-mover advantage was facing determined competition from Yahoo and Amazon. In other markets, such as online search and office software suites, firms with large first-mover advantages such as AltaVista and WordPerfect were eclipsed by such formidable rivals as Google and Microsoft, respectively. Thus, first-mover advantage alone was clearly not going to be enough to secure eBay's dominance in the online auction industry—eBay needed to retain customers who were facing a growing selection of online auction platforms. [6]

EBay's reputation system neatly solves both the trust problem and the customer retention problem in the face of entry. The key to solving the trust problem is to provide good sellers with the incentive to list products on eBay, as well as to create a mechanism through which those good sellers could signal their quality. By allowing buyers and sellers of completed transactions

to offer publicly observable feedback to one another, a good seller builds a history of success and has an advantage in terms of buyers' trust, and possibly premium prices, for future sales on the site. At the same time, negative feedback makes it more difficult for bad sellers to masquerade as good sellers while passing off inferior or non-existent goods on unwitting buyers. Thus, the reputation system enables a form of trust to be built—good sellers are rewarded for providing high quality service and bad sellers are punished by the loss of future sales or lower prices or both. As a consequence, a wide variety of new and used products are now regular eBay fare.

The feedback system also solved the entry problem by creating customer stickiness through switching costs. For instance, consider an eBay seller with a large number of positive feedback points which attracts premium prices. Despite lower selling fees on upstart Yahoo Auctions, such a seller would be reluctant to switch—switching would mean rebuilding its entire reputation on the rival site and enjoying less than premium prices during that process. Thus, even if the seller were able to attract the same number of potential bidders by switching sites, it is far from clear that the switch would be worthwhile, even with lower fees. The case for buyers is less direct. While a buyer also has a reputation on eBay which conveys some advantages, the cost of "multi-homing" between eBay and rival sites is fairly low. However, if the reputable sellers do not switch to the rival site, both the variety and quality of merchandise available on the other site is likely to be lower. Indeed, anecdotal evidence suggests that this is exactly the situation faced by buyers on eBay's rival sites—less reputable sellers selling lower quality merchandise with less product variety. EBay's reputation system has created substantial switching costs that rival sites find difficult to surmount, even through lower fees.

While eBay's feedback system has proven remarkably effective in solving the trust problem and maintaining competitive advantage in the face of entry, eBay faces a number of challenging future growth opportunities. Most notably, eBay projects that the bulk of its growth in the US online auction market will come from the sale of high-value items such as vehicles, artworks, and real estate. High-value transactions lead to substantial listing fees to eBay. In the last two quarters of fiscal year 2004, eBay reported that its motors category reported 50 percent growth in transaction value.[7] Furthermore, the motors category accounts for more than 33 percent of all transaction value in fiscal year 2004. EBay's recent purchase of the online voice communication

service Skype provides further evidence that the company expects growth in high-value items; eBay's chief executive officer, Meg Whitman, claimed that the acquisition will make online trading easier for eBay users, especially for "big ticket" transactions.[8]

Robustness of the reputation mechanisms is essential for growth of big ticket transactions in online marketplaces, and eBay in particular. The central dilemma is that the value of a "good reputation" to a bad seller, which would allow him to imitate a good seller, is considerably higher in markets for high-value items. Thus, even if a seller ruins his or her reputation after only a single large transaction, the gains from a successful scam might well be worth the cost of increasing his or her reputation. Clearly, the cost of "investing" in reputation is key. In this paper, we will show that the feedback system, which has served eBay so well and is a model for solving the trust problem in many online marketplaces, is a potential "Achilles heel" in terms of growth opportunities for high-value items. In particular, we show that the cost of investing in reputation is relatively small and, through a case study, illustrate how some sellers have already moved to take advantage of the opportunity.

Abuse of the feedback system is not the only challenge that big ticket items bring to the online marketplace. Fake high value items are also an increasing problem. Again, without trust, the presence of fakes threatens to undermine the entire online marketplace for certain types of goods. For instance, a recent lead article in the New York Times brought attention to the active market for fake collectible jewelry on eBay.[9] While eBay claims that only a small fraction of its listings offer fraudulent goods, some experienced users and legitimate companies such as Tiffany Jewelry suggest that the sale of counterfeit items is much more pervasive in the market. An eBay spokesman is quoted saying, "…we don't have any expertise [in the goods sold on eBay]… We're experts at building a marketplace and bringing buyers and sellers together." The size of the market and the volume of trade are both evidence of this managerial expertise, yet the suggestion of widespread fraud may be troubling for eBay. The notion that counterfeit goods are circulated in anonymous markets is not astounding, but does eBay's reputation system not serve to reduce the prevalence of such fraud? Expert legal opinion highlights eBay's role as an online powerhouse—if a pending court case proves that eBay facilitates fraud, the decision could affect not just eBay, but the future of ecommerce in general.[10]

With its powerful online presence and significant contributions to the Internet economy, eBay's successes and failures have widespread impact beyond collectibles and cars. While the lessons drawn here are in the context of eBay, the importance of building reputational systems has broad applicability, especially in online markets. For example, reputational systems are important in the battle for competitive advantage among e-retailers and business-to-business auctions, and in the growing online dating markets.[11]

Before proceeding, it is useful to explain the process by which buyers and sellers obtain "reputation" on eBay. At the conclusion of each completed transaction on the site, the winning bidder and the seller have an opportunity to submit "feedback" for each other through the eBay system. Feedback consists of a rating—positive, neutral, or negative—as well as a brief verbal description of the quality of the transaction. "Great buyer. Prompt payment." is an example of the qualitative feedback submitted after a typical transaction. While numeric ratings and comments are assigned on a per-transaction basis, feedback summary statistics are tallied by unique user. The most prominent feedback indicator appears next to users' identification name on the site and is the overall user feedback total, calculated as the sum of all feedback points (the number of unique users awarding positive points minus the number of unique users assigning negative points to the user). Other users may click on this summary score to view a more detailed description of the users' feedback information such as the exact number of positive, negative, and neutral feedback over several time periods as well as the detailed comments. Importantly, information about the item from which the feedback was derived is only available for 90 days following auction close. That is, once the links to past transactions have expired on a users' feedback page, it is impossible to tell whether a "reputable" seller obtained that reputation by undertaking many large scale transactions or the same number of trivially-sized transactions. Obviously, a buyer might draw very different conclusions about the quality of a given seller were he or she able to assess the source of that seller's reputation.

2 How Valuable is Seller Reputation?

For eBay's feedback system to succeed in solving the trust problem, it must be the case that

reputable sellers enjoy price premia and higher probability of making a sale relative to less reputable sellers. Absent such differences, reputation has no value. Thus, one may naturally ask: "Are differences in sellers' feedback ratings indeed reflected in prices or the probability of sales?" In general, higher positive feedback ratings are weakly correlated with price premia—there appear to be diminishing returns to feedback levels. In contrast, negative feedback is strongly correlated with lower transaction prices overall and unsuccessful auction listings.

Lucking-Reiley, Bryan, Prasad, and Reeves find that positive feedback has no effect on prices for collectible coins, while negative feedback reduces prices.[12] Eaton examines electric guitar sales and finds a similar pattern; positive feedback has no impact, while negative feedback reduces the probability of a sale for sellers with low (less than 20) feedback points.[13] Cabral and Hortacsu conclude that neither positive nor negative feedback affect auction outcomes.[14]

Livingston uses eBay data from 861 auctions of a specific variety of golf clubs to examine the effects of seller reputation on sales success and auction revenues.[15] In contrast to the previous studies, his results suggest that bidders are more likely to bid, and bid higher, when a seller has positive feedback reports. While returns from increasing from zero to 1 to 25 points is approximately 3.4 percent in terms of the probability of a sale and 5 percent in terms of auction revenue, positive reports beyond the first 25 have little impact on how the buyer rewards a seemingly trustworthy seller. Returns of feedback ratings in the highest quartile are positive (approximately another 5 percent for probability of sale and revenue), yet the marginal return for each individual feedback point must be extremely small if a user must accumulate more than 675 feedback points to enjoy this reward.

Several other studies also find that positive feedback had a positive impact on price.[16] Moreover, Ba and Pavlou use experiments in the field and find that willingness to pay increased with sellers' positive feedback.[17] They also find that the positive effect increases with item value.

Resnick, Zeckhauser, Swanson and Lockwood organized a series of controlled field experiments selling postcards on eBay.[18] Two-hundred matched pairs of postcard lots were auctioned under different seller identities, varying seller feedback ratings to identify the effect of experience and

reputation rating on sales. Initial seller feedback ratings varied from very high (net rating of 2000, with one negative point) to zero to negative (net rating of -2). Although Resnick *et al.* cannot account for the possibility that sales to previous customers were responsible for the experienced seller's differential success (*i.e.* private reputation), their findings do suggest that buyers are willing to pay approximately 8 percent more for lots sold by the more experienced seller identity rather than the new venders. Perhaps surprisingly, they also find that negative feedback has little impact on revenue.

3 A Market for Feedback

Why might one buy a low-quality digital photo of the Golden Gate Bridge for 50 cents, or ten copies of an identical e-book? What motivates a buyer to pay 10 cents for a compliment requested from a stranger? Among others, these are important questions that might be asked of eBay buyers and sellers in a small, but active market for seemingly-valueless items online. The answer, of course, is "positive feedback".

Some sellers hide their offers in their text advertisements for emailed compliments (where a successful bidder may request the exact phrasing of the praise) and digital photographs of Bigfoot, national landmarks and Eminem. Other sellers offer explicitly to return positive feedback (and only positive feedback!) to buyers who pay the small listing price. EBay's search engine makes the offers easy to retrieve—the term "positive feedback" will reveal hundreds of listings for low-prices, valueless item designed only to artificially enhance users' feedback ratings.

But is this indeed purely a market for feedback, or are the items being sold on the market actually otherwise valuable to buyers? We entered the market to investigate. We searched for "positive feedback", chose a representative listing, and bought the feedback point. Figure 1 is an eBay screenshot from the auction. The seller offered a "Positive Feedback E-book" and promised "Free Positive Feedback" for $0.01 including all shipping fees. Once the one-cent payment was processed through Paypal, we received a three-page *pdf* file (Adobe Portable Document Format) entitled "100 Feed Back in Only 7 Days" by Dave Robinson. The first page notified readers of

their re-sale rights to the document. The following is an excerpt from the e-book text:

> Look on eBay for items that cost next to nothing. You can find the eBay search feature to find items which cost anywhere from .01 to $1.00. Try this. ... Now bid on 100 items. If you want to speed things up a bit, try and find auctions with the "Buy It Now" option. If the seller offers PayPal as a form of payment, go right away and pay for the item. ... If you do this with a hundred different sellers you should be able to get your feedback score up to 100 in just a few days.

Strong anecdotal evidence suggests that this offer, sale and exchange are typical of the transactions in the market for feedback. In fact, we purchased five feedback points over several weeks and received this identical e-book from three different sellers located the US, UK and Australia, respectively.

It is likely that buyers are already aware of this feedback-enhancing strategy, given their participation in the auction. The email document provides both parties with evidence, however thin, that their transaction was not a flagrant violation of eBay guidelines. Yet, for all practical purposes, the item for sale was no "item" at all, but positive eBay feedback points. Indeed, absent the potential for increased feedback, posting such a listing on eBay makes no economic sense for the seller. It costs the seller 25 cents for the insertion fee and an additional 5 cents for the Buy-It-Now option. By setting a Buy-It-Now price equal to 1 cent with free shipping, the most the seller can hope to earn from this transaction is a 29 cent loss.

While buyers and sellers actively trade feedback, eBay aims to squelch any such market. eBay explicitly prohibits the artificial enhancement of any member's reputation by offering to buy, sell or barter feedback.[19] Members who violate the feedback-sale policy may be subject to listing cancellation and forfeiture of fees, limits or suspension of account privileges, loss of "PowerSeller" status and feedback removal. A brief, online justification for the policy reminds users that eBay is founded on trust, and that feedback trade undermines the integrity of the system. Despite the warning, our investigation reveals that eBay harbors an active and growing market for user feedback, where buyers and seller coordinate to artificially boost their feedback status.

Now, suppose a prospective "power seller" were to follow the advice of the feedback-enhancing e-book. Translating the e-book's guidance into a selling strategy is straightforward: list items at

low prices using words such as “penny”, accept Paypal and allow buyers to Buy-It-Now to accelerate the exchange, and post enough listings to improve your feedback rating within days. Would this advice be profitable? The case of *thelandseller* illustrates the potential impact of artificial feedback enhancement. [20]

4 Case Study: *thelandseller*

While the market for feedback is itself interesting, it is the possible impact of such a market on business *outside* the feedback market that deserves attention. The case of *thelandseller* highlights a selling strategy adopted by many participants and confirms our intuition that eBay users are actually using the feedback market for gains in other markets. A registered user in the US since March, 2003, *thelandseller* was an active participant in the market for feedback, accumulating hundreds of feedback points over a single month.

Between June 5 and June 28, 2005, *thelandseller* posted 304 offers for feedback enhancement on eBay. The majority of the listings were titled, “Riddle for a PENNY! No shipping - Positive Feedback”. As suggested by the descriptive headline, the feedback solicitation is couched in an offer of an inexpensive joke to be emailed to the buyer. While selling a joke alone is insufficient evidence of feedback trade, two additional features of the offer are less innocent. First, the words “positive feedback” are included in the title, ensuring that common feedback enhancing search terms will identify the posting. Second, the total joke price including shipping, handling and all other charges is one cent, and almost 95 percent of *thelandseller*’s listings are Buy-It-Now. That is, *thelandseller* locked in a 29 cent loss even in the event of a successful sale. Were he a keen eBay user trying in earnest to secure a profit selling jokes online, *thelandseller* would certainly not be pricing below marginal cost.

If the advice offered in the feedback e-book were written from a seller’s perspective, it would describe *thelandseller*’s strategy almost perfectly—price low, include words such as “positive feedback” and “penny” in the item titles, and use the Buy-It-Now feature to speed feedback accumulation.

Of the 304 offers posted by the eBay user, *thelandseller* sold 212 jokes to 172 different eBay users. *Thelandseller*'s net revenue from these activities was -$87.64 —nearly $90 worth of eBay fees offset by only $2.12 in revenue. In addition, *thelandseller* purchased "Blonde Jokes Free Shipping - Feedback!!" for £0.01 on June 17, 2005.

Closer examination of *thelandseller*'s profile is revealing—262 of the 864 total positive comments were received from users who are no longer registered with eBay.[21] Remarkably, more than 400 of the 598 unique users who left positive feedback for *thelandseller* were participants in the market for feedback.

Currently, *thelandseller*'s eBay feedback rating is 598 (100 percent positive). Counting only the feedback transaction identified in our dataset, at least 30 percent of his positive reviews resulted from solicitation in the feedback market. If we speculate that the 400 users identified as past feedback-boosters also purchased only feedback from *thelandseller,* this statistic jumps to more than 80 percent. All of the links to past joke (feedback) transactions have expired in the user's feedback profile, making the details of the transactions (except the feedback itself) invisible to other eBay users. Now, it seems that *thelandseller* has more lucrative business plans than the certain-loss market for online jokes.

While *thelandseller*'s behavior in the feedback market is interesting, it is his or her activities outside of the market that make for a compelling case study. True to his name, *thelandseller* now sells undeveloped land in Texas that he claims is zoned for a future lakeside housing subdivision. According to the text in one land listing, he represents a private investment group specializing in the buying and selling of North American properties. The land parcels, which appear for auction approximately every three weeks, have opening bid prices between $2,200 and $6,000US, depending on the lot characteristics. Photos, maps and other deed details are provided for prospective bidders. Text in the listing states that the properties may be valued up to $12,000US. Sometimes listed in pairs, at least 11 lots of land have been posted for auction since *thelandseller* exited the market for feedback.

At least one of the parcels of land was sold on eBay—*thelandseller* left positive feedback for the

buyer after the completion of the sale in mid-October, yet the buyer did not reciprocate. The buyer has subsequently left feedback for transactions with other eBay users, however.

Clearly, *thelandseller* is a sophisticated user who used the feedback market to artificially boost his online reputation to appear experienced in the market for a high-valued good. A back-of-the-envelope calculation illustrates the cost of becoming "experienced". Consider the extreme case where all of his feedback was acquired by penny sales—assuming that 70 percent of his listings resulted in sales, *thelandseller* could have create his feedback profile for approximately $360. While we cannot know whether *thelandseller* is a good or bad seller, it does seem clear that the market for feedback has allowed *thelandseller* to create a false sense of experience and, therefore, trustworthiness.

5 Statistical Study of Market for Feedback

While the case study above is suggestive of the relationship between the market for feedback and a seller's other activities, it is useful to examine the market for feedback in greater detail. To this end, we obtained data for over 6,500 listings in the market for feedback over the period from June to December 2005. Below, we describe the data collection procedures and a statistical analysis of key features of the market for feedback.

5.1 Description of the procedures for the study

Using a custom-designed computer script, we gathered data on eBay's market for feedback on a weekly basis. The automated script was designed to query the set of terms listed below, and then retrieve data from completed auctions. [22] Based on manual searches we conducted in the market for feedback, we found that the following search terms successfully captured the vast majority of transactions in this market: "build feedback, eBay reputation, eBay rating, ebook feedback, free feedback, free joke, free jokes, free riddle, get feedback, gmail feedback, gmail rating, golf shots hr, increase feedback, new to eBay, ebook money, positive feedback, positive reputation, riddle no, rocket feedback." We also used the misspelled search term "postive feedback" since misspellings in subjects headings are not uncommon.

Each listing was carefully hand-reviewed to verify that it was, in fact, only soliciting feedback exchange. Any listing also offering a tangible, otherwise valuable or non-feedback good was excluded. For example, if a seller promised matchbooks, coins, online data storage or low-value long-distance telephone cards along with positive feedback, the observation was removed from the dataset.

In total, 6,526 unique listings posted by 526 sellers were retrieved in January and May 2005, and weekly from June 2005 to December 2005. Seventy-six percent of the listings, 5,127 items, resulted in a sale. More than 80 percent of the auctions were listed with the Buy-It-Now option, whereby a seller sets a fixed price and no bidding auction is conducted for the sale.

Table 1 provides summary statistics of the data.[23] Several features of the table are noteworthy. First, unlike most other eBay markets, the average opening price is higher than the average winning bid. Average opening price includes many offers with Buy-It-Now prices set equal to $1 (or £1 when listed in UK pounds), and these listings often failed attract to bidders—not too surprising given the price points of the available alternatives offered by other sellers. Variation in the shipping charge for the "virtual" goods sold in the market for feedback is also surprising. While no postage was involved for any of the items traded in our data, some sellers sought to attract bidders by setting an extremely low (often 1 cent) Buy-It-Now price and to earn profit on the shipping and handling charge. Notice that seller profit is miniscule in this market—averaging about 8 cents. As the case of *thelandseller* suggests, however, sellers enter this market not to earn profits in the market for feedback itself, but rather to leverage the reputation gained in this market to obtain price premia for other, presumably larger, transactions.

Turning to the characteristics of participants in this market, the median seller has a feedback rating of 135 whereas a winning buyer has a much lower "reputation" with a feedback rating of only 19. Sellers take advantage of the economies of scale inherent to the market for feedback; the median seller listed 51 items in the market for feedback during the period of our study. Put differently, if the median seller were to succeed in selling all of his or her listings during the period of our study, the transactions would raise his or her existing reputation by 38 percent. As

on the rest of eBay, negative feedback is rare—the median seller enjoys 100 percent positive feedback. Thus, sellers seeking primarily to build rather than rehabilitate their reputations are entering this market.

5.2 Results

Unlike the usual eBay assortment of electronics, collectibles and cars, feedback is *created* by the transaction and is not scarce in any traditional sense—no single user has inherently more to exchange than another. Moreover, buyers and sellers in this market may transition without substantial cost from one role to the other. Facing the appropriate incentive, a feedback buyer can easily become a feedback seller, and vice versa. Users can move nearly costlessly between buying and selling positions in the market, and because both users gain feedback through the sale, prices represent cash transfers that smooth out the transaction frictions. While these features make the data difficult to interpret directly, they also make the market for eBay feedback empirically interesting. The theoretical justification for our valuation estimates is contained in the Appendix.

Buyer Valuations

We find that an average buyer's valuation for a point of feedback is at least 61 cents. While this may seem like a relatively high valuation for a single point of feedback, it is important to note that a buyer's willingness to pay for a point of feedback in this market is an expression of the discounted net present value of the stream of incremental future cash flows from this additional point of feedback.

This calculation of buyer valuations was undertaken assuming that only a single price prevails in the market for feedback.[24] However, as Figure 2 illustrates, the dispersion of winning prices in the market is remarkable; prices in completed auctions ranged from well below eBay's seller fees to nearly 10 times marginal cost. While the distribution is concentrated near 1 cent, there is also considerable mass around $1.

The feedback profiles of participants in this market are also highly diverse. Seller feedback levels range from 0 to 6,732, while winning buyers have feedback ratings ranging from 0 to

9,231. Previous empirical studies suggest that the *marginal value* of a point of feedback to a buyer should depend on the existing reputation of that buyer. That is, buyers who already have established reputations are likely to have a lower valuation for an additional point of feedback than buyers with lower reputation. Since the feedback rating of the winning bidder is contained in our dataset, it is possible to stratify the data by winners' feedback ratings. We would expect that the bound on buyer valuations would decrease with the feedback rating of the buyer.

In Figure 3, we divide winning buyers by feedback ratings to obtain valuation bounds for buyers in each decile. As the figure shows, buyer valuations are mainly decreasing. For buyers in the lowest decile, with feedback ratings of 4 or less, calculations suggest that they value a point of feedback at, at least, 71 cents. In contrast, for buyers in the highest decile, those with feedback ratings of 439 or higher, an additional point of feedback is worth much less—approximately 42 cents. Furthermore, the steep decline in the valuations of buyers in the highest two deciles suggests that there is indeed "diminishing returns" to the value of an additional point of feedback.

At first glance, these values may seem implausibly high. Yet, when one considers the potential payoff of improved reputation in markets *beyond* the market for feedback, the average valuation is not unreasonable. Consider the following example: Assume for a moment that an increase from zero to 20 feedback points results in a 5 percent increase in auction revenue in an average eBay product category such as golf clubs.[25] A new user (with zero feedback points) wants to sell a driver and expects to sell it for $250. If he purchases 20 positive points in the feedback market for approximately $10.80, he can earn 5 percent more on the golf club sale, $262.50. That is, his investment in reputation is more than offset by the extra auction revenue.

Is the market for feedback profitable to sellers?

As we saw in Figure 2, there is a considerable range in transactions prices in the market for feedback. This also suggests that sellers experience a range of profit outcomes. One of the unique features of this dataset is that seller costs (excluding hassle costs associated with posting an item) are completely transparent to the researcher. As a consequence, we can determine the profitability of each listing in our dataset. Figure 4 graphically displays the distribution of profit

and loss outcomes in this market. As the figure shows, the distribution of profits is bimodal. The higher of the two modes, which comprises 1,100 transactions making a loss of 29 cents, arises when sellers offer an item in the market for feedback at a Buy-It-Now price of 1 cent with free shipping and handling. Since the insertion fee on the US eBay site is 25 cents and the Buy-It-Now option costs an additional 5 cents at this price point, a seller's costs for this transaction amount to 30 cents; thus leading to a net loss of 29 cents. The other mode occurs at a profit level of approximately 64 cents. This profit level, which occurs in 263 transactions, arises when sellers successfully offer an item with a Buy-It-Now price of 99 cents and free shipping and handling.

Figure 5 illustrates the overall profit or loss obtained by each seller in our dataset. Most sellers incur losses—the modal seller loses 30 cents per listing. Moreover, even for sellers setting an item price equal to nearly one dollar, the feedback market is still relatively unprofitable, since these items fail to sell approximately 45 percent of the time. Thus, about half of the 99-cent listings lead to a loss of 30 cents while the other half (when the item sells) earn a profit of about 65 cents. The net expected profit from a 99-cent listing is only 22 cents. It should perhaps not be all that surprising that the market for feedback is not a profitable one for sellers. As the case of *thelandseller* illustrates, motives other than direct profits from feedback sales are often paramount. Moreover, since there is an effectively limitless supply of the "good" in this market, there is little reason to expect sellers to earn profits.

6 Managerial Implications

In markets with millions of nearly-anonymous agents buying and selling a plethora of goods, trust is critical. Moreover, the higher the value of the items being bought and sold, the more vital is trust to the successful engagement of buyers and sellers. As trade in high-value item becomes increasingly profitable on the Internet, online merchants and auctioneers face enormous challenges in overcoming the trust problem and creating attractive trading environments. Our work suggests that one current "state of the art" solution, the trust system employed by auction giant eBay, is vulnerable to being undermined in precisely those areas targeted for future growth.

Indeed, the impact of the market for feedback stretches beyond eBay. As new businesses enter the online space, either as start-up e-retailers or virtual versions of established brick-and-mortar

stores, managers face the challenge of creating an environment of trust that attract and maintain a stable customer base. While the enormous success of eBay might tempt the new managers to emulate eBay's feedback system, our work identifies a significant weakness and suggests that solutions to the trust problem should be sought elsewhere. The need for new approaches to online reputation systems is especially critical for firms seeking growth in emerging online markets—e-retailers and auction platforms in these markets may face additional pressure as users race to catch up to developed markets. And so, we ask: What can a manager do to build an environment of trust online, without being vulnerable to markets for feedback that may undermine the system?

While eBay's existing reputation mechanism has seemed to work well for smaller items where the benefit of investing in a "false reputation" is relatively modest, this is not the case for high-value items. Moreover, as eBay attempts to expand internationally, particularly in developing countries such as China, the need for reliable mechanisms to distinguish good sellers from bad will be all the more important—especially since financial systems and credit card use are far less developed in these new markets. The presence of markets for feedback suggests a potential "Achilles heel" for eBay and other online auction sites seeking these growth opportunities.

As we have shown, there are several important problems in eBay's existing reputation system that are being exploited in the market for feedback. First, since reputation is not weighted by the value of the transactions giving rise to the overall feedback score, there is no way for a buyer to distinguish between a seller whose reputation derives from legitimate transactions and one whose reputation derives from what are arguably only notional transactions. Second, eBay only retains a detailed archive of the transactions comprising the reputation of a seller for 90 days. Thus, it is possible for a seller to affect his or her perceived reputation by taking advantage of this short time horizon of transparency. Third, since feedback is bilateral, eBay dilutes the incentives for buyers to give negative feedback, even when a seller's performance is not especially good. Sellers can, and often do, retaliate against buyers leaving negative feedback by reciprocating the negative review. Since the reputation of an individual on eBay is a composite of transactions made as a buyer and as a seller, buyers who also sell items on eBay (or who expect to sell items in the future) may be reluctant to risk their reputations by leaving negative feedback.

How can eBay address these problems? First, eBay may wish to offer transaction-weighted reputational statistics based on the dollar value of the trade rather than the current practice where the sale of a car and the sale of a digital photo of Bigfoot have the same reputational effect. Second, given the dramatically falling cost of storage and computing, there would seem to be little technological reason for eBay to limit the time horizon of its detailed archive of transactions. More broadly, greater transparency in providing information about the past history of a seller should improve the ability of buyers to distinguish between good and bad sellers, and thereby avoid the trust problem. Third, there seems to be little reason to pool reputation earned as a buyer and reputation earned as a seller. As we mentioned above, this pooling creates a disincentive for honest reporting and helps to undermine the informational value of the system. EBay could easily create separate reputational accounts for a given user, segregating reputation by role.

Why doesn't eBay and others then implement these solutions? For established platforms, such as eBay, a central concern in any reform of an existing reputational system is that it will damage the loyalty of its existing user base. For instance, how would existing feedback ratings be treated under a system with transaction-weighted reputation? In principle, there could be adverse litigation consequences from eBay from sellers who felt that their businesses were harmed by such a change and who had relied substantially on eBay's existing rules in determining their business strategy. Such a change might also provide an opening for eBay's formidable competitors—Amazon and Yahoo—to grab market share at eBay's expense. Thus, to some extent, eBay appears to be "locked in" to its existing reputational system by virtue of its own past success. One wonders, however, whether the pernicious effects of the market for feedback will not ultimately undermine eBay's competitive advantage for the future.

The managerial challenges in solving the trust problem differ for existing platforms and new platforms. For existing platforms, the transition from current reputational systems to more robust systems that can operate effectively for high-value items and emerging markets is a central business consideration. For new platforms, the weaknesses in existing systems highlighted here offer a unique opportunity to overcome the built-in first-mover advantages of the established

players and gain a competitive advantage by innovating new solutions to the trust problem.

The situation in trust markets appears to us to be analogous to that in online search in the 1990s. At that time, the state of the art solution was to use data encoded in metatags to provide search results. New players, such as Google, recognized the vulnerability of existing search engines to manipulation of data contained in these metatags and were able to overcome first-mover advantages enjoyed by established players, such as AltaVista. We see the same vulnerability to manipulation in existing reputational systems in online markets and, perhaps, an opportunity for another Google to leapfrog the competition with solutions that scale to high-value items and emerging markets.

Appendix – Incentives in the Market for Feedback

Because of this ability to move (nearly) costlessly from buying to selling roles, it must be true that the net surplus obtained by a seller in the market for feedback is equal to the surplus he or she could obtain by switching sides of the market to become a buyer. To illustrate, let $v_s \geq 0$ and $v_b \geq 0$ denote the value of a point of feedback to a given eBay user when he or she is a seller or buyer, respectively. These are not necessarily equal—a prospective buyer can undertake additional search to distinguish between feedback a user earned as a seller and that earned as a buyer. Let t denote the transaction cost associated with executing a trade in the market for feedback. Let r denote the revenues paid to the seller in a given transaction in the market for feedback. Finally, let p denote the probability that a seller's listing attracts a buyer. In that case, the surplus obtained by the user when he or she is a buyer in this market is simply

$$\pi_b = v_b - r \qquad (1)$$

whereas the surplus obtained by the seller in the market for feedback is

$$\pi_s = p \times (v_s + r) - t \qquad (2)$$

Since the user can take either side of the transaction, then the market clearing revenues earned by the seller are the value of r where $\pi_s = \pi_b$; hence

$$p \times (v_s + r) - t = v_b - r \qquad (3)$$

To illustrate what would happen should this equality fail to hold, suppose that the seller surplus were greater than the buyer surplus. Since selling would be more attractive than buying, all users would assume the role of sellers. The opposite would occur if buyer surplus exceeded seller surplus. In fact, the market cannot exist unless buying and selling payoffs are exactly equal—without equality, all users migrate to one side of the market and the market fails.

From equation (3), we obtain the market clearing transfer

$$r = (t + v_b - pv_s) / (1 + p) \qquad (4)$$

Interestingly, equation (4) suggests that pricing below marginal cost can be consistent with market equilibrium in the market for feedback. To illustrate, suppose that all listings result in a sale (i.e. $p = 1$) and that the valuation of a point of feedback is the same regardless of whether the user is a buyer or a seller (i.e. $v_b = v_s$). In that case, equation (4) reduces to $r = t/2$; that is, the equilibrium revenues to the seller amount to only *half* of the costs of placing the item on eBay.

This equal division of transaction costs results from the ability of the buyer and the seller to take either side of the transaction.

From the above equations, we can derive a series of bounds on the value of a point of feedback. Unlike earlier studies, which are able to obtain estimates of price premia from reputation for individual transactions only, our bounds may be interpreted as the discounted net present value of future cash flows derived from all transactions by an individual user over his or her lifetime on eBay.

We use the conditions derived above to establish a bound on buyer valuations. First note that, since participation in the market for feedback is voluntary, it must be the case that a user entering into a transaction on this market is better off than if he or she did not participate. That is, it must be the case that $\pi_s \geq 0$ and $\pi_b \geq 0$. From equation (1), we may then deduce that the buyer's value for a point of feedback must be at least equal to the total transfer made to the seller, r. From equation (2) and the fact that $v_s \geq 0$, we may deduce that the surplus of a seller is at least $pr - t$. Finally, from equation (3), we know that a buyer's surplus is equal to that of a seller in equilibrium. Therefore, a bound on the valuation of a point of feedback to a buyer is

$$v_b \geq r(1 + p) - t \qquad (5)$$

Equation (5) allows us to use the data to estimate lower bounds on the value of feedback to buyers as a function of the realized auction revenues, the listing fees on eBay, and the aggregate probability that a posting in the market for feedback finds a willing buyer. One can use the above equations in a similar fashion to obtain bounds on seller valuations, v_s, as well; however, these bounds offer little predictive value—in most cases, the bounds predict only that feedback is more valuable to the seller than no feedback, i.e. $v_s \geq 0$.

Table 1: Summary Statistics for All Feedback Offers

# of unique sellers	526		
# of unique winners	2785		
	# of Obs.	**Mean**	**Std.Dev.**
Transaction characteristics (US$)			
opening price	6526	0.604	0.655
winning bid	4954	0.465	0.535
shipping charges	6526	0.087	0.369
total opening price including shipping	6526	0.691	0.736
total winning price including shipping	4954	0.543	0.615
fees paid by seller	6526	0.329	0.057
seller profit (revenue - fees)	6526	0.083	0.552
Participant characteristics			
winner's feedback rating	4037	217.052	703.900
seller's feedback rating	5252	307.405	406.190
seller's percent-positive feedback	6526	99.037	2.076
purchases per buyer	5819	493.056	763.102
listings per seller	6470	82.677	93.057

Figure 1: Completed Auction Screenshot

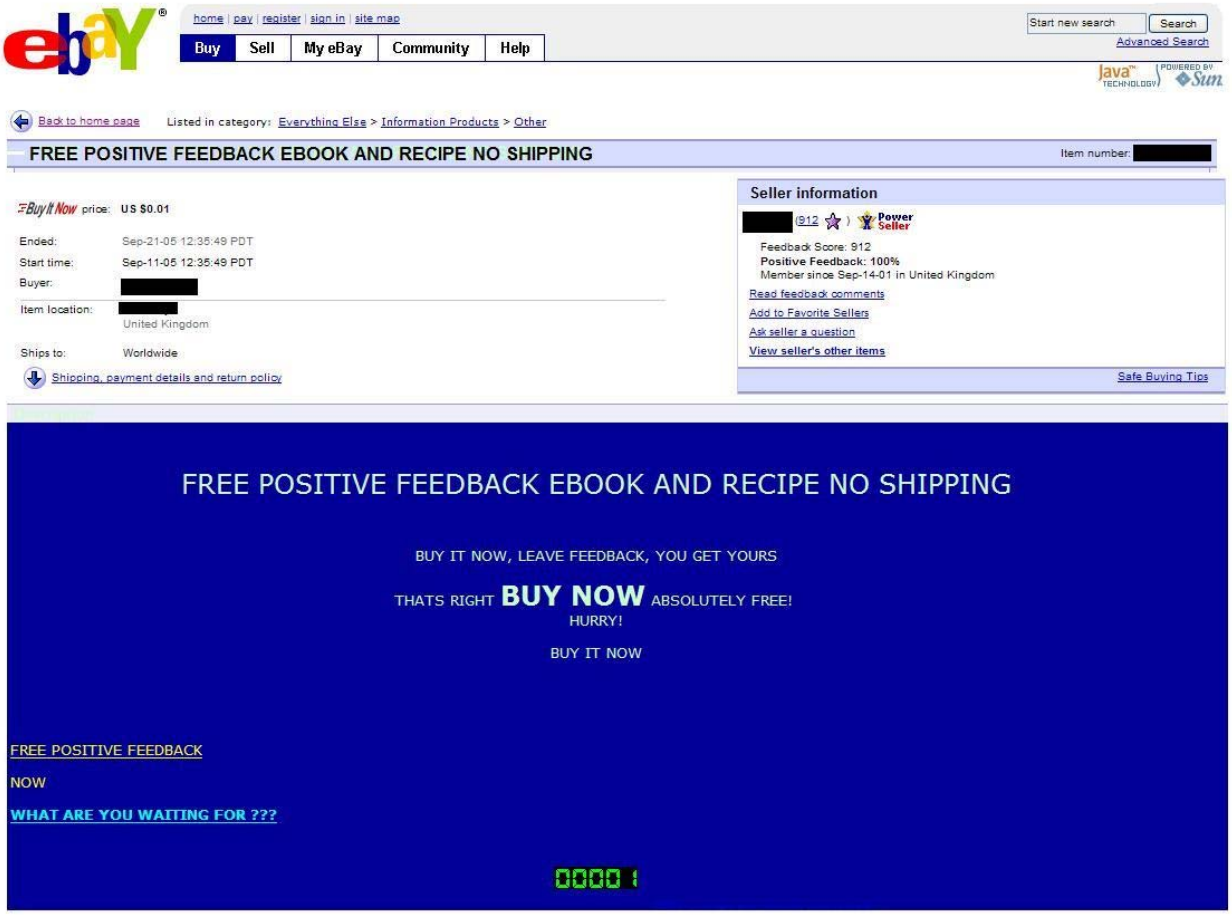
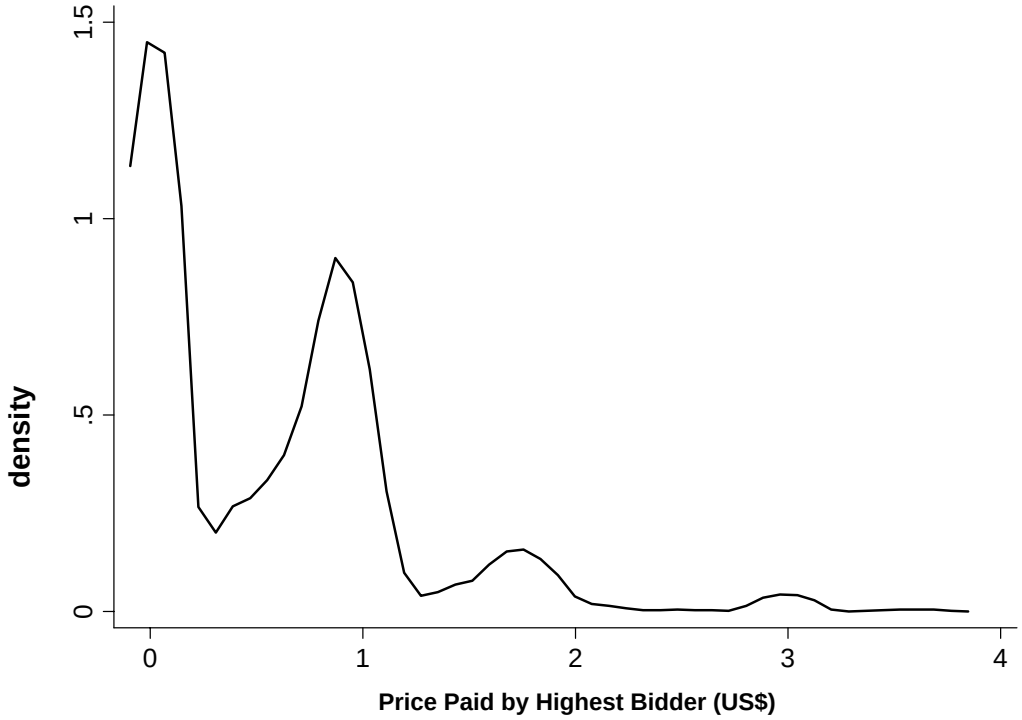


Figure 2: Distribution of Feedback Prices



Note: Kernel bandwidth is 0.22. Since prices are measured in US$, the density has the units 1/US$. Thus, the density is not measured on a probability scale.

Figure 3: Lower Bounds on Feedback Valuations

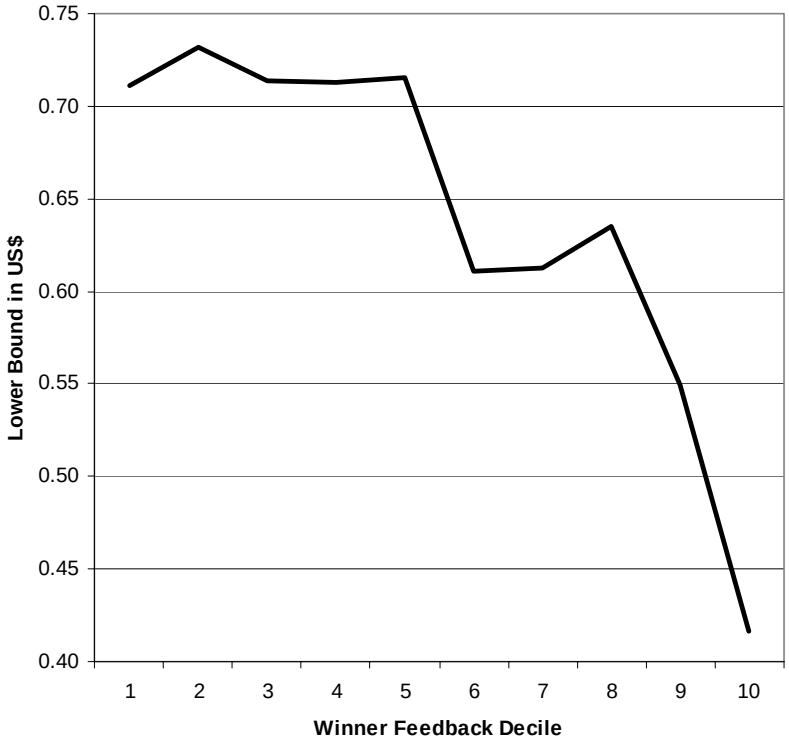
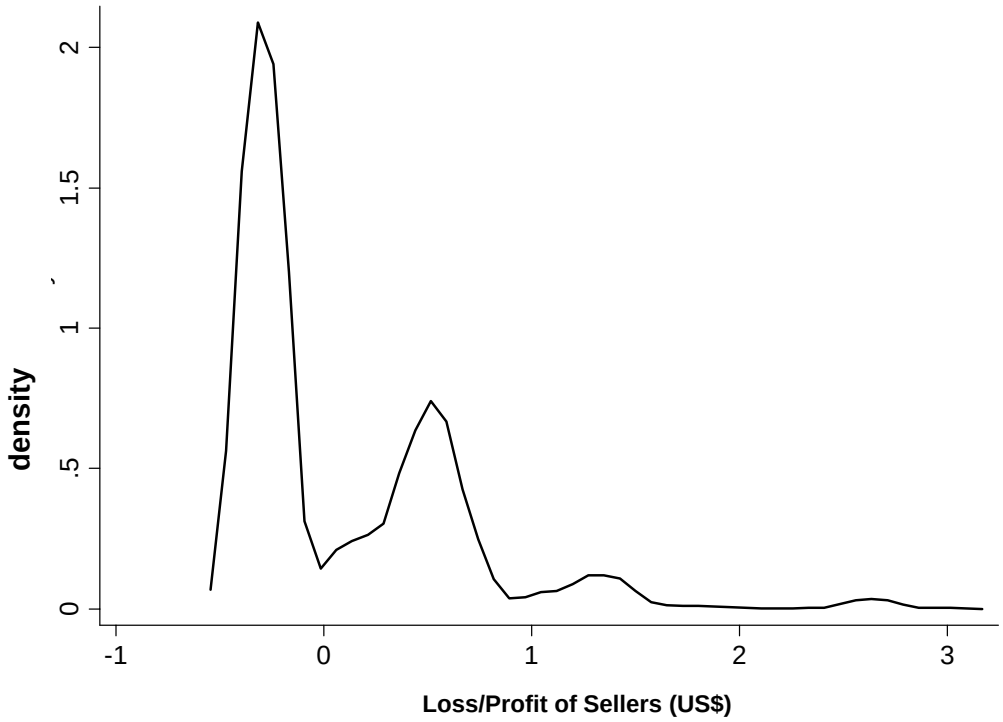
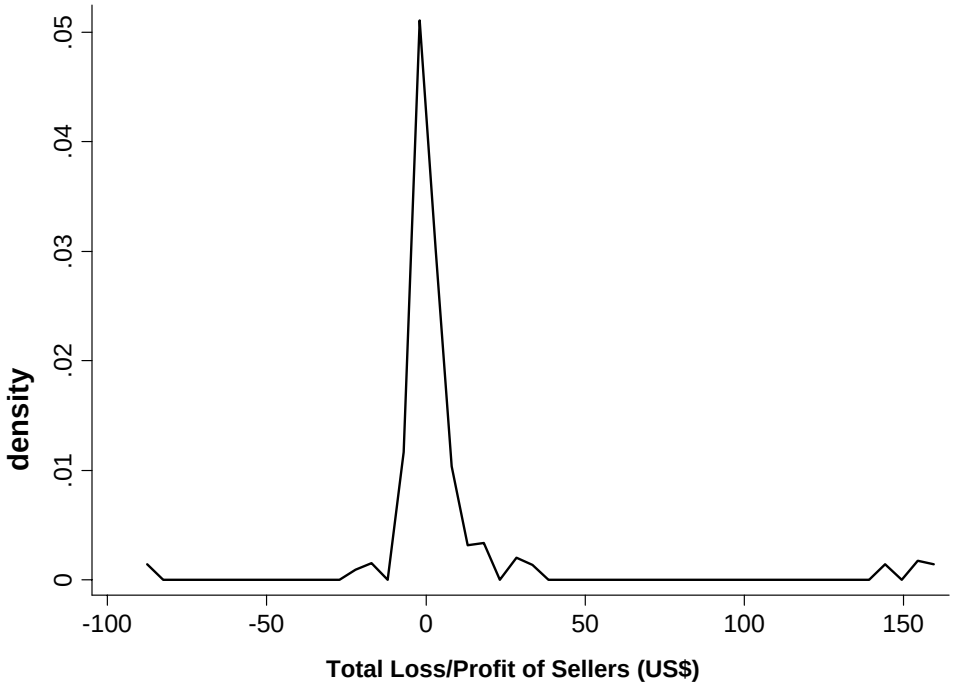


Figure 4: Distribution of Feedback Seller Profit and Loss



Note: Kernel bandwidth is 0.09. Since prices are measured in US$, the density has the units 1/US$. Thus, the density is not measured on a probability scale.

Figure 5: Distribution of Total Profit by Seller



Note: Kernel bandwidth is 0.36. Since prices are measured in US$, the density has the units 1/US$. Thus, the density is not measured on a probability scale.

Notes

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[19] See <http://pages.ebay.com/help/policies/feedback-solicitation.html> for a detailed description of eBay's policy.

[20] All user names have been changed

[21] No longer registered may indicate that the user cancelled their eBay membership or had it

suspended by eBay. It seems somewhat unlikely that users cancel their memberships so frequently, since there is no cost to simply abandoning (but not cancelling) an unwanted account.

[22]EBay allows registered users to search the records of completed auctions from the previous seven day period.

[23] Since approximately 35 percent of the transactions in the dataset were conducted in currencies other than US dollars—31 percent of the listings were denoted in UK pounds—we converted all prices to US currency using the exchange rate corresponding to the auction end date, as published by the US Federal Reserve.

[24] While successful bidders paid, on average, a total of 54 cents for a single point of feedback, the so-called "law of one price" certainly does not hold in the market for feedback. The "law" states that if a homogeneous product is sold in a competitive market, a single transactions price should prevail. A point of feedback would seem, prima facie, to be a homogeneous product. Furthermore, since each seller can provide a potentially limitless supply of this product, one would expect that the market for feedback would satisfy the classical conditions for the law of one price to hold.

[25] See: Livingston, op. cit.