Public vs. Secret Reserve Prices in Auctions: Evidence from Combining Field and Lab Experiments[1]

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1. INTRODUCTION

In this paper, we report both field and laboratory experimental results on the effects of setting public versus private reserve prices in ascending auctions. In addition to providing a check on the results of the field experiment, we use laboratory experiments to implement an important treatment that we could not use in our field experiments. We find no evidence in the field or in the lab of an effect of reserve price presentation on auction revenues.

Relying on laboratory evidence to complement and mitigate deficiencies in field data, as we do in this paper, is an underutilized approach in empirical research that we believe deserves closer attention (Carpenter et al. (2009, 2014), Ostrovsky and Schwartz (2011) and Porter and Vragov (2006)). In certain situations or for certain questions, field and laboratory experiments may play a complementary rather than substitutative role. The field experiment approach may be preferred for external validity reasons, as it studies economic agents in surroundings familiar to them, facing natural incentives. However, many auxiliary or institutional aspects of a field experiments cannot be controlled by the researcher, as is possible in a lab experiment.

[1] We thank Sergio Montero and Alejandro Robinson for careful research assistance.

Specifically, in the current study, we are able to control whether reserve prices are kept secret or not to the bidders across auctions, but we cannot control for other important endogenous determinants of auction revenue, such as the sellers' choice of reserve prices or their decisions to negotiate prices with the high bidder after each auction. Thus we complement our field study with a lab experiment where, in addition to controlling whether reserve prices are made public or kept secret, we also control whether sellers have an opportunity to engage in post-auction negotiations with bidders. Moreover, we can calibrate the payoffs in the lab experiments so that magnitudes across the field and lab settings are (relatively) comparable, ensuring (to some extent) similarity in incentives across the lab and field experiments. Combining the results from the two sets of experiments sheds light not only on the revenue effects of public vs. secret reserve prices, but also offers a glimpse into the mechanisms generating these effects. We pursue to obtain a richer and more complete picture of the research question at hand, and perhaps even to tackle previously unaccessible questions. The present paper should be taken as a first step in this line of inquiry.

For our field experiment, we enlisted the cooperation of Copart Inc., a publicly-traded (NASDAQ: CPRT) company which is the largest auction house for salvage vehicles in the world. On average, Copart trades around 5,000 vehicles per business day through its online virtual auctions. The Copart auction is organized as an English auction. Copart's auction rules allow sellers to set a secret reservation price (called the minimum bid) prior to the auction. While this reserve price is secret, bidders are informed if the high bid equals or exceeds the minimum bid. The purpose of our field experiment was to assess the revenue effects of public as opposed to private reserve prices. Copart executives allowed us to introduce public reserve prices in their auctions, but they required us to obtain sellers' consents prior to making their reserve prices public. Needing the cooperation of at least one important seller, we approached executives at a major insurance company which is a large seller of salvage vehicles at Copart auctions. These vehicles are acquired through its auto insurance branch, and they agreed to cooperate in the experiment. A previous set of field experiments which we ran with Copart has been documented in Grether, Porter, and Shum (2015).

Two possible confounders are taken into consideration. First, while we requested that the individuals setting the reserve prices were not told whether they would be made public, we cannot know if they complied or if the reserve setters noticed the announcement on the auction site. We examine the possibility that the reserve setters were aware of the manipulation and find no evidence of a response in reserve price setting to the possibility of the prices being made public.

The second confounder arises as a result of an important feature of the Copart auction which we were not able to control: sellers are allowed to negotiate with high bidders, through Copart, at the end of the auction (if the reserve price is not met). This can potentially mask or dilute any effect of the reserve price presentation on auction outcomes, as strategic sellers may set a high reserve price in order to ensure negotiation with the highest bidder. To disentangle the effect of reserve price presentation from that of final sale negotiation, and to better understand this aspect of the Copart auction design, we complemented our field experiment with a lab experiment. The setting in the lab replicated the environment in the field, with the added feature that the possibility of ex-post negotiation was introduced as an additional treatment in a 2x2 design. The results here confirm that, by itself, reserve price presentation appears to have little impact on revenues. Ex-post negotiation leads to a significant increase in reserve prices, but final sale prices are unaffected. Perhaps surprisingly, we find that the possibility of negotiation increases slightly the efficiency of the market. Hence, for the design of these types of auctions, we conclude that the issue of public versus private reserve prices may not be as important as structuring sellers' negotiation possibilities.

Reserve prices are an important ingredient in auction design, as evidenced by the considerable attention payed by the theoretical literature. Krishna (2002) and Milgrom (2004) discuss the effects of reserve prices on revenue in different auction forms and preference configurations, but the emphasis is on the existence of reservation prices rather than whether or not they are public. That issue is adressed by Vincent (1995) in the context of common value auctions.. Surprisingly there is little empirical evidence to test any of this theory regarding reserve prices (Katkar and Reiley (2006), Reiley (2006), Ostrovsky and Schwarz (2011)).There has, however, been a discussion in the experimental literature of the relative advantages of field experiments, laboratory experiments and non-experimental studies (Al-Ubaydli and List (2015a , 2015b), Prichett and Sandefur (2015), Harrison and List (2004)).

The rest of the paper is organized as follows. In section 2 we provide a detailed description of the Copart auction, and of our experimental intervention and results in the field. Section 3 then presents our lab experiment and contrasts the laboratory evidence with the field evidence. Finally, section 4 summarizes and gives concluding remarks.

2. PUBLIC VS. SECRET RESERVE PRICES IN THE FIELD

2.1 Copart's auctions

Copart sells well over a million cars annually through its online virtual auctions. Copart is an intermediary that obtains the vehicles from governments, charities, finance companies, banks, dealers, fleets, rental car companies, and the insurance industry. Copart has over 150 facilities throughout the United States, Canada, and the United Kingdom.

There are many types of buyers from around the world that participate in Copart's auctions: auto parts dismantlers, re-builders, used car dealers, wrecking yards, and the public. This is an international market of heterogeneous buyers. After buyers have

registered for an account with Copart, they are able to access the "current sales" button to view all of the auctions occurring that day, the locations of the auctions, and the start times. Buyers can join an auction at any time. Buyers can also view vehicles in upcoming auctions. Each auction shows pictures of the vehicle up for auction, its make, model and year, along with the list of details shown in Table 1. Figure 1 shows a typical auction screen from the Copart auction site.

The Copart bidding process begins with a Preliminary Bidding (proxy bids) stage. The Preliminary Bidding process, which ends 60 minutes before the start of the virtual auction, allows participants from around the world to preview vehicles for sale in each of Copart's facilities in person or over the Internet. Using Preliminary Bidding, participants enter the maximum price (called the "Bid4U Max") they are willing to pay for a specific vehicle and the software incrementally bids for the vehicle on their behalf. In the Preliminary Bidding Stage, all of the preliminary bids are incremented until only the highest preliminary bid is left. When the online bidding begins, the opening price is set equal to the second highest preliminary bid plus one increment. As the online bidding process starts, the remaining (highest) preliminary bidder has their bid controlled by Copart software which automatically bids one bid increment above the current high bid (standing bid) for the vehicle, until their Bid4U Max is reached or all other bidders drop out.

A vehicle to be auctioned is called a *lot* and is sold sequentially in *lanes* at each facility called a *yard*. Once the starting price is determined, the *bid increment* is set based on the current bid. Buyers are informed in advance how high bids increase bid increments (from a low of $1 for high bids up to $5 to a maximum of $1000 for high bids above $100,000). Once the auction is underway, bidders can submit bids by clicking on one of three buttons in real time that are equal to one of the following bid grid sizes:
(i) the current bid plus the minimum increment; or
(ii) the current bid plus 5 times the minimum increment; or
(iii) the current bid plus 10 times the minimum increment.

As shown in Figure 1, the buttons for the different bid choices available to the bidders are located prominently on the lower right-hand side of the bidder screen. Note that the exact amounts of the bids are shown on the buttons. Bidders are identified by location: bidders in North America are identified by the state or province where they are located, and bidders outside of North America are identified by country. Once a bidder submits one of these three bids it becomes the new standing bid and if no new standing bid is made in two seconds, then there is a five second count down displayed on the bidder screen. If no new standing bid is provided in those five seconds the auction ends. Thus, if no bid is received in seven seconds, the auction is over.

Sellers in these auctions include insurance companies, dealers, charities, rental car companies, governmental units and single car sellers. Sellers in Copart auctions can and typically do set a *secret reserve price* called a *minimum bid*, which is unobserved to bidders at the time they choose their bids, such that if the highest bid in the auction falls below it, the seller has the option to not sell to the highest bidder. If the minimum bid is met during the course of the virtual auction, an announcement is made that the lot is "*sellin' all the way*". If the bidding does not reach the reserve price, the seller may negotiate with the high bidder or in some cases with the second highest bidder. Copart's new revised auction site specifically highlights this feature noting that bidders may engage in negotiations with sellers who "reveal or eliminate their minimum bid requirement to speed up the final sale to you." Some sellers reserve the right to review the high bids and negotiate with the highest bidders regardless of the high bid. In those cases an announcement is made at the start of the virtual auction that the sale in "on approval". The approval auction is seldom used, generally for fewer than ten percent of the units being auctioned. The majority of cars sold "on approval" are owned by car dealers.

2.2 Making reserve prices public

As previewed in the introduction, an insurance company agreed to cooperate with us and make some of their reserve prices public. The experiment was conducted using vehicles

from three different sites: Martinez and Sacramento in northern California, and Portland, Oregon (summary statistics for the three sites are given in Appendix A). Table 2 gives the distributions of seller types for each location. At all three locations, the majority of vehicles auctioned were brought by insurance companies with car dealers being the second largest group. Except for donations and charities in Sacramento, no other seller type accounts for as much as three percent of sales. Most of the auctions were of vehicles with some kind of salvage title. In Oregon, 78 percent of the vehicles were salvage. In California they were 65 percent. In part this reflects the market share of insurance companies, as almost all cars brought by them (over 95 percent) have salvage titles while less than 25 percent of vehicles brought by dealers do so.

The preponderance of insurance companies was also reflected in high sale rates. In Oregon insurance companies sold all but six of the 3302 vehicles put up for auction; the overall sales rate was 92 percent. In California the sales rate was somewhat lower, but at 72 percent, still high. Nine percent of the cars in California were listed as "on approval", while the Oregon site had under three percent approval sales. In general, insurance companies and dealers pursue rather different strategies. Insurance companies set low reserve prices and sell almost all of the vehicles they auction, even though about 42 percent of the auctions end with high bids below the reserve price. Dealers on the other hand set higher reserve prices, and roughly 92 percent of the high bids are below the reserve price. Dealers often bring an unsold vehicle back at later auctions. In the Copart virtual auctions an experienced buyer can identify with high probability which cars are being sold by insurance companies. Some insurance companies, including the one we worked with, and State Farm self-identify by posting a notice on the website that the vehicle on auction is the property of the company (see Figure 2 for an example). Also, the presence of a salvage title and an estimate of repair costs are strong indicators that the vehicle belongs to an insurer. In contrast, if a car has been auctioned previously, it is likely to belong to a dealer.[3]

[3] The distinction between dealer and insurance company behavior is important given the results found in Grether, Porter and Shum …

The insurance company we worked with agreed to have public reserve prices in eight auctions. Figure 2 shows the auction screen from the Copart auction site with the minimum bid announced prior to the auction start. Table 3 gives the list of auction dates, locations, and the number of vehicles affected. There were approximately 500 vehicles with public reserve prices. In our sample of auctions all vehicles brought by the company had public reserve prices or they all had private reserve prices. We discussed with the insurancre cocmpany's representatives the possibility of randomizing which vehicles got the public reserve treatment, but opted for the system used because of simplicity and concern that a randomized treatment might not be fully implemented. Of the 2144 cars that the company brought to the auctions in the experiment, only three were listed as "on approval". All three sold for the high bids in their auctions at prices less than $1000. We suspect that the approval listing for the cars may have been a clerical error.

2.3 Results in the field

Regressions explaining the high bids in the auctions and, for cars that sold, the sale prices are given in Table 4. The independent variables are the actual cash value (essentially the blue book value), the vehicle's age and age squared, odometer reading, a dummy for the cases in which the reading was the actual mileage, dummy variables for make, damage type, lane, and a cubic time trend in day of the year divided by 30. In addition to these variables characterizing the vehicles there were binary variables for vehicles on approval, vehicles sold by insurance companies, vehicles brought by dealers, the company's vehicles, and for those vehicles with public reserve prices.

The results are sensible with cash value variables being highly significant with t statistics ranging up to 78. The coefficients show discounts on the order of 65 to 80 percent reflecting the damages to the vehicles. In all the regressions cars sold by insurance companies have high bids and sale prices about $1000 less than similar cars brought by other sellers. These coefficients are highly significant. Cars brought by the cooperating company receive a premium with differences being statistically significant at the

California locations. The public reserve price coefficients are not significant for the California sites, and are marginally significant and negative for high bids at the Oregon site. Using a semi logarithmic specification gives qualitatively the same results.

These results from the field experiments are somewhat unsatisfactory and incomplete. While we have been able to control whether reserve prices were kept secret or made public to bidders (for the subset of cars sold by one company), there are two other endogeneous determinants of revenue which we were not able to control, and which may have varied in a way to dilute or mask the effects of the reserve price policy. First is the possibility that sellers may have adjusted the level of their reserve prices in reaction to whether the prices were secret or public. Specifically, as mentioned before, we requested that the individuals setting the reserve prices were not told whether they would be made public. Nevertheless, we cannot know if they did as instructed or if the reserve setters noticed the announcement on the screen when they looked at the auction site. To examine the possibility that the reserve setters were aware of the manipulation, we estimated regression models with the same right-hand side variables as in Table 4, but with the reserve prices as the dependent variable. Often cars are auctioned with a minimum bid of zero, which by the rules of the Copart auctions means that they will be sold to the high bidder regardless of the highest bid. Negative reserve prices are not possible, so the data are left censored. For those vehicles sold on approval, the reserve price is given as zero, but the seller is not obligated to accept any high bid, thus the reserve is effectively unbounded. As noted, the cars sold on approval are not exceptionally valuable or unusual models, so it seems unlikely that the sellers had huge reserve prices. For some reason they chose not to commit to a fixed reserve price. None of the cars sold by the company at sales with public reserve prices were sold on approval. Thus, we estimated the minimum bid regressions using a Tobit specification assuming left censoring at zero with cars sold on approval omitted. The results are given in Table 5. Notice that the company's reserve prices are generally higher than those of other insurance companies, but the public reserves are not different from the secret reserves (the ratios on the differences are all less than one). Thus, it does not appear that the reserve prices were adjusted because of their being made public. Whether the reserve

pricing would change if a permanent policy of public reserves were adopted, we cannot say. But our laboratory experiment, which we report next, supports this finding. Reserve prices were unaffected by making them public in the lab.

Second, given the opportunity for sellers to affect final sale prices by engaging in post-sale negotiations with the highest bidder, the possibility arises that any effect of the reserve price policy on revenues may be partially "undone" by sellers in the post-auction negotiation phase.

To deal with these deficiencies in the field experiments, we complemented the field study with lab experiments in which we allowed explicitly for sellers to set reserve prices in response to the reserve price policy, and also where we prohibit post-auction negotiation in a subset of the auctions. By doing this, we confirm whether our finding that the reserve price policy has no effect on revenues is robust after shutting off post-auction negotiation.

3. PUBLIC VS. SECRET RESERVE PRICES IN THE LAB

3.1 The 2x2 design

The laboratory experiments were conducted in the computer lab of the Economic Science Institute at Chapman University. Each experimental auction had a single seller and five buyers. The sessions had three sellers and fifteen buyers. They were rotated across auctions so that sellers faced different groups of buyers in each auction.

Subjects went through the computerized instructions (see the online appendix) at their own pace, answered test questions, and participated in one practice auction prior to the start of the experiment. The experiment consisted of twenty-five auctions for each seller or a total of seventy-five auctions per session. The experiments lasted ninety minutes. In addition to a $7.00 show up fee, participants earned an average of $15.67 per hour.

At the start of each auction the sellers had twenty seconds to pick a reserve price, that is, the lowest price they were willing to receive for the item to be sold. Sellers had no costs, so their profit from a sale was equal to the purchase price. If after twenty seconds a seller had not entered a reserve price, the reserve price was set to zero.

Buyers had values for the item sold that were multiples of five up to 100. During the auction the bids were shown on the buyers' screens. As in the Copart auctions, buyers knew if the standing bid was below or at least equal to the reserve price. The auction continued until no bids were received for ten seconds. If the item auctioned was sold, the buyer received the value less the purchase price.

There were two treatments: public versus secret reserve prices, and negotiations versus no negotiations. In the negotiations treatment, if at the end of the auction the standing bid was below the seller's reserve price, the seller could make the highest bidder an offer at or below the reserve price. The buyer could accept the offer, reject it, or make a counter offer. Each participant could make at most two counteroffers. Three sessions were run in each cell of the two by two design. As each session had 75 auctions, there were 225 auctions in each cell for a total of 900 auctions.

3.2 Results in the lab

In the negotiation treatment the sellers' reserve prices were substantially higher than in the no negotiation condition, roughly double. The average price with negotiations was 56.4, over twice the price of in the other condition (27.7). The difference is highly significant with a t-statistic of 22.8. This makes sense as the availability of negotiations reduces the risk of losing a sale because of setting the reserve price too high for the buyers to meet. In contrast having the reserve prices be public made almost no difference as the mean price dropped by 1.4 (t=1.1) in the public price condition.

Only 36 of the 900 auctions ended with the item not sold. Of these 19 were in the public reserve price condition and 17 had secret reserve prices. This is about as close to an even

split as one can get. 30 of the 36 no sale results were in the no negotiation condition. So it appears that having the possibility of negotiations increased the likelihood of a sale. The no sales were distributed quite evenly over the auctions with the most failures occurring in auctions number 7 and 19.

In the 864 auctions in which sales took place, the highest bidder was the buyer with the highest value approximately 96 percent of the time. This is true independently of the treatments. Similarly, the sale prices were not affected by the treatments. The overall average price in the no negotiation and secret reserve price condition was 70.52. The price increased by 0.05 with the negotiation treatment and fell by 0.61 when the reserve prices were public. Needless to say, neither change is significant at conventional levels (t statistics less than 1.0). These results are summarized in the Appendix.

In summary, we find essentially no effect of making the reserve prices public. The only striking result is that the possibility of negotiations leads to substantially higher reserve prices but has little effect on sale prices or the efficiency of the markets. Most auctions that ended without a sale were in cases without the possibility of negotiations. These cases amounted to about four percent of the auctions (36 of 900). Overall, the laboratory markets exhibit behavior similarly to the sales of vehicles owned by insurance companies. Details are given in Appendix B.

4. CONCLUDING REMARKS

We conducted a field experiment to measure the impact of public versus private reserve prices on auction outcomes. Due to features of the auction environment we consider, the treatment effects are confounded with seller negotiation behavior; that is, strategic sellers may set a high reserve price in order to ensure negotiation with the highest bidder. This can potentially mask or dilute any effect of the reserve price presentation on auction outcomes. In fact, we find in the field that the treatment had little effect on outcomes.

To disentangle the effect of reserve price presentation from that of final sale negotiation, we complemented the field experiment with a lab experiment. The setting in the lab replicated the environment in the field, with the added feature that the possibility of ex-post negotiation was introduced as an additional treatment. The results confirm that, by itself, the reserve price presentation appears to have little impact on revenues or efficiency. However, the negotiation treatments do have an effect on market efficiency. Hence, we conclude that the issue of public versus private reserve prices may not be as important as structuring the sellers' negotiation possibilities for the design of these types of auctions.

As stated earlier, the combinaton of laboratory and field experiments in a single study has seldom been used. In this study we used both thechniques. Both the lab and field experiments give essentially the same results for treatments implemented by the two methods. This enhances the credibility of both sets of results and illustrates the complementarrity of the methodologies.

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Figure 1
Screenshot of Copart Bidder Screen

Figure 2
Screenshot of Copart Bidder Screen with Minimum Bid Announcement

Table 1
Lot Details and variable definitions

Actual Cash Value	***Estimated*** retail value of the lot as submitted to Copart by the seller. If the lot has been damaged, this is the value prior to the occurrence of the damage. The number is only informational.
Repair Cost	***Estimated*** cost to repair the vehicle as submitted to Copart by the seller of the vehicle.
Title State/Type	Title type denotes the ownership documents that will be transferred to the buyer.
Odometer	Odometer codes are shown to reflect the known reliability of the odometer reading.
Primary Damage	Location of the major damage on the car
Secondary Damage	Location of the minor damage on the car
VIN	Vehicle Identification Number assigned by the manufacturer.
Body Style	Body Style is the manufacturer's designation of the vehicle's configuration
Color	Color listed on this site is the common color name that reasonably represents the exterior color of the vehicle.
Engine	Engine is the motor
Drive and Cylinders	Manufacturer's designation of the vehicle's power train.
Fuel	Designates the fuel type used by the engine as designated by the VIN.
Keys	Indicates whether Copart is in possession of the keys to the lot.

Table 2 Seller types by location

Type	Martinez Percent	Sacramento Percent	Oregon Percent
Adjusting company	0.30	0.25	0.15
Bank, Finance company	0.19	0.18	0.13
Dealer	45.53	25.80	19.83
Copart owned	1.04	2.28	1.54
Donation Charities	0.02	8.61	2.43
Fleet seller	1.07	0.92	1.76
Government Municipalities	0.00	0.08	0.04
Insurance company	51.21	61.75	71.64
Public consignments	0.43	0.00	2.28
Rental car	0.21	0.14	0.20

Table 3 Experimental Design

Martinez	Martinez	Martinez	Sacramento	Sacramento	Sacramento	Oregon	Oregon	Oregon
Date	Private Reserve	Public Reserve	Date	Private Reserve	Public Reserve	Date	Private Reserve	Public Reserve
6/7/11	572	0	6/8/11	538	0	12/28/11	428	0
6/14/11	495	0	6/15/11	488	0	1/4/12	369	0
6/21/11	593	0	6/22/11	553	0	1/11/12	362	0
6/28/11	587	0	6/29/11	534	0	1/18/12	372	0
7/5/11	436	0	7/6/11	467	0	1/25/12	344	39
7/12/11	549	0	7/13/11	456	0	2/1/12	351	55
7/19/11	574	0	7/20/11	440	113	2/8/12	330	44
7/26/11	453	63	7/27/11	521	0	2/15/12	358	48
8/2/11	486	0	8/3/11	431	111	2/22/12	370	0
8/9/11	448	48	8/10/11	480	0	2/29/12	333	0
						3/7/12	413	0
						3/14/12	393	0
Total	5193	111		4908	224		4423	186

Table 4 High bid and sale price regressions

	Martinez High bid	Martinez Sale price	Sacramento High bid	Sacramento Sale Price	Oregon High bid	Oregon Sale price
Acv	.140 (44.5)	.189 (41.0)	.243 (33.5)	.215 (30.7)	.372 (77.6)	.323 (67.5)
Age	-2270 (12.5)	-594.3 (2.8)	-2156 (11.5)	-1538 (9.1)	1214.6 (1.4)	-464.4 (3.5)
Age squared	355.8 (45.5)	-65.3 (1.1)	451.8 (10.4)	324.0 (8.5	-79.2 (2.6)	44.9 (1.7)
Actual	301.6 (2.4)	353.3 (2.4)	346.0 (4.6)	275.5 (3.0)	235.5 (3.3)	182.0 (2.7)
Mileage	-2.45 (3.5)	-2.65 (3.3)	-1.95 (2.8)	-1.75 (2.8)	0.72 (1.7)	0.90 (2.5)
Approval	-4329 (33.0)	-3415 (16.4)	-2221.5 (12.1)	-1958 (11.9)	893.2 (4.5)	398.3 (2.2)
Insurer	-1035 (4.0)	-772.4 (3.0)	-1136 (9.2)	-1652 (12.0)	-766 (5.6)	-833 (6.7)
Dealer	2260 (8.8)	2638 (9.9)	1298 (9.2)	1420 (10.50	482 (3.5)	353 (2.8)
Public reserve	103.3 (0.3)	-63.9 (0.2)	66.2 (0.3)	-99.0 (0.6)	-319.2 (1.7)	-311.1 (2.0)
The company	1555.8 (10.0)	1711.4 (11.6)	1373.4 (12.3)	1535.9 (16.7)	193.1 (1.7)	172.9 (1.8)
R squared	.54	.53	.50	.56	.75	.74
N	5304	3478	5132	4010	4609	4241

All regressions included dummies for make, damage type, lane and cubic time trend (day of year divided by 30). Figures in parentheses are t ratios.

Table 5 Tobit regressions

	Martinez	Sacramento	Oregon
	Minimum bid	Minimum bid	Minimum bid
Acv	.180 (45.2)	.268 (30.6)	.467 (17.6)
Age	-4315 (16.5)	-2755 (12.0)	477.2 (0.6)
Age squared	845.7 (11.7)	544.2 (10.4)	-153.2 (0.9)
Actual	511.3 (3.1)	804.9 (6.0)	329.5 (0.57
Mileage	-1.7 (1.8)	-2.6 (3.0)	0.0 (0.8)
Insurer	-2043 (6.3)	-3169 (15.4)	-4535 (5.8)
Dealer	3233 (10.1)	1811 (10.0)	2372 (3.1)
Public reserve	-41.4 (0.1)	41.1 (0.2)	578.3 (0.6)
The company	3575 (19.5)	2744 (20.1)	3147 (4.9)
Chi squared [degrees of freedom]	4282.2 [83]	3387 [78]	996.7 [72]
N	4644	4863	4490

All regressions included dummies for make, damage type, lane and cubic time trend (day of year divided by 30). Figures in parentheses are t ratios.

APPENDIX A SUMMARY STATISTICS FOR FIELD EXPERIMENTS

Table A1 Summary Statistics for Martinez

Sample	Mean	Standard Deviation	N
Fraction sold			
Other insurers	.94	.24	2183
Company public reserve price	.93	.26	111
Company secret reserve price	.90	.30	422
Insurers	.93	.25	2716
Other sellers	.37	.48	2588
All sellers	.66	.48	5304
High bid			
Other insurers	2564	3640	2183
Company public Reserve price	2461	2025	111
Company secret Reserve price	2628	2713	422
Insurers	2570	3458	2716
Other sellers	3461	5340	2588
All sellers	3005	4498	5304
Sale price if sold			
Other insurers	2556	3278	2048
Company public Reserve price	2406	1959	103
Company secret Reserve price	2664	2774	380
Insurers	2566	3163	2531
Other sellers	3681	4923	947
All sellers	2870	3757	3478
Reserve price			
Other insurers	1153	2634	2183
Company public reserve price	2843	2231	111
Company secret reserve price	2834	2627	422
Insurers	1483	2701	2716
Other sellers	3357	5261	2588
All sellers	2398	4256	5304

Table A2 Summary Statistics for Sacramento

Sample	Mean	Standard Deviation	N
Fraction sold			
Other insurers	.91	.28	2098
Company public reserve price	.91	.29	224
Company secret reserve price	.91	.29	847
Insurers	.91	.28	3169
Other sellers	.57	.49	1963
All sellers	.78	.41	5132
High bid			
Other insurers	2628	2714	2098
Company public Reserve price	2988	3156	224
Company secret Reserve price	3165	3643	847
Insurers	2797	3030	3169
Other sellers	2160	5340	2588
All sellers	2554	3215	5132
Sale price if sold			
Other insurers	2665	2763	1916
Company public Reserve price	3083	3270	204
Company secret Reserve price	3218	3752	768
Insurers	2841	3102	2888
Other sellers	2191	3264	1122
All sellers	2569	3161	4010
Reserve price			
Other insurers	1428	2718	2098
Company public reserve price	3263	3056	224
Company secret reserve price	3246	3449	847
Insurers	2043	3077	3169
Other sellers	2813	4678	1963
All sellers	2338	3788	5132

Table A3 Summary Statistics for Oregon

Sample	Mean	Standard Deviation	N
Fraction sold			
Other insurers	1.00	.05	2762
Company public reserve price	1.00	.00	186
Company secret reserve price	1.00	.00	354
Insurers	1.00	.05	3302
Other sellers	.72	.45	1307
All sellers	.92	.27	4609
High bid			
Other insurers	2033	2530	2762
Company public Reserve price	1788	2191	186
Company secret Reserve price	2185	2520	354
Insurers	2036	2511	3302
Other sellers	4062	6087	1307
All sellers	2610	3982	4609
Sale price if sold			
Other insurers	2053	2518	2756
Company public Reserve price	1820	2193	186
Company secret Reserve price	2203	2525	354
Insurers	2056	2502	3296
Other sellers	3823	5181	945
All sellers	2450	3374	4241
Reserve price			
Other insurers	1402	11468	2762
Company public rserve price	1569	1909	186
Company secret reserve price	1685	2134	354
Insurers	1441	10522	3302
Other sellers	5136	7189	1307
All sellers	2489	9835	4609

APPENDIX B LABORATORY EXPERIMENTS

Sample means of reserve prices

Reserve price= 28.36 + 28.72negotiation -1.37public
(26.0) (22.8) (1.1)

N=900 R-squared=.37

Sample means of sale prices

Sale price= 70.53 + 0.05negotiatioin -.61public
(66.1) (0.0) (0.5)

N=864 R-squared= .0003

Cases of unsold items

Negotiation	Secret reserve	Public reserve	Total
No	12	18	30
Yes	5	1	6
Total	17	19	36

Cases of sales to buyer with highest value

Negotiation	Secret reserve	Public reserve	Total
No	203	197	400
Yes	214	212	426

Total	417	409	826