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Abstract

While much attention has been given to reputation mechanisms to deter fraudulent behavior in online auctions, we know little about the nature of disputes or the types of problems that users face. This is an exploratory analysis of 129 disputes for six different types of products that were sold on eBay. In the descriptive and multinomial analysis, we find eight different types of disputes including poor quality, slow shipping, seller withdrawal, failure to ship the product, fraud, poor communications, misunderstanding, and non-paying bidders. Of these the most common types of disputes were poor communications, non-paying bidders and item quality. In the most serious disputes of fraud and no shipment where the seller is at fault the reputation ratings are much lower than the ratings for other disputes related to sellers. Similarly for buyers, the reputation ratings for the most serious disputes of non-paying bidders are considerably lower than those of other types of disputes related to buyers. This implies that analysis of reputation ratings is of some value in reducing the probability of dispute. Of the types of payments methods in eBay auctions personal checks show the greatest number of disputes. Auction sites may wish to discourage sellers from accepting this type of payment.

1 Introduction

The purpose of this paper is to understand the nature of disputes that occur in online transactions. While there have been other studies that have analyzed the importance of reputation mechanisms to deter the likelihood of inappropriate or fraudulent activities, there has been little analysis of the nature of disputes, which are an important factor in the success of an electronic marketplace. This is thus an exploratory study of online auctions to determine whether factors such as the number of bids, the reputation of the seller, the length of the auction, and the final price are more likely to lead to a particular type of dispute.

There are different factors that can lead to a dispute. A dispute can occur in an online transaction when either the buyer or the seller is dissatisfied. There are several factors that can lead to a dispute. These are lack of or late payment, lack of or late product delivery,

poor quality, miscommunication, and misinterpretation of the terms of the exchange or the product.

2 Causes Of Auction Disputes

When people engage in transactions there is an expectation that they will benefit from the exchange and that the transaction will be smooth. Classic economic theory suggests that people enter into trades because the utility that they derive from what they are receiving exceeds that of what they are giving. Thus the sale of a good can allow a seller to acquire the means to maintain production and earn a profit. Similarly for a buyer the purchase of the good can enhance utility. It can for example increase his productivity or simply enhance other aspects of the person's life.

Most transactions are routine and do not result in problems. In a physical transaction, where both the buyer and the seller are present, the exchange of goods and payment take place simultaneously at the time of purchase. If there are any problems with quality or payment, they can be immediately resolved. The buyer in a physical trade has the opportunity of inspecting goods and deciding if they fulfill expectations. Similarly if the payment is incomplete or a credit card was not accepted, again the problem can be solved at that moment thus making the transaction satisfactory for both parties.

There are several built in factors in a physical trade that make it less likely for a transaction to result in a dispute. The transaction is simultaneous; payment and receipt is done at the time of purchase; if there are any problems with the product the buyer can locate the seller and request repair or exchange; and transactions are often done at established retail stores that have a reputation to protect.

Creative entrepreneurial initiatives, advances in technology and the desire to facilitate the exchange of goods and services led to the development of asynchronous transactions in the form of catalogs, for example, and recently virtual marketplaces. Transactions in these environments have inherently greater risks and the likelihood that a trade will result in a dispute is thus increased.

There are several factors that make an asynchronous online transaction more prone to disputes. First, asynchronous transactions are inherently riskier than a simultaneous trade. The buyer finds a product that he desires or needs, orders it, pays for it, and waits for delivery. Asynchronous transactions have existed for a long time. These were done primarily through catalogs. Purchases of this type were less problematic than many of their online equivalents. Companies that sell products through catalogs are frequently established retailers that have invested time and resources in developing a brand and maintaining the loyalty of their customers. They know that through positive transactions customers will continue to purchase with the company. In an online environment transactions can take place not only between consumers and businesses but also among individuals. In this environment, an asynchronous transaction entails greater risk than a catalog would. The investment necessary to set up a retail outlet on the Internet is much smaller than the investment for paper catalogs. This has resulted in the emergence of many micro enterprises that allow individuals to sell things. On eBay, for example, there are millions of individuals selling products and services. There are also countless numbers of micro retailers who are unknown to buyers. The existence of this type of sellers can potentially result in a market of lemons where low quality goods are exchanged in most transactions (e.g. Akerlof, 1970).

While there have been markets where individuals sold products and services to other individuals these were done through physical exchanges in the form of garage sales or

flee markets. The physical presence of the buyer and seller reduced the likelihood of disputes.

In this study we analyze Internet auctions, specifically eBay. The reason why we choose auctions is because these are, according to the U.S. Federal Trade Commission, the area where the greatest volume of fraudulent activity on the Internet occurs. We also emphasize consumer-to-consumer transactions because this type of transaction poses the greatest difficulties and is also relevant to emerging transactions in peer-to-peer and other Internet communities.

The different types of disputes that can emerge from an online transaction differ in severity. A misunderstanding or slow payment or delivery is less serious than failing to pay or send the product. Table 1 presents the different types of disputes represented in the sample of auctions in this study. The table is organized from the least to the most severe type of dispute.

Table 1: *Types Of Disputes In Ebay Auctions*

Type of dispute	Example
Quality	"Received my money promptly, delivery of item weeks later, item in need of repair"
Slow shipping	"Took over a month to send item; but once contacted, very helpful."
Seller withdrawal	"Won bid, paid, and had to wait 3 weeks for seller to say 'sorry, no sale'"
Failed to ship	"I never received my purchase from this person"
Fraud	"BEWARE: no contact since payment, no response to emails, phone disconnected"
Poor communication	"Never paid. Ignored multiple emails. Tried to contact - wrong #. Beware!"
Misunderstanding	"Refused to pay by cashiers check/money order as auction terms required"
NPB (non-paying bidder)	"Placed the Bid, closed auction and after started to research what he bought."

3 Literature Review

In this study we used as dependent variables the types of dispute that are listed in Table 1. To our knowledge there have not been any academic studies that help us understand the nature of disputes. The few studies related to this issue include reports prepared by the National Consumers League (http://www.fraud.org/welcome.htm) and by the FBI Internet Fraud Complaint Center (http://www.ifccfbi.gov/index.asp). Both of these reports find that auctions are the largest source of Internet fraud, with 46% of complaints. Other causes of Internet fraud include non-delivery of merchandise with 31% of the complaints (http://www.ifccfbi.gov/strategy/2002_IFCCReport.pdf). Beyond these statistics there is little information about the factors that lead to these types of disputes. This study thus is an attempt to fill this gap.

In the analysis of disputes we find that miscommunication, lack of payment, and poor quality are the three most common sources of disputes. Previous work on electronic commerce trust and reputation has shown that interaction with people in real time increases the level of trust when conducting electronic transactions (Basso, Goldberg, Greenspan, and Weimer, 2001). Trust develops over time as people interact with one

another and incrementally develop trust (Meyerson et al., 1996). In a physical interaction, Ekman and Friesen (1974) find that facial expressions help individuals form either trust or deceptive impressions. E-mail, which is the most common means of communication among individuals participating in online auctions, lacks these facial and body cues. Unfortunately there is no available record of the level of communication that individuals have after auctions have been finalized and the only thing that we know is whether or not they were a satisfied with the transaction and if poor communication was a factor.

While failure to pay after a transaction is not fraud because the merchandise has not been shipped, it nonetheless disrupts the market. Although auction fees are reimbursed to the seller, it is nonetheless time consuming to arrange this and relist the item. In spite of the fact that much research has been done about auctions, we do not know what prompts people to not finalize the transaction after winning the auction. We can speculate that the buyer later realized that the bid was too high.

There are a number of independent variables that we include in this study to determine the factors that lead to different types of disputes. These are: seller experience, reputation, product type, item quality, information provided about the item, payment mechanism, price, length of the auction, and number of bids.

3.1 Reputation And Disputes

Because individuals are unable to form long term relationships and because it is not possible to develop impressions from physical and facial cues, online auction sites have developed ratings as a substitute for physical interactions. Studies on reputation have shown that an individual's reputation encourages others to engage in trade (Andrianova, 2000). We know that reputation mechanisms have been implemented to alleviate the information asymmetries that are prevalent in electronic transactions. Reputation ratings are imperfect. A paper by Resnick and Zeckhauser (2001) finds that ratings are used as a means to reciprocate and retaliate. Individuals can also create new identities and eliminate bad ratings from their history (Friedman and Resnick, 1999). It is possible as well for people to conspire against a seller or a buyer and intentionally give negative ratings (Dellarocas, 2000).

H_1: The lower the ratings of the seller the higher the likelihood of disputes related to non-delivery, poor quality, and seller withdrawal.

H_2: The lower the reputation of buyers the higher the probability of non-paying bidders.

3.2 Product Type And Quality

There are some products that are inherently more difficult to buy than others. The purchase of groceries, for example, involves a decision making process that is almost automated, where the buyer does not need to make complex comparisons, and disposable income is almost the only variable of relevance (Kinsey 1997). This contrasts with the purchase of an automobile or a house, which requires much more research and knowledge of the product and the seller. In between these two extremes lay a number of other products for which people have developed certain criteria to help them decide what to buy. In clothing for example young females consider fit, look, and style as important factors in their purchase decisions (Taylor, Cosenza, 2002). While things like fit are important to people in the consumption of clothing, for example, it is quite surprising to

find that apparel is one of the most purchased goods on the Internet (Research Alert, 2002). It is even more surprising to note the large number of used cars purchased over the Internet. There are several factors that online sites are incorporating into their sites to make the individual more comfortable with a purchase.

H_3: The more complex the criteria used in evaluating the good the greater the likelihood of dispute.

3.3 Payment Methods And Disputes

The trade press reported that there are approximately 27 billion credit card transactions every year (Caunter, 2001). In 2001 2% of these were from transactions were conducted over the Internet. Fraud from electronic commerce transactions is 10 to 20 times more likely than fraud in face to face interactions, and some of research report that E-commerce fraud it is 5 to 10% higher (Caunter, 2001). Credit card fraud happens frequently. Credit card companies have developed sophisticated systems that help them detect unusual behavior and stops authorization in cases that could be fraudulent. Perhaps similar systems will be implemented in online transactions.

Studies that have looked at the issue of payments for transactions on the Internet have examined the development of secure systems, the factors that affect the adoption of electronic payments, and the potential for government regulation of electronic banking. The systems literature has worked on the development of protocols and algorithms that will make transactions more secure, or to ensure that personal information is not released when a payment is made over the Internet, or to preserve the anonymity of traders. (Hwang J, Yeh T. and Li J, 2003; Alexandris N. et al. 2000; Camp et al. 1996; Brickell, Gemmell and Kravitz 1995;). Scholars in this field have also tried to develop mechanisms that will assure payment (Schuldt H. Popovici A, and Schek H., 2000). While these efforts are important to limit breaches in the system we need to understand the behavior of the users in these online environments to be able to develop solutions.

Because of the growing number of transactions taking place over the Internet, there have been great advances in security of online payments. The problem is not of systems that fail or that are hacked but with the simpler problem that emerges when two individuals participating in a transactions agree to a transaction but in the end one of the parties decides not to fulfill its part of the agreement. Secure systems are not able to resolve this type of behavioral problem.

In online auctions individuals accept multiple types of payments such as credit cards, cashiers checks, personal checks, and PayPal. Because of the automation that has been achieved with electronic payments, we suspect that credit cards and PayPal payments are the least likely of these to lead to disputes while cashiers and personal checks, which have time delay, are more likely to have problems.

H_4: Electronic payments have a lower probability of dispute compared to non-electronic payments.

3.4 Prices And Disputes

Much research has been done about auctions and prices. Recent studies have analyzed the strategies that sellers and buyers use for online auctions. We are not aware of studies that have looked at the relationship between prices and types of disputes. There is nonetheless

evidence from existing research that both buyers and sellers strategically participate in these auctions and one could argue that some strategies may lead to disputes. Studies about bidding behavior have shown, for example, that sellers can maximize their revenues by manipulating things such as minimum bids, opening price, and reserve prices. Katkar and Lucking-Reiley (2000) find that secret reserve prices deter bidders and ultimately lead to a lower price. Similarly Lucking-Reiley et al. (1998) find that increases in minimum bids result in reduced numbers of bidders but, according to Haney (2001), increasing the bid increment can result in higher revenue as well. Bajari and Hortacsu (2003) find evidence of the winners' curse in their empirical analysis of eBay auctions.

Sellers can also selectively close an auction after a particular bid has been received (Stubblebine and Syverson, 1999). Sellers can manipulate bidding requirements and there is also evidence that some of them contact the highest bidder to offer them a price. If the bidder accepts the transaction they can avoid paying the commission to eBay (Katkar and Lucking, 2000). Strategies in auctions are not unique to sellers. Buyers can also contact the seller and bid strategically. However, prices, as stated by Morris and Maes, are over-emphasized in auctions and they become the only criteria for matching buyers and sellers. This criterion can leave some buyers unsatisfied with their purchases. Some of the variables that buyers and sellers can manipulate can have an impact on the probability of disputes.

H_5: The fewer the number of bids and the shorter the length of the auction the greater the number of disputes related to price.

4 Methods

In this paper we use multinomial logit (MNL) to determine the factors that are more likely to result in a certain type of dispute. MNL has been used in disciplines such as marketing to determine the factors that lead to a given selection among many options. In the case of online transactions, disputes occur as a result of buyer and seller choices. We will thus construct two models, one in which we analyze the factors that lead to disputes when the person primarily at fault was the seller, and another when the person primarily at fault was the buyer.

MNL analysis has three elements in the model: a) the decision makers; b) the alternatives; and c) the attributes of the alternatives.

The decision maker. In this analysis there are two decision makers, the buyer and the seller, which will thus lead us to fit two models, one for each. Data about the decisions makers in this study corresponds to their experience in conducting eBay transactions and their reputation rating.

The alternatives. In any given transaction sellers decide whether or not to provide accurate information regarding the quality of the product, to send the product quickly, or to not send it at all. A person may refuse to sell after she said she would or she may not communicate promptly and clearly. Similarly the buyer can decide to send the payment promptly, slowly, or not at all. He may also not communicate adequately.

The attributes. The specific attributes for each of the alternatives can be the result of several factors such as the price of the product, the quality, the amount of time that the product was auctioned, the number of bids received, and the type of payment. A seller may decide not to sell if she believes that the auction was too short or that the price was too low. Similarly the buyer may change his mind and decide not to pay if the price seems too high.

The data analyzed in this paper comes for a sample of eBay.com auctions that resulted in disputes. The sample corresponds to 129 transactions in six different product categories. The data was compiled using a PERL program developed by the authors that extracted the data from over 17,000 auctions into a database in two passes over a three week period in May and June 2003. The data required substantial cleaning. Many of the auctions did not result in transactions. Table 2 describes the data used in the statistical analysis.

Table 2: *Data Description*

Variable name	Description	Code
Product	Data on 6 item types	1=Vacation package 2=Sony camcorder 3=Electronic keyboard 4=Card game 5=Cutter 6=Drill
Reputation	Reputation in eBay is represented by the seller and buyer ratings. The higher the number the better the reputation	Integer number
Experience	Experience was constructed from the addition of positive, neutral and negative ratings for sellers and buyers. A higher number indicates greater experience.	Integer number
Quality	The physical products were subcategorized in new and used. A used product is expected to have lower quality than a new product.	Dummy variables: new, used
Communication	Because it is impossible to determine if communication took place between the buyer and seller before the auction took place we can only use a proxy. In this case the seller communicates with the buyer through the length of the description posted in the auction offer	Content size (in Kbytes) of the file of the auction
Payment mechanisms	Some payment methods may be more prone to disputes than others so we created different categories of payments accepted in any given bid	Dummy variables: credit card, PayPal cashiers check
Price difference	Difference between the starting and final price of the auction	Amount
Tangibility	Physical goods are tangible while services and digital items are intangible.	Dummy variables: physical, non-physical
Number of bids	The total number of bids for the entire auction	Integer
Length of auction	Number of hours that the auction was active	Integer
Final price	The selling price of the item	Amount

5 Descriptive Statistics

In this section we present some summary statistics of the variables of interests that may provide some insights into the problem of disputes and their causes. Table 3 presents the number of disputes by type of dispute and by product. It shows that physical products

rather than services tend to have a greater number of disputes, as are consumer related items as opposed to business ones such as welders and cutters. The table also shows that that most prevalent type of dispute is related to communication. Buyers and sellers are dissatisfied with a transaction because of the difficulties that they have communicating. Non-paying bidders and quality of the product are the second and third most prevalent type of disputes.

Table 3: *Disputes By Type And By Product*

Dispute type/Product	Vacation package	Sony camcorder	Electronic keyboard	Card game	Cutter	Total
Quality	0	6	8	4	0	18
Slow shipping	0	0	1	7	1	9
Seller withdrawal	0	2	7	2	0	11
Failed to ship	0	0	5	6	0	11
Fraud	0	9	1	0	0	10
Poor communication	3	7	12	16	1	39
Misunderstanding	0	1	1	2	0	4
NPB (Non-paying bidder)	11	3	11	2	0	27
Total	14	28	46	39	2	129

Pearson chi2(28) = 91.4623 Pr = 0.000

Since we are concerned with the type of factors that lead to certain disputes we present first the attributes of the decision makers. This will help us determine whether buyer, sellers, their reputation, or experience lead to certain types of dispute.

Table 4 indicates who was largely responsible for the dispute. Thus disputes related to quality, slow shipping, seller withdrawal, and failure to ship are normally associated with the seller. The buyer most often causes disputes relating to non-paying bidders, poor communication, and misunderstanding. Many disputes result from the misinterpretation of the information that the seller provides. This sample shows that the greatest loss, such as through fraud, is born by the buyer. The experience and reputation ratings for the most serious disputes such as failure to ship, fraud, and non-paying bidders have substantially lower reputation ratings compared to the less serious dispute types.

Table 4: *Summary Statistics Related To The Decision Makers And The Relationship With The Type Of Disputes - Mean (Standard Deviation)*

	Quality	Slow shipping	Seller withdrawal	Failed to ship	Fraud	Poor commu-nication	Misunder-standing	NPB
Seller Fault	80.56 (12.59)	71.11 (25.71)	88.18 (14.01)	99.09 (3.02)	100 (0)	19.23 (31.90)	32.5 (22.17)	0 (0)
Buyer Fault	5 (14.65)	0 (0)	0 (0)	0 (0)	0 (0)	76.92 (36.06)	60 (8.16)	100 (0)
No Blame	14.44 (9.84)	28.89 (25.71)	11.82 (14.01)	0.91 (3.02)	0 (0)	3.85 (9.63)	7.5 (15)	0 (0)
Seller Experience	107.94 (140.86)	120.78 (237.99)	132.81 (320.63)	49.18 (69.05)	97.4 (33.52)	298.82 (523.95)	147 (119.51)	896 (1381.65)
Buyer Experience	29.11 (41.63)	18.56 (29.81)	18 (21.89)	30.18 (60.17)	14.4 (16.81)	42.51 (195.40)	15.25 (10.31)	5.04 (6.94)
Seller Rating	105.11 (139.95)	117.44 (231.41)	114.18 (268.17)	45.82 (64.22)	88 (31.62)	281.82 (506.11)	142.75 (116.03)	855.22 (1349.88)
Buyer Rating	28.39 (40.37)	18.22 (29.52)	15.64 (19.81)	29.73 (59.05)	14.2 (16.41)	41.33 (195.57)	13.75 (10.46)	3.67 (6.73)

Quality is another factor that leads to disputes. Because it is often difficult to determine the quality of a product based on the description provided by the seller, we can only differentiate quality in three attributes: 1) whether or not the product is new or used, 2) whether the product is tangible or not; and 3) the size of the file that contains the product description.

We expect that used products will have more quality related disputes because the condition of the product is difficult to assess from a description or a picture. The buyer, who is unable to inspect the merchandise, thus bears a greater risk. We also expect that a tangible product will have greater quality related disputes than a virtual product because they experience wear and tear. We expect that smaller file sizes for descriptions will lead to greater quality related disputes because there is less information available to assess.

Table 5: *Percentages Of Disputes With Respect To Used And New Goods*

Dispute Type	Used	New	Total
Quality	13	1	14
Slow shipping	2	0	2
Seller withdrawal	7	2	9
Failed to ship	5	0	5
Fraud	1	9	10
Poor communication	16	3	19
Misunderstanding	1	1	2
NPB (Non-paying bidder)	13	0	13
Total	58	16	74

Pearson chi2(7) = 36.1729 Pr = 0.000

Table 6: *Type Of Disputes By Item Tangibility*

PriDispute	Intangible	Tangible	Total
Quality	0	4	4
Slow shipping	0	7	7
Seller withdrawal	0	2	2
Failed to ship	2	4	6
Fraud	0	0	0
Poor communication	4	15	19
Misunderstanding	0	2	2
NPB (Non-paying bidder)	12	1	13
Total	18	35	53

Pearson chi2(6) = 28.8591 Pr = 0.000

The final variable that we used as a proxy for quality is the size of the file that the seller uploaded to describe the roduct or service that he was offering for sale. In this case we are concerned about disputes related to quality, poor communication, and misunderstanding and we want to determine if those types of disputes have descriptions that are shorter than the descriptions provided on the transactions that had a different type of dispute. Table 7 shows the summary statistics of the content size of the files by type of dispute. The average content size for all disputes is 44,026 kilobytes and the content size for quality, communication, and misunderstanding does not appear to be smaller than any of the others. This indicates that it is not the lack of information provided about the product or service that is leading to disputes but more the actual content of the description.

Table 7: *Summary Statistics For Content Size By Type Of Dispute - Mean (Standard Deviation)*

	Quality	Slow shipping	Seller withdrawal	Failed to ship	Fraud	Poor commu-nication	Misunder-standing	NPB
Content size	41161 (6786)	35521 (2569)	41136 (7091)	35229 (3139)	38395 (1740)	45671 (10252)	39201 (3091)	53959 (14588)

No. Obs. = 18

The type of payment is another element that can result in disputes. An eBay seller can determine the payment mechanism that they accept to complete the transaction. There are some sellers that only accept one type of payment such as PayPal, credit card, or cashier checks. Other sellers allow more than one mechanism. PayPal and credit cards involve instant payment while personal and cashier's check have a time gap between the termination of the auction and receipt of payment. Table 8 presents the percentage of disputes for each payment method. Only four types of disputes were included in these tables because they are the ones most likely to have occurred as a result of payment problems. The table includes four types of payments. PayPal only, PayPal and credit card only, cashiers check only, and personal check. It is clear from the tables that fewer disputes were related to the use of cashier's checks, PayPal only, and PayPal and credit card only options. Transactions that accepted all types of checks have the greatest number

of disputes and since cashier's check have fewer disputes it is clear that personal checks cause the greatest number of disputes.

Regarding the type of dispute associated with a type of payment, we find that with the exception of fraud, there was no substantial difference. The table shows that, in general, payments done through PayPal resulted in fewer disputes but in the case of a fraud related dispute, the payment method used was PayPal. This is a surprising result that requires further investigation.

Table 8: *Percentage Of Disputes For Each Payment Method*

	Quality	Slow shipping	Seller withdrawal	Failed to ship	Fraud	Poor commu-nication	Misunder-standing	NPB	Pearson Chi^2 (Pr)
PayPal Only	19.23%	0%	7.69%	7.69%	34.62%	19.23%	0%	11.54%	35.04 (0.0)
Personal Checks Accepted	13.27%	8.16%	8.16%	9.18%	1.02%	33.67%	4.08%	22.45%	12.26 (0.09)
PayPal/ Credit Card Only	18.52%	0.0%	7.41%	7.41%	33.33%	18.52%	0.0%	14.81%	36.97 (0.0)
Cashier's Checks Only	10.53%	0.0%	21.05%	15.79%	5.26%	21.05%	10.53%	15.79%	36.97 (0.0)

Some sellers may decide not to ship the product if they are unsatisfied with the final price. Similarly a buyer may become a non-paying bidder if he realizes that he overpaid. Some auctions result in the winner's curse phenomenon and these may occasionally result in non-paying bidders. Table 9 presents the summary statistics by type of dispute for these factors. With the exception of the fraud category, which requires further inspection, the price differences between the starting and selling price do not seem to result in a higher number of non paying bidders.

Table 9 also shows summary statistics by type of disputes and hours of auctions. Most sellers on eBay choose a three, seven, or ten day auction. eBay charges an additional fee for longer auctions. The table shows that the length of auction does not affect the type of dispute.

Table 9: *Percentage Summary Statistics By Type Of Dispute*

	Quality	Slow shipping	Seller withdrawal	Failed to ship	Fraud	Poor commu-nication	Misunder-standing	NPB
Price difference	0.61 (0.41)	0.62 (0.40)	0.44 (0.37)	0.43 (0.44)	0.06 (0.19)	0.41 (0.40)	0.64 (0.41)	0.57 (0.37)
Number of bids	9.72 (15.02)	4.22 (4.97)	12 (9.5)	8.18 (5.64)	21.3 (5.46)	7 (6.04)	6 (4.08)	7.60 (6.42)
Length of auction	116 (57)	112 (63)	142 (39)	82 (53)	72 (0)	128 (49)	151 (90)	137 (66)
No. Of Obs.	18	9	11	11	10	39	4	27

6 Statistical Analysis

Because in a multinomial logit we are representing decisions, we need to separate the decisions that are made by the buyer from the decisions that are made by the seller. Once this is done then we can fit the multinomial logit for each of the two parties.

Table 10 presents the results of multinomial logit analysis. This is an initial attempt to understand the nature of disputes in online auctions but it should be understood that the limited number of disputes combined with multiple options and variables included in the model limits the statistical results. Thus only general conclusions can be drawn from this analysis.

First, we notice that the most common type of disputes that result from buyers related disputes are poor communication and non-paying bidders. We also note that poor communication related disputes are independent of the product while non-paying bidders seem to be more associated with consumer related products and less with business related products. In both types of disputes the rating of the buyer was relevant. For a dispute regarding poor communication we would have expected that the buyer rating would be the relevant variable and the other would not be relevant. In this case the other variables are also significant, but from the limited amount of information that is available about the type of communications that seller and buyer have after an auction has been won, it is difficult to determine why these variables have an effect on this type of dispute. Regarding non-paying bidders we suspected that the buyer ratings, the sell price difference between the minimum bid and the winning bid, as well as the number of bids could be a factor that could have motivated a buyer to not pay after winning an auction. Here we find that the rating is relevant but the price difference or number of bids is not.

Table 10: *Multinomal Logit Results For Buyers By Type Of Dispute*

	Poor communication	Misunder-standing	NPB
Buyer rating	0.82 (0.04)	1.19 (0.55)	0.75 (0.01)
Content size	1.00 (0.00)	1.00 (0.94)	1.00 (0.01)
Price difference	0.02 (0.01)	38.42 (0.34)	1.24 (0.91)
Length of auction	1.01 (0.01)	1.02 (0.53)	1.02 (0.00)
Number of bids	0.32 (0.01)	2.17 (0.53)	0.86 (0.78)
Camcorder	6.88e-08 (0.00)	0.28 (0.88)	1.78e-09 (0.00)
Keyboard	1.85e-07 (0.00)	0.16 (0.82)	5.88e-09 (0.00)
Card game	3.01e-07 (0.00)	1.66 (0.94)	3.47e-09 (0.00)
Cutter	6.14e-08 (0.00)	1.84e-15 (1.00)	1.56e-23 (1.00)

Number of observations = 129

Pseudo R2 = 0.32

Relative risk ratios – RRR (z-tests significance level)

Table 11 presents the probabilities for each of the products by type of dispute. We can see that for the products included in the model, poor communications is the type of dispute that has the highest probability of occurring, while misunderstandings are the type of disputes that have the lowest probability. Non-paying bidders fall in the middle, and the keyboard and camcorder are more likely to experience this than the card game, which is also available in a digital format, and the drill.

Table 11: *Probability Of Buyer-Related Dispute By Type And Product*

	Poor commu-nication	Misunder-standing	NPB	Buyer not at fault
Camcorder	0.25	0.01	0.08	0.65
Keyboard	0.42	0.00	0.17	0.40
Card game	0.56	0.04	0.08	0.32
Cutter	0.26	0.00	0.00	0.74

Table 12 shows the results of the multinomial logit analysis for sellers. There are more types of disputes that can emerge related to the conduct of the seller. The types of disputes that were identified were quality problems, slow shipping, failure to ship, fraud, poor communication, and misunderstanding. Because of the low number of disputes and the high number of choices, it was not possible to fit a model that included all of these alternatives. We thus needed to collapse them into three categories. Quality and slow shipping were combined. We consider that slow shipping is an element of quality. Similarly fraud and failing to ship were combined. In this case fraud was a code given to disputes that showed intent to deceive the buyer while failing to ship could potentially be attributed to lost mail. Poor communication and misunderstanding were also combined due to their similarity. Table 12 presents the results of this multinomial analysis. As in the model that was fit for buyers, we also present these results with the caveat that the small sample and the complexity of the interactions that are modeled with this analysis does not allow for minute interpretation of the results. Only general patterns can be inferred. For disputes related to quality we find that the rating of the seller, the content size, and the number of hours that an auction is up have an effect on the type of dispute. To a certain extent we can see how the reputation of the seller can determine whether or not the quality is high. We can also see how the content of the product in the auction can potentially lead to sellers providing information that is not quite accurate. We do not have an explanation for the number of hours.

For disputes related to failure of shipment we see that all of the coefficients are significant with the exception of the payment mechanism. This is expected because a failure to ship dispute can only happen when payment was made so the type of payment should not have any impact on the likelihood of this type of dispute happening. A seller may also be dissatisfied with the price obtained. The price may have also been related to the number of hours that the auction was opened. As expected these two variables are significant. We also note that the failure to ship happens to all types of products.

Disputes related to poor communication and misunderstanding are not explained by almost any of the factors included in the model. This to a certain extent is expected as communication outside of the auction environment is related to factors that cannot be captured by the information displayed at the auction site. Collectible cards seem to be most affected by this type of dispute.

Table 12: *Multinomal Logit Results For Sellers By Type Of Dispute*

	Quality	Failed to ship	Poor Communication
Seller rating	0.74 (0.06)	0.63 (0.00)	0.80 (0.15)
Content size	1.00 (0.00)	1.00 (0.00)	1.00 (0.67)
Length of auction	*0.98* *(0.02)*	0.98 (0.01)	0.99 (0.09)
Price difference	1.43 (0.75)	0.13 (0.08)	0.25 (0.14)
PayPal and credit card only	0.58 (0.58)	0.90 (0.92)	0.23 (0.11)
Camcorder	2.21 (0.58)	3.44e+08 (0.00)	5.55 (0.13)
Keyboard	0.22 (0.31)	4.61e+07 (0.00)	2.24 (0.50)
Card game	1.38 (0.85)	7.14e+07 (0.00)	17.61 (0.04)

Number of observations = 129

Pseudo R2 = 0.28

Relative risk ratios – RRR (z-tests significance level)

Table 13 once again presents the probability of dispute by type for the products. It shows that camcorders are more likely to experience problems related to quality. Keyboards and game cards are more likely to experience non-shipment disputes. In general non-shipment is the dispute that is more likely to occur.

Table 13: *Probability Of Seller-Related Dispute By Type And Product*

	Quality	Failed to ship	Poor communication	Seller not at fault
Camcorder	0.36	0.14	0.18	0.58
Keyboard	0.28	0.16	0.05	0.00
Card game	0.29	0.45	0.72	0.18
Cutter	0.07	0.25	0.05	0.23

17 Conclusion

While much attention has been given to reputation mechanisms to deter fraudulent behavior in online auctions, we know little about the nature of disputes or the types of problems that people who engage in those transactions most commonly face.

In this study we presented an exploratory analysis of disputes for six different types of products. In our analysis of descriptive and multinomial logit statistics of the disputes, we found eight different types of dispute including poor quality, slow shipping, seller withdrawal, failure to ship the product, fraud, poor communication, misunderstanding, and non-paying bidders. Of these, the most common types were poor communication,

non-paying bidders, and quality. It is not surprising that online transactions experience these types of disputes as the parties involved cannot inspect the product, do not have direct communication, and may not pay because the relationship is quasi-anonymous. Of all of the types of payments that are accepted in eBay auctions personal checks show the greatest frequency of disputes. This suggests that auction sites may want to discourage sellers from offering this type of payment.

We found that in the most serious disputes involving fraud and no shipment, where the seller is at fault, the reputation ratings are much lower than the ratings for other types of disputes related to sellers. Similarly for buyers we find that the reputation ratings for the most common dispute, the non-paying bidder, are considerably lower than those of other types of disputes related to buyers. Thus, the most serious disputes such as failure to ship, fraud, and non-paying bidders, have substantially lower reputation ratings compared to the less serious dispute types. We thus conclude that reputation ratings are a useful predictor of fraud potential.

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