Seller Strategies on eBay

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Abstract

This paper analyzes seller characteristics and choices in approximately 1000 eBay auctions for a particular model of PDA. Seller characteristics include frequency of selling, reputation, and the qualities of the product sold. Seller choices include the length of the auction, information provided about the product, starting price, and whether to use a 'Buy it Now' option. We find that different types of sellers pursue systematically different strategies for how their items are offered, and we discuss the possible causes of these differences. For example, the two high volume sellers in our sample always use a combination of a 'Buy it Now' with a low starting price, while the many less frequent sellers use an array of pricing strategies. In addition, more highly rated sellers were somewhat more likely to provide more detailed product information, as well as secure payment options.

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1. Introduction

Online sales in the United States accounted for 1.3 percent of retail transactions in 2002, and 1.6 percent in 2003, or $54.9 billion out of over $3.4 trillion in total US retail sales.[1] These numbers, while still relatively small, represent substantial growth.While auctions have not been used for traditional, brick-and-mortar retail transactions, they are well suited for online buying and selling, because of the automation of the auction process and the consequent reduction in some kinds of transaction costs. In 2003, eBay's net sales, from transaction fees on $15 billion in gross revenues, reached $1.2 billion (Hof, 2003), displacing mainly traditional and less structured bargaining methods, but also some conventional retailing.

A significant element of the emergence of online auctions has been the utilization of auction sites such as eBay to sell products that are simultaneously sold in conventional retail markets. The image of online auctions has expanded beyond that of a web-based garage sale or swap meet, focusing on collectibles or unique items, to one where entrepreneurs are seeking to launch or enhance 'e-tail' businesses in direct competition with traditional retail markets. Established retailers, such as Sears Roebuck, and other firms that have moved into retailing, such as Walt Disney, have responded to this threat by selling on eBay as well, capitalizing on their existing brand names (Hof, 2003). In continuing to attract the largest number of online auction sellers, eBay has provided easily accessible tools to quickly establish and easily maintain seller ratings, based upon buyer feedback. Seller ratings as reputational signals, along with exposure on eBay, can help to level the playing field for smaller versus higher volume sellers, without much expense to the seller for advertising.

Given the diversity of products and sellers on eBay, it is interesting to understand how the characteristics of sellers affect their choices of different facets of their Internet auctions. Examples of such choices include the length of the auction, information provided about the product, payment options, the starting price, and whether to use a private reserve price. EBay auctions also allow the seller to include the option for buyers to purchase immediately at a pre-specified 'Buy it Now' price. As explained below, this option allows sellers to offer a hybrid of an auction format and a posted price format, as well as pure versions of each market institution. We seek to understand how sellers' characteristics, such as reputation and frequency of selling, affect their choices about pricing, payment and so on.

[1] These estimates are from the US Census Bureau (reported at www.census.gov/mrts/www/current.html): "A stratified simple random sampling method is used to select approximately 11,000 retail firms whose sales are then weighted and benchmarked to represent the complete universe of over two million retail firms… Coverage includes all retailers whether or not they are engaged in e-commerce. Online travel services, financial brokers and dealers, and ticket sales agencies are not classified as retail and are not included in either the total retail or retail e-commerce sales estimates. Nonemployers are represented in the estimates through benchmarking."

Our ultimate motivation is that one can view eBay and other online auctions as a type of 'lab' for studying the evolution of markets, where both larger corporations and individual entrepreneurs may be represented. Quantitative analyses, such as we perform here, are a complement to historical case studies that seek to examine similar questions. However, we should note that the current analysis is based on a cross-sectional 'snapshot' of the sales environment within a single e-business, eBay. We would expect infrequent and inexperienced sellers to try many different strategies when they use eBay, and we cannot necessarily identify which strategies will be most successful in the long run. Our indirect evidence comes from contrasting this diversity with the approach followed by the highest volume sellers in our sample.

Our sample includes two sellers who we can easily classify as 'retailers.' We pay special attention to their characteristics, and to the choices that they make concerning the conduct of their auctions in order to compare their selling strategies with those of the other sellers in the sample. We are particularly interested in whether these high-volume sellers function as 'leaders' in this eBay marketplace by exhibiting successful strategies, which might be identified and copied by the lower volume sellers in our sample. In more traditional retail markets, we would expect this type of convergence in the fairly mature market for the Palm Pilot Vx, which we examine. However, if increased accessibility for sellers is still the primary calling card of eBay then our sample is likely to have been collected during an ongoing "churning" of the market, with sellers entering and exiting all the time.

In fact, we see much greater heterogeneity of strategies amongst lower volume sellers. This may reflect inherent differences in optimal strategies between high volume and low volume sales. Another, evolutionary explanation of the diversity in sales strategies amongst lower volume sellers may be evident from our result that selling less frequently in our sample is highly correlated with less experience in selling on eBay in general. In such a case, most of the sellers that we have caught in our cross-sectional "snapshot" may still be in a process of experimentation with the many selling-strategy choices that eBay offers to its potential sellers.

The rest of the paper is structured as follows. Section 2 reviews some of the most relevant literature on Internet auctions, as well as some other evidence on Internet markets. Section 3 summarizes the data, obtained from about one thousand eBay auctions over a period of five weeks for a particular brand of handheld computer. Section 4 examines the relationships between observable characteristics of products and sellers. For example, we find that selling frequency and measured seller reputation in this market can be correlated with whether the products are damaged or new. Section 5 presents results on the relationship between sellers' characteristics and their choices with respect to the format of the auction. We find that the wide variety of sellers' characteristics represented on eBay is accompanied by a widely varying set of seller strategies, where the patterns in these strategies are very difficult to identify. In spite of this difficulty, the volume of sales by the seller, which can be interpreted as their 'experience' in eBay auctions, is a primary determinant of recognizable patterns, particularly for 'retailers.' Section 6 discusses differences in auctions that resulted in a sale versus those that did not. The main conclusions of this section are that auctions ending in a sale were much less

likely to involve a private reserve price, much less likely to be conducted by high volume sellers, and somewhat more likely to use the 'Buy it Now' option. Section 7 concludes with a summary of our analysis, a discussion of implications, and suggestions for future research.

2. Research on Internet Auctions

There is a large literature, both theoretical and empirical, on auctions, but little of it relates product and seller characteristics to seller choices regarding the format of the auction. In addition, while online auctions and their characteristics have received a lot of attention since their rapid emergence in the last decade, the more recent move toward hybridization of online auctions that introduces elements of the posted price institution has not.

Within the theoretical auction literature perhaps the most relevant to the current issue of seller choice is that of optimal auction design. Such work addresses connections between auction structure, efficiency, and value maximization. For instance, Riley and Samuelson (1981) evaluates the appropriate choice of minimum bid or reserve price for maximization of seller revenue given an environment of private bidder values. The optimal minimum bid maximizes revenue but introduces the possibility of failure to sell the item. The issue of auction design in an environment with many sellers is explored by Peters and Severinov (2002). The authors identify equilibrium seller behavior regarding auction structure and reserve prices. They verify the result of McAfee and Vincent (1993) that sellers set a reserve price equal to cost in equilibrium. Their primary focus, however, is on bidder response to such design and the resulting efficiency properties. Their environment incorporates neither heterogeneity in seller and product characteristics nor the potential to offer a posted price.

Empirical studies of the conduct of online auctions address a wide range of issues. Pioneering work by David Lucking-Reiley (1999) focuses on testing classical results from auction theory, such as revenue equivalence. Using data from online field experiments, Reiley rejects revenue-equivalence of Dutch and second-price sealed bid auctions but finds no such evidence for first-price sealed bid and English auctions. In another field experiment, Katkar and Lucking-Reiley (2000), comparing public and private reserve prices, show that the use of a private reserve reduces both the probability of a sale and the transaction price.[2] Resnick et al (2003) find that the effects of seller reputation, often unclear in field data, have the predicted positive impact on seller revenues when proper experimental controls are imposed.

Our work belongs to an alternative approach, which collects and analyzes transactions data from Internet sites. Using this method, Morgan and Baye (2001) analyze persistent price dispersion in posted price markets on the Internet. Also, Houser and

[2] One caveat to these results is that the authors found some informal evidence that sellers were using the private reserve to circumvent eBay's fee structure by contacting high bidders on the side in unsuccessful auctions.

Wooders (2000) examine the effect of bidder and seller reputation on auction outcomes, concluding that seller reputations are correlated with auction success in *Pentium III* microprocessor auctions on eBay. Roth and Ockenfels (2002) study the timing of bids, and the impact of different methods of specifying auction deadlines. Comparing eBay and Amazon auctions, they find evidence that auctions held with a 'soft' ending time where the length of the auction is extended when a late bid arrives discourage such late bidding, or 'sniping' common on eBay. They further propose that, given eBay's auction format, late bidding may be rational strategic agents.[3] Lucking-Reiley et al. (2000) use data collected from eBay auctions of one-cent coins to study determinants of price. They find evidence that seller feedback ratings have a significant impact on prices, that minimum bids and private reserve prices raise the auction price, and that the length of an auction has a significant and positive effect on price in these auctions.

In a companion piece of research to this paper, Anderson et al. (2004) examine a sub-sample of the eBay auctions considered in this paper, and use regression analysis to analyze auction outcomes. For example they find that less experienced sellers received lower prices, on average, unless they effectively posted a price, but seller reputation, as measured by eBay's feedback ratings, did not significantly affect the final price. Milam (2002) also examines the issue of posted prices versus auctions, contrasting the working of eBay and Yahoo auctions in this respect. A major difference is that Yahoo allows a 'Buy it Now' price to be available even after bidding starts, and this greater flexibility leads to the option being used by a greater proportion of Yahoo sellers, with more auctions also ending with a buyer accepting the 'Buy it Now' price.

A third empirical approach has been to use laboratory experiments to examine the impact of different auction rules. For example, Ariely, Ockenfels and Roth (2003) further examine the issue of ending rules. The experimental design allows the authors to isolate the importance of ending rules in explaining patterns of late bidding, without the other differences that make comparisons across sites such as Amazon and eBay difficult to interpret unambiguously.

3. Data Overview

Seller behavior on an online auction site is best examined with a reasonably large sample of auctions involving a homogeneous good, and over a short period of time. Therefore we chose to gather data for one of the highest volume (at the time – August 2001) and most homogenous items, the Palm Vx handheld computer. The data was taken from eBay, the largest Internet auction site, using a web-crawling 'spider' program.

EBay Auction Rules

We begin with a review of eBay's basic rules before presenting the data. The seller provides information on the item, such as a description and picture, terms of payment and shipping, and chooses the duration of the auction, either 3, 5, 7, or 10 days.

[3] See also Bajari and Hortaçsu (2003) and Ockenfels and Roth (2003) on this and related issues.

The seller also chooses a minimum first bid, or starting price, and whether to enter a private reserve price. Potential buyers know when a private reserve price exists but do not know its value until someone bids above it. Sellers may also provide links to their own "home pages" on the web, which can be a source of further information for buyers.

Potential buyers can bid on any item they find on eBay's web site, and bid histories are available to them. The auction ends at the pre-specified time, and the item goes to the highest bidder at the highest bid price. Details of shipping and payment are left up to the buyer and seller, although eBay provides services on these aspects of the transaction, at an additional fee. Finally, eBay also provides a record of comments about sellers, so that sellers have the potential to develop and maintain reputations. Potential buyers have access to these comments, as well as all seller-provided information.

The seller also can specify a 'Buy it Now' price, whereby s/he commits to sell the item immediately to any buyer who accepts that specified price, thus ending the auction early. The 'Buy it Now' option is extinguished (and disappears from the item's auction site) when any buyer enters a bid that is at least as great as the minimum first bid, even if the first bid is lower than the 'Buy it Now' price. The seller can prevent this from happening by specifying a starting price (or a private reserve price) at or above the 'Buy it Now' price. Such price combinations are equivalent to a posted price, since bidding is rendered irrelevant. A scan of buyer comments on eBay suggested that they find the practice of using a high private reserve price annoying and they may avoid the auction. Using a high starting price is just as effective and more transparent. Used by itself, the 'Buy it Now' option creates a hybrid institution, a mix of an auction and a posted price, with buyer behavior determining which of the two institutions is activated for the transaction.

The Data

We collected data on 1211 Palm Vx auctions on eBay from August 6 to September 11, 2001 using a web-crawling 'spider' similar to that described in Lucking-Reiley *et al* (2000). Of these auctions, 1031 resulted in a sale, but in 23 cases we could not determine whether or not the auction started with a 'Buy it Now' option, and we eliminated these from consideration. Therefore, the main analysis (Sections 4 and 5) focuses on 1008 successful auctions for which we have complete data. Section 6 provides an analysis of the differences between auctions that resulted in a sale and those that did not, and examines a total of 1177 auctions. Table 1 lists the variables used in the analysis, including some that describe the outcomes of the auctions.

Table 2 presents the average values of the variables for the 1008 successful auctions with complete data. The first column reports on the full sample of completed transactions, the second and third report the subsamples for which the seller did not or did use the 'Buy it Now' option, and the last two divide the previous subsample according to whether the 'Buy it Now' option was exercised. The sample sizes appear in the bottom row.

Table 1: Variable Names and Definitions

Variable	Description
NEW	Equal to one, if the item is definitively described to be "sealed, in the box, and new" in either the title of the auction listing or in the description text (zero otherwise)
DAMAGE	Equal to one, if any significant damage to the item is mentioned in either the title or the description text.
EXTRAS	Equal to one, if the item is being offered with significant accessories, mentioned in either the title or the description text.
QUANTITY	Number of items sold in a single, particular auction.
DAYS806	Number of days between the start of the auction and the date of the first auction in the sample (8/6/01).
SINGLSR	Equal to one, if the seller only held one auction during our sample.
MULTSLR	Equal to one, if the seller held more than one auction but no more than ten auctions during our sample.
FREQSLR	Equal to one, if the seller held more than ten auctions but no more than fifty auctions during our sample.
RETAILER	Equal to one, if the seller held more than fifty auctions during our sample.
LNSLRTNG	Natural logarithm of the difference between the number of unique, positive comments about the seller and the number of unique, negative comments.
NEGRATIO	Ratio of the number of unique, negative comments to the total number of unique comments listed in the seller's feedback page.
SLRHOME	Equal to one, if the seller posts a link to his website in the description text of the auction listing.
STARTPRC	Initial price to start the bidding, posted by the seller at the beginning of the auction.
SQRSTPRC	Square of the seller's starting price.
LOWSTPRC	Equal to one, if the seller posts an initial price below twenty dollars.
POSTDPRC	Equal to one, if the seller sets the initial price equal to a displayed, 'Buy it Now' price.
STRTBYNW	Equal to one, if the seller offers buyers the option to buy the item immediately at a displayed, 'Buy it Now' price.
BYNOWPRC	Seller's price if displayed at the beginning of the auction as a 'Buy it Now' offer.
PRIVTRES	Equal to one, if the seller displays a notice that actual sale is subject to a buyer at least bidding as high as some unknown, private, reserve price.
FEATURED	Equal to one, if the seller paid extra to have the item(s) listed at the top of the listings, no matter what the potential buyer's search criteria was.
DSCLNGTH	Number of text characters in the description of the item, composed by the seller for the auction listing page, minus the number of HTML tags.
IMAGE	Equal to one, if the seller included at least one image in the description of the item.
SCRPYDUM	Equal to one, if the seller accepts credit cards, PayPal, or eBay Online Payments.
DURATION	Duration of the auction, initially set by the seller to a maximum of 3, 5, 7, or 10 days.
ENDBYNOW	Equal to one, if the auction ends with a buyer accepting a seller's 'Buy it Now' option.
NUMBIDS	Number of bids on the item(s) in a particular auction.
UNIQBIDR	Number of unique bidders for the item(s) in a particular auction.
WINBID	Dollar value of the final bid in an auction that resulted in a sale.

Table 2: Sample and Sub-sample Means

Variable	All Sales	"Buy it Now" not Offered	"Buy it Now" Offered	"Buy it Now" not Accepted	"Buy it Now" Accepted
Product Characteristics					
NEW	0.283	0.368	0.187	0.157	0.312
DAMAGE	0.019	0.023	0.015	0.005	0.054
EXTRAS	0.316	0.400	0.223	0.168	0.452
QUANTITY	1.793	2.480	1.021	1.026	1
DAYS806	18	18	17	17	18
Seller Characteristics					
SINGLSLR	0.316	0.445	0.173	0.131	0.344
MULTSLR	0.216	0.270	0.156	0.089	0.430
FREQSLR	0.208	0.285	0.122	0.099	0.215
RETAILER	0.259	0	0.549	0.681	0.011
NEGRATIO	0.019	0.030	0.007	0.005	0.017
LNSLRTNG	4.132	3.313	5.052	5.155	4.627
Seller Choices					
SLRHOME	0.210	0.141	0.288	0.309	0.204
STARTPRC	$62.56	$63.91	$61.05	$26.20	$204.20
LOWSTPRC	0.541	0.435	0.659	0.819	0
PRIVTRES	0.183	0.225	0.135	0.086	0.333
FEATURED	0.020	0.038	0	0	0
DSCLNGTH	9618	4485	15378	18126	4090
IMAGE	0.794	0.675	0.926	0.953	0.817
SCRPYDUM	0.800	0.705	0.905	0.937	0.774
POSTDPRC	0.090		0.192	0.003	0.968
STRTBYNW	0.471		1	1	1
BYNOWPRC	$224.34		$224.34	$229.03	$205.08
Auction Outcomes					
DURATION	5.030	5.164	4.880	5.516	2.269
ENDBYNOW	0.101		0.196	0	1
NUMBIDS	17.299	18.317	16.156	19.500	2.419
UNIQBIDR	9.771	10.424	9.038	10.804	1.785
WINBID	$200.83	$197.94	$204.07	$204.04	$204.20
Sample Size	**1008**	**533**	**475**	**382**	**93**

The observable product characteristics — whether the item is new, whether it is damaged or includes any extra accessories — are coded as dummy variables, with our categorization of the characteristic being present relying on a definitive indication in the accompanying product description. The Quantity variable refers to the number of units offered in a particular auction; the mode is always one, since single item sales are by far the most common, and large quantities are quite rare when 'Buy it Now' was offered.[4] DAYS806 is the time trend; auctions starting later would tend to yield lower prices due to economic obsolescence. The means in row one of the table indicate that the 'Buy it Now'

[4] Only two sellers sold significantly large quantities per auction. In looking at seller choices, their strategies were basically the same. They did not use 'Buy it Now' or a private reserve price but they did set their starting prices very high.

option is less likely to be offered but more likely to be accepted on new items, which constitute 28.3% of the sample.

The data in Table 2 are organized according to four categories. The first set of variables cover the characteristics of the good, as observed or inferred from the web site data. The PERL script in the 'spider' program used to gather this data had to focus on certain key words and qualifiers in the title and text describing the item, in order to determine these good characteristics without actually viewing a picture of the item for sale, as a bidder typically would. Since the sellers, who write these titles and descriptions, are likely to shade the truth as much in their favor as possible, our specifications for the script search had to be very strict.

As a result, the proportions of damaged items are probably understated, due to the reluctance of sellers to mention any damage, but the proportions of new items could also be understated, since many items that were labeled as "new" but not factory "sealed" in the original box could not be deemed as strictly "new". Also, there are many possible extras or accessories for the Palm Pilot Vx but some of them are essential to its function, such as the stylus and the recharging base or cradle. Many sellers mentioned these standard components, which are included with the basic Palm Vx, as "extras." Therefore, we counted such items as extras. However, the estimated proportions only slightly overstate the prevalence of extras, because a scan through the actual auction pages indicated that, almost always, when these standard accessories were present, so were true extra accessories.

Observable seller characteristics (unfortunately) cannot include risk aversion or time preference, but they do include the number of auctions conducted during the sample period — MULTSLR codes 2-10 auctions, FREQSLR codes 11-50, and RETAILER codes over 50) — as well as buyer ratings. The two retailers in our sample accounted for more than half of the 'Buy it Now' offers but only 1% of those offers accepted by buyers.[5]

Ratings are long strings of comments, which we summarize in two variables: NEGRATIO is the ratio of negative to total comments, and LNSLRTNG is the natural log of positive comments net of negative comments.[6] Thus lower NEGRATIO and

[5] Two more sellers in our sample could not be clearly classified as retailers, although they also sold a large quantity of Palm Pilot Vx's during our sample period by offering large quantities (25 to 45 items) for sale in the same auction. Such auctions are termed "Dutch Auctions" on eBay and usually result in the seller receiving a lower price in order to move a larger quantity of items more quickly. We define "retailers" to exclude such sellers, whose choices might consistently be affected by extraordinary time constraints.

[6] Even if old, possibly irrelevant, negative comments on a seller do matter to a potential buyer, one should expect them to eventually be swamped by mostly positive feedback if the seller continues to be able to sell on eBay. That is, for an experienced eBay seller/buyer even grievous mistakes of the past are not likely to be reflected in the seller's rating, nor easily discovered by the potential buyer, although the negative feedback remains on the sellers permanent record. Thus, since there is not much fluctuation in the raw number of negative comments amongst sellers and the number of negative comments is relatively low, we use the ratio of negative comments to the total number of comments. This variable behaves much like the seller rating, except in the opposite direction, decreasing steadily as the frequency of selling for a particular seller increases.

higher LNSLRTNG indicate two aspects of better seller reputation. These ratings are better on average in the 'Buy it Now' subsamples.

Seller choices are summarized in the next section of the table. Overall 21% display links to homepages. Minimum bid prices average about $60, but diverge for accepted and not accepted "Buy it Now," probably reflecting the fact that this option is accepted more often when it is effectively a posted price (POSTDPRC = 1). Private reserve prices are used in 18.3% of all auctions, and more frequently when a 'Buy it Now' price is accepted. Sellers offer secure payment procedures (SCRPYDUM = 1) and a picture of the product (IMAGE = 1) in about 80% of auctions, but rarely pay for a place in eBay's featured items (FEATURED = 1). Description lengths average about 10,000 characters but are, for no obvious reason, longer in auctions where the option is not accepted. Some 47.1% of auctions in our sample offer the 'Buy it Now' option; of these 19.2% actually are posted price.

Before our sample period, eBay established a popular, alternative web site, called Half.com, for individuals who wished to buy and sell most of the same items that are available on eBay, including Palm Pilots, at posted prices. The low numbers of sellers posting a price in our sample may indicate that sellers interested in posting a price, preferred such an alternative posted price site, rather than try to "fool" the bidders who were visiting eBay looking for more of an actual auction. We also noted by informal inspection of the eBay auction pages from our sample that eBay allowed sellers to post links to their storefronts at Half.com in order to sell the same item at a posted price.

The last part of the table contains data on the auction outcomes, including average duration (about 5 days except when the 'Buy it Now' option is accepted), the number of bids, number of unique bidders, and the winning bid. Winning bids averaged about $200 and tended to be about $6 higher for sellers offering the 'Buy it Now' option, whether or not it was accepted.

4. Product and Seller Characteristics

In Table 3, we present correlation matrices for three sub-samples, focusing on the correlations between product and seller characteristics. We observe generally low correlations between different product characteristics, with expected negative signs on correlations between such characteristics as "new" and "damaged". Negative signs on correlations between the dummy variable for a new item, based upon the seller's description, and whether any extras are mentioned by the seller in advertising the item are also intuitive in the sense that it should be clear to the seller, with the definition that we have used to categorize "new", that a new item must necessarily be accompanied by what sellers of used items often term as "extras".

Table 3: Correlations Between Product and Seller Characteristics

Non–'Buy it Now' Sub-sample (533 Observations)

Variable	NEW	DAMG.	EXTS.	QUNT.	DAYS.	SINGL.	MULT.	FREQ.	RET.	NEGS.	LRTNG
NEW	1	-0.06	-0.23	-0.02	0.02	-0.29	-0.02	0.34	0	0.27	0.08
DAMAGE		1	-0.05	-0.04	0.06	0.09	-0.01	-0.10	0	-0.06	0.04
EXTRAS			1	-0.12	0.02	0.36	0.04	-0.43	0	-0.21	-0.14
QUANTITY				1	0.09	-0.23	-0.01	0.27	0	0.01	0.27
DAYS806					1	0.01	0.08	-0.09	0	0.04	-0.06
SINGLSLR						1	-0.54	-0.57	0	-0.22	-0.33
MULTSLR							1	-0.38	0	-0.06	0.04
FREQSLR								1	0	0.31	0.32
RETAILER									0	0	0
NEGRATIO										1	0.04
LNSLRTNG											1

"Buy it Now" not Accepted Sub-sample (382 Observations)

Variable	NEW	DAMG.	EXTS.	QUNT.	DAYS.	SINGL.	MULT.	FREQ.	RET.	NEGS.	LRTNG
NEW	1	-0.03	0.27	0.10	0.02	0.15	0.27	0.55	-0.63	0.17	-0.23
DAMAGE		1	0.16	-0.01	0.04	0.08	0.10	-0.02	-0.11	-0.02	-0.15
EXTRAS			1	-0.05	0.01	0.41	0.18	0.39	-0.65	0.22	-0.41
QUANTITY				1	-0.04	-0.04	0.32	-0.03	-0.15	0.12	-0.10
DAYS806					1	0.01	-0.05	0.12	-0.06	-0.07	-0.14
SINGLSLR						1	-0.12	-0.13	-0.57	0.14	-0.36
MULTSLR							1	-0.10	-0.46	0.40	-0.35
FREQSLR								1	-0.49	0.07	-0.14
RETAILER									1	-0.38	0.56
NEGRATIO										1	-0.20
LNSLRTNG											1

"Buy it Now"–Accepted Sub-sample (93 Observations)

Variable	NEW	DAMG.	EXTS.	QUNT.	DAYS.	SINGL.	MULT.	FREQ.	RET.	NEGS.	LRTNG
NEW	1	-0.16	-0.10	0	0.02	-0.19	-0.30	0.61	-0.07	-0.02	0.37
DAMAGE		1	-0.12	0	0.12	0.03	0.08	-0.12	-0.02	0.45	-0.12
EXTRAS			1	0	-0.06	0.02	-0.18	0.21	-0.09	-0.19	-0.10
QUANTITY				0	0	0	0	0	0	0	0
DAYS806					1	-0.07	0.02	0.07	-0.02	-0.02	0.05
SINGLSLR						1	-0.63	-0.38	-0.08	-0.20	-0.42
MULTSLR							1	-0.45	-0.09	0.19	-0.11
FREQSLR								1	-0.05	0.02	0.59
RETAILER									1	-0.05	0.12
NEGRATIO										1	-0.15
LNSLRTNG											1

Some of the correlations between product and seller characteristics are notable. For example, whether an item is new is positively correlated with the seller holding 11-50 auctions during the sample period, while this is not the case for other frequencies of selling. Also in the 'Buy it Now'-accepted sub-sample, sales of damaged items are positively correlated with NEGRATIO. This is the strongest correlation of the damage variable with any of the other variables in the table. Since all but one seller in this sub-sample posted a price, this correlation appears to indicate that posting a price is a popular seller strategy when trying to overcome a history of negative feedback related to dealing

in damaged goods. Finally, note the positive correlations between whether an item is new and a seller's rating. This is consistent with an underlying causality that sellers of clearly new items are less likely to encounter negative feedback, because the product characteristics are less uncertain. Of course, negative ratings could also be based on other aspects of the transaction, such as timeliness of delivery.

The reputational aspects of the seller are obviously of considerable interest, since one of the issues in Internet selling has been how to judge the quality of the seller in the absence of familiar visual signals (storefront, location, and so on). EBay makes it fairly simple for sellers to effectively bury negative comments on the seller's ratings page. Additionally, this breakdown of the seller's rating is not immediately observable by a potential buyer at first glance of the seller's eBay auction page. Since past comments concerning the individual as either a buyer or a seller, both positive and negative, never disappear from a seller's ratings, we should generally expect seller ratings to improve with more frequent selling or buying on eBay and NEGRATIO to eventually approach zero. Furthermore, unlike with person-to-person consumer information sharing or "word on the street" regarding bricks and mortar sellers, if you do not actually purchase an item from a particular seller none of your feedback concerning that seller will be posted for future potential buyers to see.

An exception to the expectation that selling frequency and rating are positively correlated is the coincidence of a large number of negative comments with sellers who repeatedly sell very "well used" or damaged goods on eBay. Also, less experienced 'multiple' sellers (those who held less than 10 auctions in our sample), may be still experimenting with advertising and delivery methods of this particular item. Within this category there are positive correlations between the ratio of negative comments and being a multiple seller for both 'Buy it Now' sub-samples.

Table 3 does show that the ratio of negative comments is positively correlated with being a frequent seller in the sub-sample where no 'Buy it Now' option was made available, although it is negatively correlated in the sub-sample where the 'Buy it Now' option was not accepted and has almost zero correlation in the 'Buy it Now'-accepted sub-sample. Among sellers that do not make a 'Buy it Now' option available, frequent sellers may be at an "in-between" level of experience, where the negative comments in their feedback pages have more than kept up with any positive feedback, while they have been experimenting with various selling strategies. We do see the expected correlations with feedback for the sellers who make the 'Buy it Now' option available but do not post a price. This may indicate the popularity of this hybrid institution with more experienced sellers.

5. Seller Characteristics and Choices

In examining our sample data for evidence of "retailers" functioning as "market leaders" on eBay, we do not observe this leadership role with respect to the seller strategies that we can identify. The two retailers in our sample uniformly adopt a strategy of: a 'Buy it Now' price, no posted price, a low starting price, and no private reserve. As

we will more carefully describe in this section, the strategies of the less frequent sellers in our sample differ widely from the choices of retailers.

First, we examine the relationship between seller reputations and seller choices and auction conduct. We are interested in whether sellers with different ratings have different behavior, and whether the resulting auctions are different. We have already noted the positive correlation between a seller's reputation and the volume of auctions conducted during our sample. We also noted that a possible reason for finding such weak correlations between negative feedback on sellers and their ability to sell on eBay is the way that eBay relegates this negative information to another page. Therefore, we begin this section with a look at the correlation of these two reputation variables with seller choices, auction conduct, and auction outcomes, as shown in Table 4.

In general, the seller's rating should be positively correlated with the seller choosing to more accurately represent the quality of the item, be more transparent about what price will be accepted (no private reserve prices), and prompt delivery in the past. With more eBay experience, a seller has had greater opportunities to record more successes along these lines than failures, so the ratio of negative comments to positive should decrease with the number of sales. However, negative comments should have more of an effect when they are more noticeable (fewer overall comments), such as when a seller is less experienced on eBay. Unfortunately, we still may not be able to notice this negative correlation in our sub-samples because it may have prevented previous sales, in which case there is no record in the seller's feedback.

Correlations with Seller Reputations

The correlations in Table 4 indicate that when buyers are not confronted with a high public reserve price and have more leeway and time to bid on the item, they do not inflict negative comments upon the seller. This is reflected in the negative correlations of the ratio of negative comments with a low starting price and with auction duration, for our sample as a whole. At least buyers do not appear to be laying blame on the seller for the outcomes of auctions when the bidding process is less restricted. Note that, in general, the ratio of negative comments to total comments concerning the sellers' past dealings on eBay is not strongly correlated with most of the other seller choices or auction outcomes, when one considers all sales in our sample.

Still, correlations of negative comments with seller choices and outcomes appear to be much stronger for the auctions that started with a 'Buy it Now' offer. In particular, attempts to protect a price appear to be more common for sellers with proportionally more negative comments, on average, for this sub-sample. Using "Buy it Now" to effectively post a price or imposing a higher starting price to start the bidding (even if it is not equal to the 'Buy it Now' price) have notable, positive correlation coefficients with the ratio of negative comments. Also, note that the correlation between seller reputation and auctions ending with the 'Buy it Now' option being accepted are almost identical to the correlation between posting a price and seller reputation because only one 'Buy it Now' offer that was not also a posted price was actually accepted in our sample.

Sellers who started their auctions with "Buy it Now" and have a higher ratio of negative feedback, it appears from Table 4, tend to set lower 'Buy it Now' prices and provide less information about the item, either via a longer description or by posting a photograph of the item. This combination might indicate these sellers attempting to sell quickly to impatient eBay "deal seekers", who may snap up the item at a discounted 'Buy it Now' price without doing the extra work of delving through these sellers' ratings pages to discover the higher prevalence negative comments, relative to other sellers. Finally, note that the auction outcomes are negatively correlated with the ratio of negative comments for the sellers in this 'Buy it Now' sub-sample. Duration, number of bids, number of bidders, and the dollar value of the final price are all negatively correlated with negative feedback on these sellers, although these same correlations were not notable for the sample as a whole.

Table 4: Correlations of Seller Choices and Auction Outcomes with Seller Reputational Characteristics

	All Sales		No "Buy it Now"		Only "Buy it Now"		"Buy it Now" not Accepted		"Buy it Now" Accepted	
Variable	NEGS.	RTNG	NEGS.	RTNG	NEGS.	RTNG	NEGS.	RTNG	NEGS.	RTNG
Seller Choices										
SLRHOME	-0.03	0.45	-0.00	0.40	0.09	0.48	0.03	0.59	0.32	0.13
STARTPRC	0.06	-0.17	0.00	-0.09	0.24	-0.29	0.26	-0.38	-0.36	0.06
LOWSTPRC	-0.27	0.32	-0.24	0.17	-0.33	0.38	-0.34	0.46	0	0
POSTDPRC	-0.01	0.08			0.26	-0.16	0.09	-0.01	0.06	-0.09
STRTBYNW	-0.24	0.46								
BYNOWPRC					-0.34	-0.19	-0.24	-0.37	-0.37	0.05
PRIVTRES	0.02	-0.27	-0.03	-0.19	0.09	-0.34	0.16	-0.41	-0.12	-0.16
FEATURED	-0.05	0.05	-0.09	0.15	0	0	0	0	0	0
DSCLNGTH	-0.05	0.57	0.38	0.31	-0.22	0.65	-0.21	0.78	0.03	0.21
IMAGE	0.00	0.42	0.11	0.35	-0.06	0.30	-0.14	0.30	0.11	0.25
SCRPYDUM	-0.01	0.29	0.08	0.19	-0.10	0.25	-0.20	0.21	0.122	0.25
Auction Outcomes										
ENDBYNOW	-0.02	0.08			0.25	-0.15				
DURATION	-0.18	-0.08	-0.27	0.00	-0.18	-0.14	-0.08	-0.34	-0.11	0.12
NUMBIDS	-0.04	0.11	-0.02	0.15	-0.26	0.20	-0.20	0.15	-0.04	0.10
UNIQBIDR	-0.04	0.12	-0.02	0.17	-0.32	0.21	-0.30	0.18	-0.06	0.11
WINBID	-0.07	-0.04	-0.00	-0.08	-0.23	-0.12	-0.14	-0.22	-0.36	0.06
Sample Size	1008		533		475		382		93	

Moving from analyzing the ratio of negative comments to the logarithm of the sellers' net ratings, correlation coefficients in Table 4 suggest that both providing more information about himself, through posting a link or links to a personal web-page, and providing more information about the good, through posting a photograph and increasing the length of the product description, are choices that increase with an improved seller rating. These strong, positive correlations hold for the sample as a whole and not just the 'Buy it Now' sub-sample, unlike with the prevalence of negative comments. Still, in sum, Table 4 provides strong evidence that sellers with better reputations provide more

information concerning themselves and their product than sellers with less favorable reputations on eBay.

The correlations in Table 4 also indicate that trying to protect a price, through either requiring a private reserve price to be met by the eventual buyer or by simply setting a higher starting price, was not as common for sellers with better seller ratings. Again, this can be seen in the sample as a whole – unlike the increased prevalence of protecting a price amongst sellers with proportionally more negative comments, which we could really only detect amongst sellers in the 'Buy it Now' sub-sample. For the same result with respect to posting a price, we still have to look at the 'Buy it Now' sub-sample and it yields the same result of better reputations being negatively correlated with this strategy of completely protecting a price.

It is important to keep in mind that merely starting the auction with a 'Buy it Now' offer is not really protecting a price and, if not accompanied by a private reserve, a high starting price, or being part of the strategy of posting a price is more a form of price discrimination between more or less patient buyers. This price discrimination strategy is strongly and positively correlated with sellers' net seller ratings, on average, for the sample as whole.

Auction outcomes are only weakly correlated with sellers' net seller ratings for the sample as a whole, although it does appear from Table 4 that better reputations attracted more bids and bidders, on average. This realization is in spite of the appearance of negative correlations between the sellers' reputations and the duration of the auctions, especially in the 'Buy it Now' sub-sample.

Finally, it does not appear as if sellers with better seller ratings were able to consistently or effectively leverage that reputation into better sales prices for their product, relative to less reputable sellers. For the sample as a whole and for the non-'Buy it Now' sub-sample this is simply reflected by slightly negative correlations that are not very distinguishable from zero between seller ratings and final prices. For the 'Buy it Now' sub-sample, this negative correlation is more notable, possibly indicating that starting an auction with "Buy it Now" reduces even further the ability of more reputable sellers to parlay this into higher sales prices. It should be reiterated that the ratio of negative comments is even more strongly, negatively correlated to the final price, than the log of net seller ratings but this appears to be primarily due to the strategies of sellers that posted a price (about 98%) of the 'Buy it Now' accepted sub-sample.

Comparisons among Different Selling Frequencies

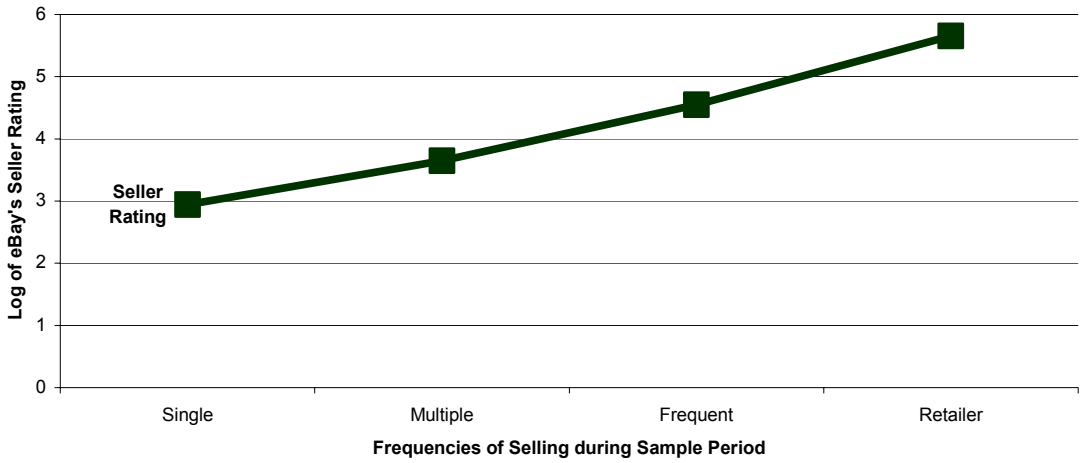
As noted in the introduction, using 'Buy it Now' without trying to further protect a price or otherwise restrict the conduct of the auction is indicative of the strategy employed by the two retailers in our sample. Simultaneously, because feedback comments do not disappear on eBay, a seller's reputation as measured by the seller's net seller rating is strongly and positively correlated with selling frequency. Therefore, we would like to examine more carefully the choice of starting an auction with a 'Buy it Now" offer, other seller choices, characteristics of products, conduct and outcomes of the

auctions, and characteristics of the sellers (like reputation) more closely between groups of sellers, as categorized by selling frequency.

Our primary interest in analyzing the following plots of mean values of these different eBay auction characteristics in our sample, according to the different selling frequencies, is an attempt to identify whether the strategies of our two more experienced sellers (retailers) are dominant and offer some insight as to why or why not. Secondarily, this analysis also allows more insight into the correlations that we have just examined in the first part of this section.

The first figure clearly demonstrates how a seller's net rating (reputation) increases with increased frequency of selling (experience) in our sample, on average. Since previous comments on the seller do not disappear these ratings are aggregated by a seller over a fairly long period of time and may be based on the seller's eBay performance as either a buyer or a seller. It does appear that more frequent selling of Palm Pilot Vx's during our sample is consistently indicative of more experience with eBay overall and therefore more experience with eBay institutions, such as "Buy it Now". Thus, in interpreting the selling strategies of less frequent sellers we are inclined to envision them as still in a process of experimentation, relative to more frequent sellers.

Figure 1: Mean Seller Rating for Each Group of Sellers in Sample (Sellers Grouped According to Sample Selling Frequency)

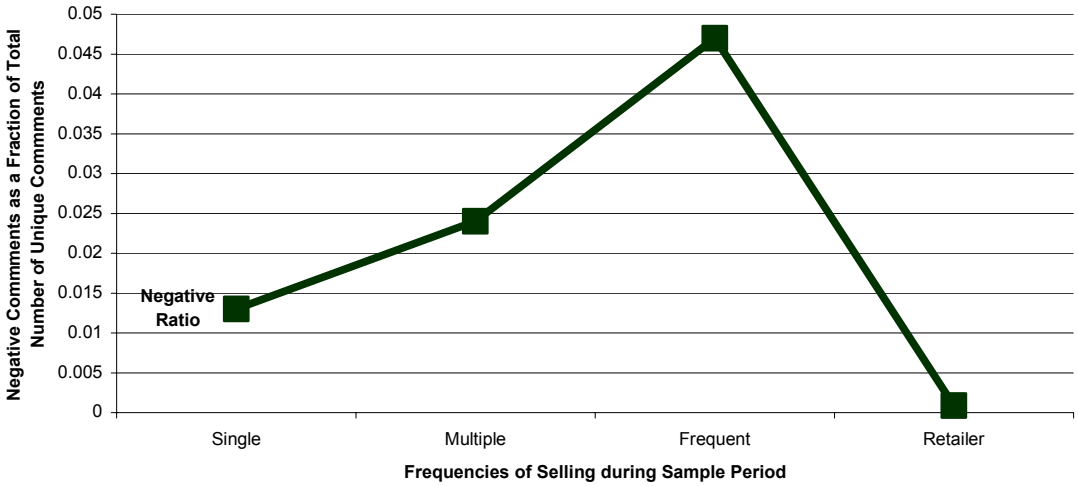


Theoretically, we would expect any negative comments in a seller's ratings to have a significant, detrimental effect on a seller's eBay reputation and, therefore, a large impact on the seller's choices and the outcomes of these auctions. However, in the correlations presented in Table 4 we found that the ratio of negative comments was not highly correlated with either sellers' choices or the conduct/outcomes of their auctions, for the sample as a whole. In looking a little more closely at eBay's policy of retaining

all historical comments on sellers the preliminary conclusion that this is due to negative comments being effectively buried on a separate seller's feedback page is quite intuitive.

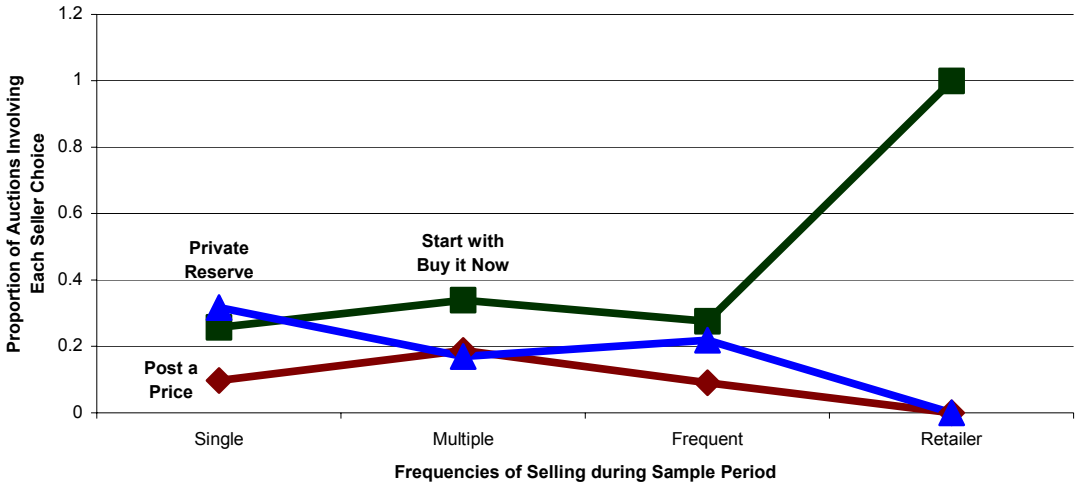
However, in looking more closely at this possibility in the following figure, it seems that negative comments would not truly appear to be easily buried until one achieves "retailer" status in frequency of selling. This would require high volume selling indeed, as our two retailers sold single Palm Pilot Vx's in 100 and 161 auctions, respectively, within our one-month sample period. No other seller held more than 33 auctions for Palm Pilot Vx's on eBay during the same period. Therefore, we suspect that the problem with seller choices and auction conduct outcomes not being highly correlated with the ratio of negative comments is jointly due to negative comments being buried for our two retailers and these two sellers holding more than 25% of the auctions that resulted in a sale in our sample. We will look at auctions that did not result in a sale in the following section.

Figure 2: Fraction of Unique Negative Comments



Since the correlations in Table 4 may not clearly indicate the actual effect of the proportion of negative comments in a seller's rating on seller choices, we want to compare plots of mean values of variables that indicate seller choices across these same selling frequency groups. The following figure does this for seller choices involving whether or not to protect a seller's price, either through a public reserve price (posted price), a private reserve price, or starting the auction with a 'Buy it Now' offer.

Figure 3: Selected Seller Choices



Again, merely starting the auction with "Buy it Now" is not really protecting a price, but it does probably indicate that the seller has some idea of what the equilibrium price should be, which leads us to expect 'Buy it Now' offers to be more prevalent amongst more frequent sellers. The mean proportion of auctions that start with "Buy it Now" first increasing with selling frequency and then decreasing for the next most frequent seller group, before reaching the common value of 100 % for our two retailers makes the interpretation of less frequent sellers being caught in our cross-sectional "snapshot" while in a process of experimentation seem appealing. That is, making 'Buy it Now' offers does not monotonically increase with the volume of sales in our sample, which would indicate increasing impatience by sellers that are using eBay to move a higher volume of product. We see less experienced sellers using 'Buy it Now' in different proportions and the proportion cannot be predicted by the frequency of selling in our sample.

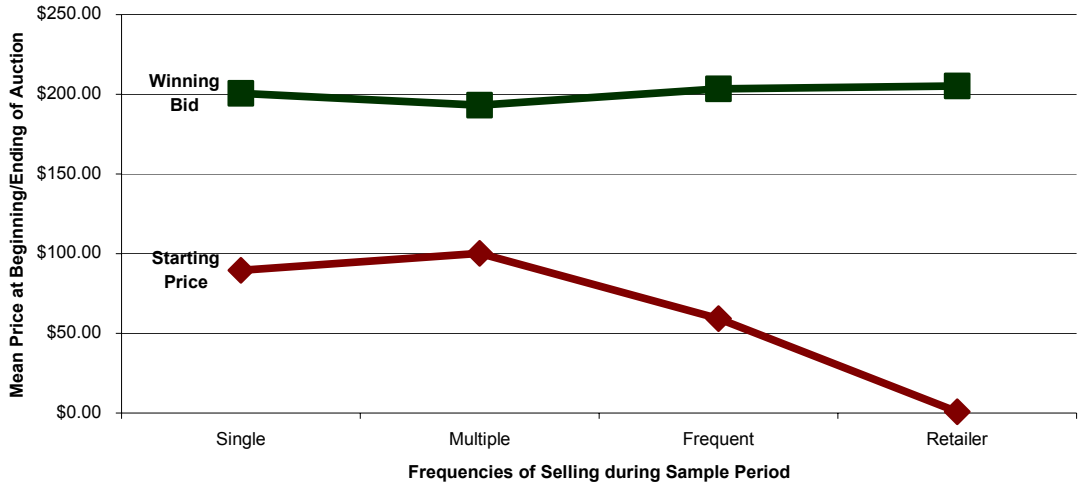
Protecting a price with either a private reserve price or by posting a price is not a favored strategy by either of our retailers but the proportion of these choices is also not monotonically decreasing with increased selling frequency for our less-frequent sellers. Therefore, these choices do not seem to be predictably tied to the volume of sales by each seller in our sample.

Of course, these separate choices are often combined in different ways by the different sellers in our study. Single sellers appear to be the most willing to protect their price with a private reserve price but this strategy that risks limiting the number of bids and bidders for the assurance that the item will not sell for less is still pretty popular, on average, with frequent sellers. Also, note that posting a price, as we have defined it, requires that the auction start with 'Buy it Now' so the popularity of this choice among the different groups of sellers moves with the popularity of making a 'Buy it Now' offer to begin with. Still, neither choice is monotonic with increased selling frequency.

The last method of protecting a price is to simply set a higher starting price, with the tradeoff between attracting less bidders and bids vs. forcing bids to higher levels earlier in the bidding process. This seller choice is depicted in the following figure along with the corresponding sales price. Again, our two retailers chose to start their auctions with an average starting price of $0.01 and did not try to protect a price in any other way, as mentioned concerning the previous figure. On average, by group, single sellers started with slightly lower prices than multiple sellers but frequent sellers appear to have favored even lower starting prices but no group was anywhere near a mean starting price as low as our retailers' were.

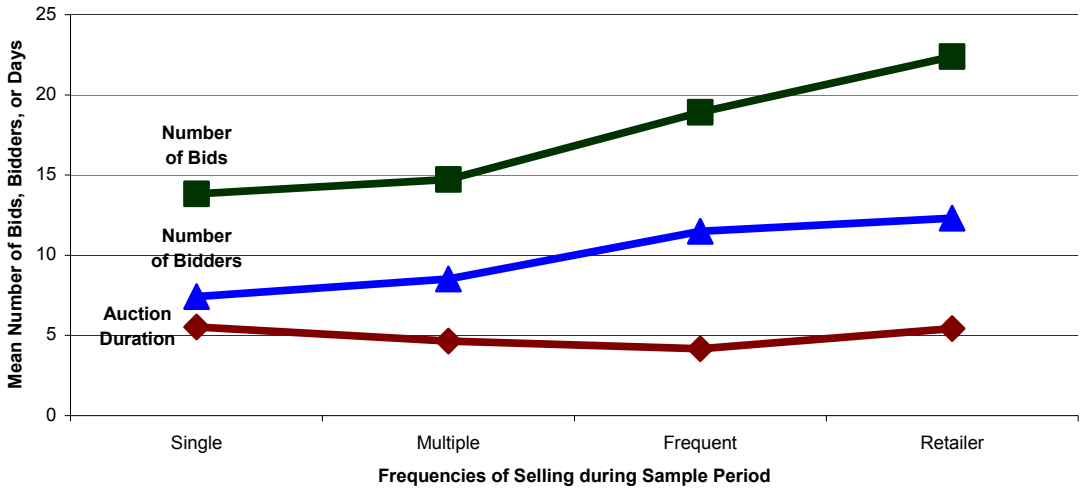
Therefore, it does not appear as if our retailers were behaving as market leaders during our sample period, although one can see from the plot of winning bids that, on average, they did sell their product for a higher price. The frequent sellers in our sample held as many as 20-33 auctions during our sample yet still did not adopt the same strategies as our retailers or do as well in the end, on average. Multiple sellers held as many as 10 auctions during our sample period yet their final sales prices were the worst of all, on average.

Figure 4: Mean Starting Prices and Winning Bids by Seller Group



The consequences of seller choices on the conduct of their auctions should help complete the picture of how their different strategies eventually resulted in the pattern of sales prices that we see in the previous figure. Briefly, single sellers attracted the lowest number of bids and unique bidders even though their auctions lasted the longest period of time. We should therefore probably look to considerations other than seller choices, such as typical seller and good characteristics, in order to attempt any explanation of how this group of sellers still managed to not end up selling for the lowest average price, relative to more experienced sellers.

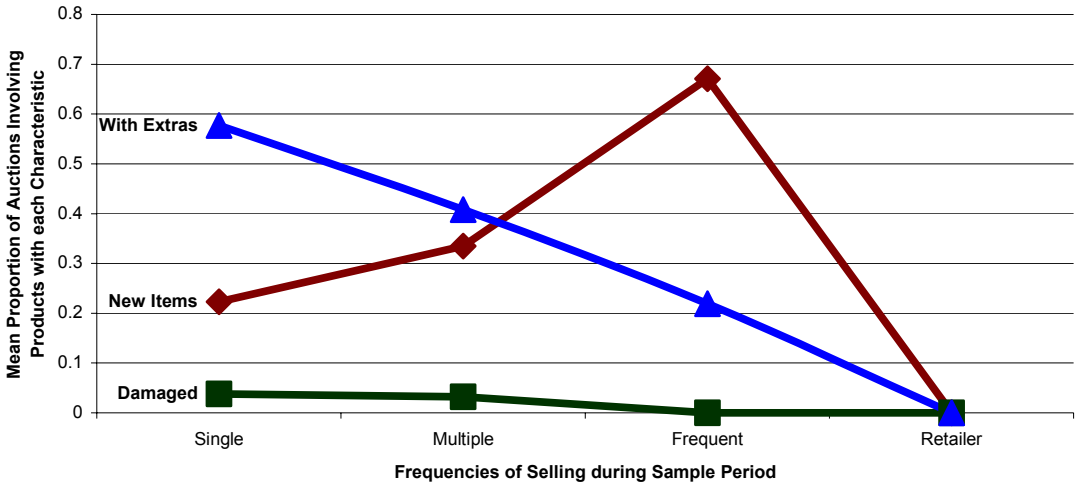
Figure 5: Mean Auction Conduct Indicators, Conditional on Seller Group



Multiple sellers appear to have attracted only slightly more action than single sellers, in terms of the mean number of bids and bidders, while frequent sellers were substantially better, as a group, at encouraging more excitement surrounding their auctions. Retailers did not attract that many more unique bidders than frequent sellers but the bidding appears to have been allowed to carry on for a bit longer, which may help explain the slightly higher sales prices that the two retailers received, on average, relative to frequent sellers.

Finally, we checked for how the mean quality of the product varied across these groups of sellers. It is apparent from the Figure 6 that selling more frequently meant dealing less and less with damaged merchandise. It also meant offering steadily less extras as part of the product package. It should be noted that sales of new items on eBay appear more prevalent with greater selling frequency of the seller except that our 2 retailers did not deal in new items. We would like to qualify this with an observation made in collecting the data and looking at the auction advertisements for some representative auctions in our sample, including those of retailers. It was apparent that retailers were selling new but repackaged items, probably returned items from some other retail outlets. However, these items were not classified as "new" using our very strict criteria.

Figure 6: Mean Proportion of Auctions for Product with each Characteristic



In summary, the common eBay selling strategy of our two retailers does not seem to serve as a template for less frequent sellers of the same product to follow, even if those sellers did hold a substantial number of auctions during our sample period. This does not appear to be explained by any one characteristic of the sellers themselves, including their reputations, nor does it appear to be only due to differences in product characteristics. This pattern of choices appears to be at least partially a combination of these observable characteristics with different levels of experience amongst the sellers in our sample, some of whom we may have caught in our "snapshot" of the eBay selling process while still in a process of experimentation with the various eBay institutions.

In our sample, retailers sell repackaged items with no extras for higher prices, on average, than any of the other sellers, conditional upon selling frequency. Retailers accomplish this by letting the auction bidding process run with minimal imposition of restrictions by themselves, while still providing an impatient buyer with the opportunity to purchase the item immediately at a 'Buy it Now' price.

Frequent sellers sell a greater proportion of new items (according to our strict definitions) with more extras than retailers but for slightly lower prices, on average. This is apparently due to this group of sellers imposing more restrictions on their auctions than retailers in apparent attempts to protect target sales prices, through use of higher starting prices, posted prices, and private reserve prices. It is reasonable to suspect from this evidence that this may be an attempt to compensate for the highest mean ratio of negative comments, amongst any of the groups of sellers as we have classified them according to selling frequency.

Multiple sellers sold, on average, proportionally less new product, with more damaged items but also more extras, than frequent sellers. This combination of mean product characteristics together with the highest mean starting price amongst any of these

four groups of sellers could alone explain why this group sold its product for the lowest mean price, relative to the other groups of sellers, differentiated according to selling frequency. Additionally, the reader should also recognize that these multiple sellers, as a group, made noteworthy attempts to protect a price through both private reserve and posted prices, as well as having to make choices to best overcome a fairly large ratio of negative comments in their seller ratings.

Overall, single sellers in our sample appear to have benefited from having sold very little on eBay in the past, although their strategies would appear to be far from optimal, also possibly due to this lack of experience with eBay institutions. Naturally, these sellers had the lowest mean seller rating, as a group, relative to the more experienced sellers but they also had a mean ratio of negative comments that was the lowest of all groups of sellers, outside of our two retailers. Thus, although this group sold the most damaged items and the fewest new items (although with the most inclusion of extras), proportionally, and protected their prices substantially with very high starting prices, some posting of prices, and the highest proportion of auctions with private reserve prices, they still managed to obtain substantially higher sales prices than the next most experienced group of sellers, on average.

To conclude this section, although it may appear as if the correlations in Table 4 indicate that negative comments on eBay are not highly correlated with seller choices, the conduct of their auctions, or the final sales price, except for the sellers that start their auctions with 'Buy it Now,' sellers may simply have effectively covered for that critical seller characteristic with a combination of many choices that are possible on eBay. While it is true that negative comments can be easily buried on a seller's ratings page, separate from the page that advertises the auction, this cannot easily occur without very frequent selling on eBay, on par with over 100 auctions in roughly a one-month period.

The apparent lack of correlation may be due to single sellers making a combination of choices that basically undoes the advantage of having very few negative comments (although they also do not have many positive comments either), while more frequent sellers employ a mix of auction characteristics and selling strategies to overcome temporarily poor reputations. This "active management" may weaken the correlations between any one seller choice or aspect of auction conduct and the seller's reputation. On the bottom line, some seller groups, categorized according to seller frequency, have done slightly worse than others but there appears to be a much wider dispersion in seller choices than in the mean final sales price, conditional on selling frequency.

6. Sale Probabilities and Seller Characteristics and Choices

In this section, we consider the sample of 1177 auctions for which we had complete data, including 169 auctions that did not result in a sale. Table 5 shows that there were some systematic differences between auctions that resulted in a sale and those that did not. In particular, potential sellers who used a private reserve price were much more likely to fail to sell the item. However, it is possible that the same sellers re-entered

our sample by re-listing without a private reserve. This is consistent with the higher proportion of sellers without a sale having conducted 2-10 auctions.

More than half the sellers chose to not make a 'Buy it Now' option available, whether or not these auctions eventually ended in a sale. However, a higher proportion of the auctions that did end in a sale had this option available to start the auction. Sellers in our sample rarely chose to use "Buy it Now" to effectively post a price, but when they did, the result was always a sale. This is an important sub-sample in our regression analysis of the companion paper to this one, where an auction and was not actually taking place.

Also, it is important to note that the mean number of unique negative comments about the seller, conditional upon having made the sale, is slightly larger than for the auctions without a sale. This may be partly because of how such negative comments are collected and listed.[7] Furthermore, negative comments may simply be outweighed by positive comments, or by seller choices with respect to the auction parameters.

Table 5: Differences Between Auctions that Resulted in a Sale or Not

Selected Seller Choices and Characteristics	"Sale"	"No Sale"
Seller had a Private Reserve Price	0.183	0.562
Seller Chose to Make a 'Buy it Now' Option Available	0.471	0.302
Seller Chose to use "Buy it Now" to Effectively Post a Price	0.090	0
Seller only Held 1 Auction During the Sample period	0.316	0.396
Seller Held 2-10 Auctions During the Sample Period	0.216	0.450
Seller Held 10-50 Auctions During the Sample Period	0.208	0.130
Seller Held over 50 Auctions During the Sample Period	0.259	0.024
Number of Unique Negative Comments on Seller	2.77	2.04
Number of Unique Positive Comments on Seller	230	116
Seller Rating	228	115
Sample Size	1008	169

We collected the data used to measure seller reputations after the auctions were completed. Additionally, in our data, the seller's measured reputation is affected by any comments that he received from other sellers, where he was a buyer, either during or before our sample period. One can see from Table 5 that about 85% of the sellers who held auctions that did not result in a sale were "less-frequent" sellers (held less than 10

[7]First of all, only the seller rating appears on the primary auction page as part of the most vital, summary information that the potential buyer views first. In order to view the amount and type of negative comments, which a seller accrues only from previous buyers, who actually purchased an item from him, or from previous sellers, who actually sold an item to him, the buyer must click on a link to a secondary "feedback" page and potentially scroll through hundreds of comments on frequent sellers in order to obtain full information on any negative comments. Secondly, previous bidders for this seller's goods, who did not win the auction, are unable to contribute to the seller's official feedback. Thus, eBay protects the sellers from the repercussion of actual and potential negative feedback in these two ways, with the second eBay policy probably being the most important.

auctions during our sample period). If we are willing to accept this as an indicator that these same sellers have completed fewer overall transactions on eBay then it is intuitive to expect both fewer positive and fewer negative comments concerning sellers in this "no sale" sub-sample.

Conversely, in the "sale" portion of the sample (which we consider in more detail in a complementary paper – Anderson et al., 2004), the proportion of more experienced sellers is much greater. The evidence in Table 5 for the mean seller rating, the number of unique positive comments, and the number of unique negative comments are being higher for our eventual sample is consistent with the relatively higher proportion of more frequent sellers. This evidence causes us to expect that the seller rating and other measures of seller reputation may not be very highly correlated with the outcomes of these auctions for the sample as a whole, since eBay has no term of expiration for old feedback and all feedback for a registered member is lumped together, whether they were a buyer or a seller in the previously completed transaction.

Table 6: Numbers of Auctions Resulting in a Sale with Use of Private Reserve

	No Private Reserve	**Private Reserve**	**Total**
Auction Resulted in No Sale	74	95	169
Auction Resulted in Sale	824	184	1008
Total	898	279	1177

In Table 6, we re-examine conditional means, and look more closely at the "number of sales" in private reserve auctions. The proportion of auctions where the seller did not set a private reserve price that resulted in no sale is only 74/898 = 0.082, while the proportion of these non-private reserve auctions that resulted in a sale 0.918. Additionally, the proportion of private reserve auctions that resulted in "no sale" is 95/279 = 0.341, leaving a proportion of 0.659 private reserve auctions that did result in a sale. Thus, these probabilities of completing a sale, conditional upon the seller's choice of whether or not to hold a private reserve auction, appear to favor not having a private reserve price in our sample, although eBay allows sellers to make this choice. A possible rationale for sellers lies in the fact that successful private reserve auctions resulted in higher prices, *ceteris paribus*.

7. Conclusion

An important aspect of our analysis is the specific strategy that appears to be adopted by the highest volume sellers, whom we have termed 'retailers'. What we observe is (*i*) seller ratings are higher for retailers than for the rest of the sample, which follows from our discussion of how eBay's seller ratings favor more frequent sellers; (*ii*) both of the retailers in our sample started their auctions by making a 'Buy it Now' option available but they did not set the starting price to equal the 'Buy it Now' price (i.e., they

did not post a price); (*iii*) retailers did not rely on a private reserve price to protect their 'Buy it Now' price and the prices that they selected for minimum bids (starting prices) were all the lowest possible ($0.01), which can potentially encourage a larger volume of bidding. Basically, all retailers in our sample took full advantage of the hybrid, 'Buy it Now' institution by using it to provide a quick sale to impatient buyers, yet encouraging as much bidding up of the price as possible if no impatient buyer happened to be shopping at the time. This retailer strategy illustrates the appeal and potential optimality of 'Buy it Now' for larger volume sellers on eBay.

Since we only captured the strategies of two retailers in our cross-section, it is interesting to look for patterns in the strategies of the other sellers that entered and exited this market during our brief sample period. The most prominent conclusion from this data is that the market included a large number of "new" sellers, with heterogeneous characteristics who tried a wide range of strategies. In particular, these sellers did not follow the strategies of retailers, even if they possessed similar characteristics (such as having a high seller rating), and the product that they were selling was also similar to those being sold by retailers (for example, being new). We did find that more highly rated sellers were somewhat more likely to provide more detailed product information, as well as secure payment options

A primary difference between sellers was the volume of sales during the sample period. There was not a monotonic convergence toward the "retailer strategy" for more frequent sellers, though some patterns of convergence did emerge in reputation and in the number of bids. Our analysis of sellers on eBay is suggestive of a conclusion that it is not a straightforward exercise for new sellers to identify and copy successful strategies, in particular those of retailers. It is also possible that some lower volume sellers were experimenting with different selling strategies during our sample period. Future work may be able to explore the possibility that information technology accelerates processes of evolution of strategies in markets. On the other hand, high turnover and heterogeneity among sellers on eBay will continue to make convergence of strategies difficult.

Finally, our analysis of unsuccessful auctions clearly illustrated the importance of a private reserve price, leading to a trade-off between selling price and probability of sale. Future work that is more concerned with the dynamics surrounding experimentation and re-entry can build upon our observations here, and attempt to follow sellers who failed to sell, in order to determine how their strategies evolve in future attempts.

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