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The Effect of Reputation on Selling Prices in Auctions

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Abstract

In economic approaches it is often argued that reputation considerations influence the behavior of individuals or firms and that reputation influences the outcome of markets. Empirical evidence is rare though. In this contribution we argue that a positive reputation of sellers should have an effect on selling prices. Analyzing auctions of popular DVDs at eBay we, indeed, find support for this hypothesis. Secondary, we unmask the myth that it is promising for eBay sellers to let their auction end at the evening, when many potential buyers may be online.

Keywords: Reputation, eBay feedback system, auction

JEL classification: D44, D82, K12, L81

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1. Introduction

The decision of whether or not to go to court and try to enforce a claim legally is simply the outcome of a cost-benefit analysis from an economic viewpoint. Supposing the costs of legal enforcement (e.g. for hiring a lawyer) to be relatively constant across situations, claims that are connected with low benefits and low chances of success are unlikely to be legally enforced. Hence, there exist particular markets, where people forgo a legal enforcement of their claims. Consider such a market and suppose additionally that products sold are of varying quality and quality is ex ante, i.e. when sale of the product occurs, unobservable to potential buyers. As argued by e.g. Akerlof (1970), in such a market the following scenario may arise: Sellers of low-quality products pretend their products to be of high quality, for, after the transaction, they are unlikely to be sued by buyers. Anticipating this, a buyer's willingness to pay decreases. This induces sellers of high-quality products to withdraw their products from the market. This entails a further decrease in the willingness to pay for a product, which again induces some sellers to leave the market and so on. In the end, only the sellers of products of the lowest quality find it worthwhile to stay in the market.

Reputation is said to mitigate the described problems. Offering high-quality products may become profitable, for it leads to a good reputation, which is rewarded by more attractive terms in future transactions. Thus, reputation may become a substitute for legal enforcement in markets, where the latter is too costly (see Kreps & Wilson 1982, Milgrom & Roberts 1982).

Until recently, empirical research on the effects of reputation has been scarce since reputation was hard to quantify. The emergence of electronic markets such as eBay or amazon together with their feedback systems, however, gives economists the opportunity to study the effects of reputation. The data required to conduct an empirical study can simply be obtained from the respective internet sites.

There already exist some studies that analyze reputation and its effects in internet auctions. Resnick & Zeckhauser (2002) report that feedback is given by the majority of sellers and buyers in eBay internet auctions. Eaton (2002) and Livingston (2005) show

that the number of positive (negative) reports has a positive (negative) impact on the probability that auctions of guitars and golf clubs, respectively, result in a sale. Melnik & Alm (2002; gold coins), McDonald & Slawson (2002; Barbie dolls) as well as Houser & Wooders (2006; Pentium III processors) analyze the effect of positive and negative reports on selling prices and hardly find economically substantial effects. Livingston (2005) argues that sellers' reputation is built by the first few positive evaluations. However, marginal returns seem to be severely decreasing.

In this contribution, we also examine the effect of sellers' reputation on auctions' selling prices. However, we enlarge the analysis by not only looking at the *number* of negative reports in previous auctions, but also considering the *percentage* of negative feedbacks. We use the German eBay website www.ebay.de and investigate more than 300 auctions of new DVDs that took place in November and December 2005.

We confirm that the absolute number of negative ratings has no effect on the selling price.[1] However, the impact of the percentage of negative ratings on selling prices is strong and highly significant. A further finding is that selling prices are significantly lower in auctions, which end in the evening. This is rather surprising, as, in the evening, one would expect that there are more potential bidders active at the eBay marketplace, i.e., that demand for the products is higher. This is probably what many sellers expect, too. As a consequence, many sellers decide to let their auctions end in the evening hours. In other words, sellers seem to concentrate on the demand side, but neglect the supply side of the market. As our data confirms, the simultaneously larger supply in the evening hours seems to dominate the demand effect, so we can speak of an eBay evening fallacy.

The paper is organized as follows: Section 2 explains, how auctions are organized on www.ebay.de and how the feedback system works. In Section 3, a simple model is presented, building the basis of our hypotheses. Section 4 describes our data and contains the empirical results. Finally, Section 5 concludes.

[1] The cited studies find at least weak support for effects of number of negative ratings on selling prices. The absence of these effects in the current study is probably caused by the kind of product we have chosen. As DVDs are relatively low-priced (in comparison to products analyzed in the studies cited), it is likely that reputation plays a less important role.

2. Auctions on www.ebay.de

In order to become active at www.ebay.de, one first has to accomplish a registration process, which includes provision of personal information such as name, address and an email account. Further, a nickname has to be chosen. This nickname is a person's identity at eBay. This means that other eBay users do not see a person's true identity, but only his nickname. For email accounts that do not demand an identification of the holder, eBay itself arranges an identification process. In this way, eBay tries to prevent users from providing fake personal information. Moreover, the identification process narrows a person's ability to restart with a clean record, after having received negative feedback. Nevertheless, it does not eliminate this possibility, as a user could e.g. restart under the name of some relative that is inactive at eBay.

As a registered user, one can place items for sale or bid on items. In order to sell an item, one has to create an offer page. It is mandatory in this context to specify an offer name, an offer description, a starting price, the auction's duration, the accepted payment method and the country, from which bids are accepted. Further, the offer can be voluntarily enriched by providing a picture of the product or a specification of a mode of dispatch together with the entailed costs.[2] For eBay auctions, it is usually the case that the buyer bears the shipping costs, while the seller bears the fees for using the eBay marketplace.

Subsequent to a transaction, both buyer and seller can give a feedback about their respective trade partner. A feedback consists of a general evaluation, which may either be positive, neutral or negative, and an additional comment. On a seller's offer page, there is a link to all feedbacks the seller has received. Moreover, eBay provides two numbers summarizing the seller's overall feedback. The first number is the difference between positive and negative feedback, both from unique users. The second number is the percentage of positive ratings, which is even presented in bold characters. When

[2] In the US, sellers are able to enter a (secret) reserve price. If the actual price lies below the reserve price, they are not forced to sell the product. This is not possible in Germany.

examining an offer, these two numbers are hard to overlook so that each bidder should at least have a rough impression of the seller's reliability. Therefore, a dubious reputation can be characterized by a considerable percentage of negative ratings.

Neutral and negative feedback is rare on eBay. It is common practice to provide positive feedback, unless a heavy breach of trust has occurred. This means that negative feedback is mainly provided, if one party fails to deliver, i.e., if either the buyer refuses to pay or the seller, upon receipt of payment, does not deliver the item. A negative rating should thus work as a strong stigma.

Finally, on eBay products are auctioned off via second-price auctions. That is, the highest bidder receives the good and pays a price slightly (i.e., € 0.50 ≈ US-$ 0.60) above the second highest bid. Therefore, a second-price auction builds the basis of the theoretical model following in the next section.

3. A model of reputation in a second-price auction

We consider a second-price auction in a standard independent private values model.[3] There is a single seller of an indivisible good, and n bidders. All parties are assumed to be risk-neutral. The valuation of bidder i (i= 1,...,n) for the good is denoted by $v_i \geq 0$ and is independently distributed according to a distribution function $F_i(\cdot)$.[4] The seller's valuation for the good is normalized to zero.

After the auction, it is common practice that the auction's winner first pays the good. For simplicity, we assume that payment is never reneged on, although, in reality, this is sometimes the case. Thereafter, the seller decides on whether or not to send the product. That is, the seller may, upon receipt of the payment, hold up the buyer and keep the good himself. Similarly, the good may be lost during the transport. Altogether, a successful bidder can never be totally sure that he actually receives the good.

[3] See, for an introduction into these models, e.g. Matthews (1995) or the textbook by Krishna (2002).
[4] Note that the distribution function need not be the same for all bidders.

To capture this formally, suppose that, with probability $q(REP)$, the buyer receives the good as described on eBay, in which case he gets a payoff of $\pi_i = v_i - p_i$, where p_i denotes the price that was paid. With probability $1 - q(REP)$, on the other hand, he does not receive any product at all or a product of lower quality than the one described. Then, the buyer's payoff is lower and normalized to $\pi_i = -p_i$. Taken together, the expected payoff from winning the auction is given by $E[\pi_i] = q(REP)v_i - p_i$.

Bearing this in mind, it is an easy task to show that it is a (weakly) dominant strategy for each bidder to offer a bid $b_i = q(REP)v_i$. Overstating the bid does not change the bidder's payoff, if he has already been the highest bidder. Otherwise, he may even be worse off. If he becomes the auction's winner by overstating the bid, he realizes a negative expected payoff, as the price to be paid exceeds the expected gain. Similarly, understating the bid is also weakly dominated. In this case, a bidder is never better off, but may be worse off, if understating the bid makes him lose the auction.

As bids are given by $b_i = q(REP)v_i$, the selling price is given by $p = q(REP)v_{(2)}$, with $v_{(2)}$ denoting the second-highest valuation. Obviously, the price is increasing in $q(REP)$. If bidders become more convinced that the good is going to be delivered in promised quality, they will increase their bids. We assume that $q(REP)$ depends on the seller's reputation *REP*. A seller, who has performed well in the past, is trusted more than a seller, whose clients were oftentimes discontent or a seller, about whom is little known. This could e.g. be justified by assuming that hold up of a buyer leads to psychic costs for sellers and that sellers differ in the size of these costs.[5] Those who feel high costs for non-delivering the promised product are more likely to deliver the product than others, who feel low costs. Hence, they should have a better reputation and this should signal a higher probability of a satisfactory transaction. Summarizing, a high reputation is a signal of trustworthiness and so should lead to higher bids, and, accordingly, to higher selling prices.

[5] See, for models along these lines, Hart & Holmström (1987) or Gürtler (2006).

4. Reputation effects in auctions – an empirical investigation

4.1. Data and hypotheses

We make use of the German internet site of eBay and observe auctions of popular DVD movies (Star Wars, Madagascar, Fantastic Four, The War of the Worlds, Kingdom of Heaven, and Batman Begins) from November 14 to December 18 2005. Analyzing DVDs implies several advantages. First, we include only new DVDs so that product homogeneity is guaranteed. Second, concentrating on six different movies, we can control for "film effects". Additionally, it is argued in some contributions that reputation effects are more likely to occur in high-price-product auctions (see e.g. Houser & Wooders 2006, Livingston 2005). Therefore, the observation of reputation effects in auctions with low selling prices like DVDs even strengthen the argument that reputation is empirically relevant.

On the eBay marketplace, there exist a lot of different possible reputation measures. A person's eBay reputation could e.g. be represented by the number of positive, neutral or negative ratings a seller has received in previous auctions. Furthermore, any function including one or more of these numbers is a possible reputation measure. Of all possible functions, the difference of positive and negative ratings from unique users as well as the percentage of positive or negative ratings seem to be of particular interest, as these functions are directly available from a seller's offer page.

In the following, we restrict attention to two reputation measures, namely the *number* and the *percentage* of negative ratings a seller has received in previous auctions.[6] Moreover, we also consider the number and percentage of negative ratings a seller has received within the last twelve months. These reputation measures are available on the eBay website, too. They may be important, if potential buyers play (timely) limited punishment strategies, as suggested by Osborne (2004, p. 429) for instance. These strategies imply that buyers should punish a non-delivering seller by submitting lower bids for a limited time period. In this case, negative ratings, which occurred some years

[6] The results to be derived are very similar, if reputation is measured by the number of positive ratings or the difference of positive and negative ratings from unique users (instead of the number of negative ratings) or the percentage of positive ratings (instead of the percentage of negative ratings).

ago, do not affect the seller's current reputation and potential buyers look on the latest ratings in particular.

Using these reputation measures, we make the following hypotheses based on the theoretical considerations of the previous section:

Hypothesis A:
The *number* of negative ratings for the seller in eBay auctions has a negative impact on the selling price.

Hypothesis B:
The *percentage* of negative ratings for the seller in eBay auctions has a negative impact on the selling price.

Hypothesis C:
The *number* and *percentage* of negative ratings received within the last 12 months have a larger effect on the selling price than older ratings.

Next to our proxies for reputation, we record information on selling prices, which, as mentioned before, exceed the second highest bid by € 0.50. Other characteristics besides reputation, which may determine the price, include the duration of the auction, the required postage or the weekday and time, when the auction ends. The longer an auction persists the more likely it is that a certain customer will become attentive to it. Second, the required postage should lower the selling price, because it has to be paid by the buyer on top of the price. Furthermore, the weekday and time, when the auction ends, may influence the price. Demand may be higher, when people usually have leisure time, which may result in higher selling prices of items, whose auctions end during the weekend and/or in the evening. Thereby, we assume that bids are not equally distributed during the runtime of the auction, but that many bidders wait until few minutes or even seconds before the end of the auction.[7]

[7] See Roth and Ockenfels (2002) for empirical evidence and explanations of this phenomenon.

In total, 313 DVDs of the mentioned six movies have been sold at the German website of eBay during the observation period. The mean selling price of about 12 € differs between the movies from less than 10 € (Batman Begins) to more than 15 € (Star Wars) (see Table 1). During the observation period there were only four more auctions that offer one of these movies and did not receive any bid. Previous studies also examine the issue, to what extent the reputation of sellers affects the probability of receiving at least one bid (see, for example, Livingston 2005). Obviously, there are no such effects in our examination. The percentage of sellers' negative ratings is below average in all four of these auctions. However, they ask for a starting price of more than 14 € on average, which exceeds the mean sales revenue. Apparently, bidders are deterred by the amount of the asking price in these cases.

Table 1: Sample and descriptive statistics of selling prices [€] of DVDs in German eBay auctions (November/December 2005)

DVD	N	Mean	Standard deviation	Min	Max
Star Wars	64	15.80	2.08	9.17	21.00
Madagascar	61	11.91	2.29	7.50	19.00
Fantastic Four	21	11.69	1.25	9.02	13.23
The War of the Worlds	96	10.39	1.53	6.50	13.63
Kingdom of Heaven	36	13.31	1.91	9.00	17.17
Batman Begins	35	9.70	1.15	6.60	12.03
Whole sample	313	12.14	2.79	6.50	21.00

4.2. Results

The sellers have got six negative ratings in previous auctions on average. Given the number of positive ratings, 1400 on average, the mean percentage of negative ratings does not exceed 0.5% (see Table 2). In spite of the small average percentage of negative ratings, we can observe a range from 0 to 6.7%. Probably, sellers with a larger

percentage of negative ratings abandon their eBay personality and start to sell under a different name. Sellers can decide, whether the auction lasts 1, 3, 5, 7 or 10 days. Each possibility is used to some extent. In spite of the homogeneous goods there is considerable dispersion in the requested postage. Auctions do not end at weekends above average. However, almost half of the observed auctions end in the evening during 7 and 10 p.m. (see Table 2).

Table 2: Descriptive Statistics of dependent and independent variables (n=313)

	Mean	Standard deviation	Min	Max
Proxies for reputation				
Number of negative ratings	5.73	18.10	0	122
Percentage of negative ratings (per cent)	0.46%	0.872	0	6.67%
Number of negative ratings (last 12 months)	3.22	9.80	0	62
Percentage of negative ratings (last 12 months)	0.33%	0.720	0	5.88%
Characteristics of auctions				
Duration of auction [days]	4.63	2.88	1	10
Postage [€]	2.56	0.689	1.44	5.20
End of auction: weekend	0.240	0.428	0	1
End of auction: evening (7-10 p.m.)	0.476	0.500	0	1

In order to analyze the effect of reputation on the price in eBay auctions, we regress the number respectively percentage of negative ratings as our proxy for reputation together with the control variables x on the log of selling price in a simple OLS approach:

(1) $\ln(\text{selling price}) = \alpha + \text{number of negative ratings}_i \lambda + x_i' \beta + \varepsilon_i$,

(2) $\ln(\text{selling price}) = \alpha + \text{percentage of negative ratings}_i \lambda + x_i' \beta + \varepsilon_i$,

respectively.

As stated in our hypotheses, we expect to find a negative λ. The unit of observation is the individual auction. We find, however, that there is no effect of the number of negative ratings on the selling price (Model 1 of Table 3). This contradicts the results of

Melnik & Alm (2002), McDonald & Slawson (2002) and Houser & Wooders (2006), who measure reputation by the number of negative ratings and find at least weak support for effects of this measure on selling prices. As argued before, the absence of these effects in the current study is probably caused by the relatively low prices of the DVDs we have considered.

In contrast, the percentage of negative ratings is negatively associated with the price. An increase in the share of negative ratings of one percentage point decreases the selling price in the amount of 4 per cent (Model 2). On average, a seller with 1 per cent negative ratings should receive about € 0.50 (US-$ 0.60) more per DVD than a seller with 2 per cent negative ratings. Similar results can be observed for the number and percentage of negative ratings within the last 12 months (Model 3 and 4). Again, we find only a significant effect for the percentage, but not for the number of negative ratings. Model 5 shows that the total percentage of negative evaluations is an important indicator for bidders' considerations with respect to the trustworthiness of sellers. In contrast, the percentage of negative ratings obtained in the last 12 months has no additional effect.

To sum up, we find evidence that reputation significantly affects the selling price in auctions. Bidders evaluate a seller's reliability via the percentage of negative ratings so that this measure strongly affects the selling price. Thus, we contradict previous studies on reputation, which found, if any, only weak reputation effects. Reputation effects may well be present in their data sets, too, but attention was focused on the wrong reputation proxies. In this context, it should be mentioned that, as an exemption, McDonald & Slawson (2002) measure reputation – inter alia – by the ratio of the number of negative and positive ratings. Although this measure is closely related to our reputation measure, they find no significant effect on the selling price. In their sample, however, sellers have little experience compared with the sellers from our sample (the average number of negative ratings is 0.51 in their sample, while it is 5.73 in ours). Therefore, in their sample a ratio of 0 probably describes an extremely inexperienced seller, who is, despite the absence of negative ratings, not trusted a lot.

Summarizing, we find support for hypothesis B (percentage of negative ratings affects selling price) derived from the theoretical considerations, but not for hypothesis A (number of negative ratings affects selling price) and C (number and percentage of negative ratings received within during the last 12 months have a larger effect on the selling price than older ratings).

The results with respect to the other variables indicate that postage affects sales revenue negatively, which was expected. However, an increase of postage in the amount of 1 € does decrease the price only by the amount of 5 per cent on average, which means by about 60 Cent at an averaged price of 12 €. Hence, sellers can make money by demanding an above average postage. This result contradicts an implication of the mental accounting approach of Thaler (1985), who suggests bundling prices because of individuals' loss aversion and the assumption that several "accounts" are built for different parts of a product's price. In our case, however, it seems to be beneficial for sellers to segregate the total revenue into the two dimensions postage and selling price, because potential buyers concentrate on the main price during auctions and neglect the amount of the postage.

The end of the auction at the weekend has no significant effect on the price. Also the duration of auctions has, against our expectations, no effect on the price. Significant differences across the movies confirm the descriptive results.

It is, at first glance, surprising that selling prices are significantly lower in auctions, which end in the evening. Probably, many sellers expect the opposite. That is why the auctions, indeed, end in the evening hours in large part. Hence, sellers do not keep in mind the supply side of the market. Although page impressions at eBay may be higher during the evening hours, the simultaneously larger supply dominates the demand effect. Thus, we can speak of an eBay evening fallacy.

Table 3: Determinants of selling prices

	Dependent variable: log selling price of DVD				
	(1)	(2)	(3)	(4)	(5)
Number of negative ratings	0.000				
	(-0.44)				
Share of negative ratings [in per cent]		-0.040***			-0.044***
		(-4.13)			(-3.13)
Number of negative ratings (last 12 months)			0.000		
			(-0.50)		
Share of negative ratings (last 12 months) [in per cent]				-0.033***	0.007
				(-2.67)	(0.38)
Postage	-0.059***	-0.049***	-0.058***	-0.054***	-0.050***
	(-4.63)	(-4.06)	(-4.53)	(-4.39)	(-4.07)
End of auction: weekend	-0.014	-0.015	-0.014	-0.021	-0.013
	(-0.66)	(-0.69)	(-0.65)	(-0.95)	(-0.62)
End of auction: evening	-0.048***	-0.045***	-0.048***	-0.047***	-0.045***
	(-2.80)	(-2.69)	(-2.80)	(-2.76)	(-2.68)
Duration					
1 day	-0.027	-0.025	-0.026	-0.029	-0.024
	(-0.90)	(-0.86)	(-0.88)	(-0.98)	(-0.84)
3 days	0.010	0.013	0.010	0.012	0.013
	(0.37)	(0.50)	(0.38)	(0.47)	(0.49)
5 days	—	—	—	—	—
7 days	-0.051*	-0.055**	-0.051*	-0.062**	-0.053*
	(-1.87)	(-2.06)	(-1.88)	(-2.27)	(-1.95)
10 days	-0.003	-0.013	-0.003	-0.014	-0.012
	(-0.09)	(-0.41)	(-0.10)	(-0.42)	(-0.37)
Movie					
Star Wars	0.425***	0.420***	0.424***	0.424***	0.419***
	(17.2)	(17.4)	(17.2)	(17.4)	(17.4)
Madagascar	0.133***	0.124***	0.132***	0.124***	0.124***
	(4.68)	(4.48)	(4.68)	(4.43)	(4.49)
Fantastic Four	0.151***	0.132***	0.151***	0.137***	0.133***
	(4.00)	(3.65)	(4.02)	(3.73)	(3.65)
The War of the Worlds	—	—	—	—	—
Kingdom of Heaven	0.248***	0.238***	0.248***	0.240***	0.239***
	(8.18)	(8.03)	(8.17)	(7.96)	(8.03)
Batman Begins	-0.059*	-0.07**	-0.060*	-0.066**	-0.07**
	(-1.91)	(-2.31)	(-1.92)	(-2.16)	(-2.29)
Day♣	-0.001	-0.001	-0.001	-0.001	-0.001
	(-0.74)	(-1.27)	(-0.74)	(-1.06)	(-1.26)
Intercept	2.538***	2.549***	2.537***	2.552***	2.548***
	(56.6)	(59.1)	(56.5)	(58.0)	(58.7)
Number of observations	313	313	313	313	313
R^2 adj	0.588	0.610	0.588	0.598	0.609

Notes: Absolute T-values in parentheses. ♣day coded from 1 (November 14th) to 35 (December 18th).

5. Conclusion

In this study, we used information on more than 300 auctions of new DVDs that took place on www.ebay.de in November and December 2005 to analyze whether there exist reputation effects in Internet auctions. Reputation is measured by the total number of negative ratings and – different from previous studies – the percentage of negative ratings. While the former measure has no effect on selling prices, the latter has a strong and highly significant effect. These findings explain why previous studies, neglecting the second measure, have identified only weak reputation effects. The conclusion from previous studies that reputation does not matter much on the eBay marketplace therefore underestimates the true reputation effects. Reputation does indeed play an important role on the eBay marketplace. However, bidders do not focus on the absolute numbers of negative ratings, as argued in many studies. Instead, they attach particular importance to the first reports (as shown by Livingston 2005) and to the *percentage* of negative ratings.

The importance of the finding that reputation indeed matters is not restricted to certain product markets. On the contrary, the relevance of reputation for economic interactions is widespread. For instance, reputation is argued to sustain implicit wage contracts (Lazear 1979, Baker et al. 1994), to affect the boundaries of the firm (Garvey 1995, Baker et al. 2002, Halonen 2002) or to enable collusion in rank-order tournaments (Dye 1984) and oligopoly market games (Harrington 1989). As our results indicate, reputation effects are empirically relevant so that further research on reputation is desired.

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