Art Auctions

by

Orley Ashenfelter, Princeton University
Kathryn Graddy, University of Oxford

CEPS Working Paper No. 203
March 2010

Art Auctions

Orley Ashenfelter and Kathryn Graddy

Works of art and culture are sold by many means. These include transactions between dealers and their customers, auctions with open outcry, and even, occasionally, sealed bid auctions. However, the standard procedure for establishing art valuations is most commonly the English auction, where prices ascend in open bidding. (The primary, but not the only, alternative, is the Dutch auction, where the auctioneer starts at a high price and reduces it until a bidder is found.)

How "English auctions" really work

Many people think they understand the rules of an English auction because they are so commonly used.[1] Sotheby's, Christie's, Phillips, and the other English auction houses have invented and refined these rules over two centuries, and they are now common in many other parts of the world. It is well known that in an English auction the bidding begins low and edges upward as bidders escalate their bids. When the bidding stops, the item for sale is said to be *knocked down* or *hammered down*. The price at which an item is knocked down or hammered down is called the *hammer price*.

What is not so well understood is that the items knocked down have not necessarily been sold. Here is the reason. The seller will generally set a *reserve price*, and if the bidding does not reach this level the item will go unsold. Auctioneers say that an unsold item has been *bought in*.

[1] What is called an English auction is, in fact, Roman. The word auction comes from the Latin *auctio*, which means to ascend.

(This terminology is somewhat misleading since the auction house rarely buys unsold items.) An item that has been bought in may be put up for sale at a later auction, sold elsewhere, or taken off the market. In auctions of Impressionist paintings, about one-third of the paintings put up for sale will not find buyers in a normal period. In wine auctions, on the other hand, the typical *buy in* rate ranges from 5 per cent to 10 per cent. The typical buy in rates for other auction items—European paintings, silver, furniture and jewelry—usually, but not always, fall between these extremes. Table 1 shows sale rates (equal to one minus the buy in rate) in different departments at Christie's in London in 1995 and 1996 along with average value of a lot sold. As can be seen from the table, 96% of items put up for sale in auctions of arms and armor was sold, 89% of wine at auction was sold, and 71% of impressionist and modern art items were sold.

Auctioneers are very secretive about whether and at what level a reserve price may have been set, and there is a real auctioneer's art in getting the bidding started on each item without revealing the reserve price. For example, the auctioneer may have to accept and announce fictitious bids *off the wall* or *from the chandelier* to start the *real* bidding. Bids from off the wall are legally being placed on behalf of the seller. At the same time, sellers are forbidden by contract with the auctioneer from bidding in the auction. This is the protection that the auctioneer offers to the prospective buyers to ensure that they are not being artificially *bid up*.

If you sit through an auction you will find that every item is hammered down and treated as if it were sold.[2] Only after the auction does the auctioneer reveal whether and at what price an

[2] There are exceptions to this rule. In New York City the auctioneer is legally required to state whether an item has been sold at the conclusion of the bidding. When an item goes unsold, the auctioneer announces that the item has been *passed by*. This rule was promulgated after it was revealed publicly that an auction in the early 1980s consisted primarily of unsold paintings and a lawsuit was filed by their owner against Christie's. The New York auctioneers did not reveal this information before this rule was promulgated, and they usually do not reveal this information in other locations except where required by law.

item may have actually been sold. In short, the auctioneers do not reveal the reserve price and they make it as difficult as they can for bidders to infer it.

Although the above description outlines commonly accepted practice in auctions, many people describe them differently. For example, one prominent economist states, "the auctioneer begins with the lowest acceptable price—the reserve price—and proceeds to solicit successively higher bids from the customers until no one will increase the bid. Then the item is *knocked down* (sold) to the highest bidder." As noted above, real auctioneers do not reveal the reserve price in this way, and many *knocked down* items may be unsold. In another example, Graham and Marshall (1987) state that, "when the bidding stops, the auctioneer will generate a false or phantom higher bid if he feels that the high bidder is good for *another bump*." However, inventing fictitious bids above the reserve price is certainly unethical and probably illegal, too. Since the auctioneer's rules are known to an entire array of personnel who often move on to become bidders or their agents, it is difficult for an auction house to engage systematically in the generation of fictitious bids above the reserve price over long periods. Indeed, the recent litigation by the US Department of Justice over price fixing engaged in by Sotheby's and Christies, where the chairman of Sotheby's was convicted, demonstrates how difficult it can be to avoid the detection of collusion. Any auction house that values its reputation—and the long-run profits its reputation secures—has an incentive to avoid this practice.[3]

---

[3] It should be appreciated that an auctioneer faces a real trade-off in deciding whether to follow the standard ethical auction practices. If the auctioneer gains a reputation for following these practices he receives the benefit that buyers will reveal their true valuations of the items put up for sale and this results in higher prices for the buyers (and higher commissions for the auctioneers). Many sellers try to give the impression that they follow standard auction practices even when they do not, apparently because they believe that it increases their sale prices to uninformed buyers. Some of the most amusing examples of

Secret reserve prices and high *buy in* rates have some interesting implications for the theoretical study of auctions. In the optimal auctions model of Riley and Samuelson (1981), for example, the reserve price serves to extract a slightly higher price from the bidder with the highest valuation of the item on offer.[4] The reason is that in an English auction the seller only receives an amount equal to the second highest valuation placed on the object among the bidders. By setting a reserve price the seller takes a chance on extracting part of the valuation gap between the two bidders with the highest valuations in exchange for the risk of losing the sale altogether.

However, this optimal auctions model is probably not much help in understanding how reserve prices are set in most auctions. First, since it is a dominant strategy for each bidder in an English auction to bid up to their true valuation of the object, the optimal reserve price is identical no matter whether it is kept secret or not. This model therefore offers no explanation of why the reserve price should be secret. Second, in the optimal auctions model the reserve price is independent of the number of bidders. It follows that the probability that an item will be sold increases with the number of bidders. In fact, however, as was noted above, buy in rates are very high for some types of items despite a large number of bidders. Moreover, buy in rates differ systematically across types of items in a manner that is almost certainly not related to the number

---

this practice are depicted by the home shopping clubs broadcast on late night cable television. This kind of cheating seems to be endemic to any kind of economic activity where reputations are valuable.

[4] The term *reserve price* is an unfortunate choice of words in this context. In reality virtually every seller has some price below which they would not agree to sell an object; the theory of optimal auctions indicates why, for strategic reasons, a seller should set a reserve price that is strictly higher than the minimum price for which they would sell the object.

of bidders in these auctions. It seems very unlikely that actual buy in rates can be explained primarily by the considerations important in the optimal auctions literature.

One likely explanation for the secrecy surrounding reserve prices is that it serves to thwart *rings*.[5] There is always random variation in the interest and turnout of bidders; when the turnout is low, some sellers may prefer that their goods be bought in and offered for sale at a later date rather than risk a collusive ring bidding to depress the item's price. The auctioneer may also engage in other practices that weaken rings. For example, the auctioneer typically does not reveal the identity of the purchaser, if there was one, and this creates strong incentives for the ring members to bid privately in opposition to the interests of the ring.

An explanation for the key determinants of the seller's reserve price may be found in models of search (Mortensen, 1970), where the seller may expect to offer the item at auction more than once, or even to sell it privately to a dealer as an alternative. The highest observed price in a particular auction may be thought of as a *job offer* which will be accepted only if it exceeds the reserve price. In these models there is a *natural rate of unemployment* that may well be related to the *normal buy in rate* that characterizes auction markets.

Competition among auction houses

It is sometimes said that the auctioneers at Christie's (now owned by Frenchmen) are gentlemen who try to act like businessmen, while the auctioneers at Sotheby's (now owned by Americans!) are businessmen who try to act like gentlemen. There is no doubt an element of truth to this characterization of the style of these two auction houses. The competition among auctioneers is more than a matter of style, however. The auction business is an interesting

[5] Webster defines a *ring* as: "An exclusive combination of persons for a selfish, and often corrupt, purpose, as to control the market."

example of an industry where the cost of building a reputation may act as a significant entry barrier to new competitors. Surprisingly little attention has been paid in the literature about auctions to the role of the auctioneer.

In principle the auctioneer acts on behalf of the seller, but the auction house typically receives compensation from both the buyer and the seller for items that are sold. The buyer's premium is a percentage of the sale price paid to the auctioneer by the buyer. In most auction houses, the buyer's premium varies from 10 to 25% of the sale price, typically being a lower fraction of higher valued sales. This use of a sliding scale by value for the buyer's premium is a fairly recent innovation. It seems likely that competitive pressures among the major auction houses resulted in this change in the scale, as it is more likely to represent the real selling costs of an item. However, it is almost certainly also due to the fact that more of the auction houses' revenues have, in recent years, derived from the buyer's side of the market. Table 2 lists the buyer's premium for Christie's and Sotheby's as of January, 2010. These buyer's premiums had been in effect since June of 2008. This amount is generally not negotiable.

The seller's commission is a percentage of the sale price paid to the auctioneer by the seller. It varies with the type—and importance—of the item being sold, ranging from 15 per cent for wine to as little as 5 per cent or less for certain kinds of paintings. Furthermore, auction houses operate a sliding scale for commission rates, based on total annual sales.

Thus, with a buyer's commission of 25% and a seller's commission of 5%, if a painting is sold at an auction for a hammer price of $100 the buyer will pay $125 to the auctioneer, and the seller will receive $95 from the auctioneer, giving the auctioneer a gross revenue of $30.

If an item goes unsold, the auctioneer will receive neither a buyer's premium nor a seller's commission. To make sure the seller bears some of the cost of auctioning but not selling

an item, auctioneers usually charge the seller a fee on unsold items. This fee is often a percentage of the reserve price set by the seller, which obviously gives the seller an incentive to keep the reserve price low. In addition, some auction houses will not allow a seller to put up an easily recognized item for resale until some time has passed. Sometimes it is claimed that when an advertised item goes unsold its future value will be affected. Such items are said to have been *burned*. Indeed, Beggs and Graddy (2008) find that paintings that have failed between sales return about 30% less than other paintings.

Whether failure at auction actually causes the lower price is still open to debate. While paintings may sell for less after they fail at auction, it is not at all clear that the failure caused the lower price. Changes in the seller's reserve price—perhaps because of a previous failure—can cause final observed prices to be either higher or lower after an item fails to sell, in which case observed price changes are not caused directly by failure, but result from sample selection. Lower prices may also be observed because of downward price trends when an artist falls out of fashion, or for other idiosyncratic reasons.

When bidders have independent private valuations of the items on offer, as in Riley and Samuelson (1981), the failure of an item to sell should not influence its future saleability either at auction or privately. But in models where bidder valuations are correlated, as in Milgrom and Weber (1982), the failure of an item to sell is informative about the value it might achieve in another sale. If an object can be burned, the assumption of correlated valuations becomes more appropriate. However, it is not clear whether paintings really are burned—that is, whether their failure to sell has caused a price decrease—or whether this is a fiction invented to encourage sellers to be satisfied with lower reserve prices.

Most auction houses now collect a much larger part of their revenues from the buyer's premium than was true in the past. The most commonly given reason is that auction houses have been increasingly forced to bargain down the size of the seller's commission when they deal with large consignors. Since it is far more difficult for a large number of small buyers to bargain effectively, the buyer's premium has provided a new source of revenue. This suggests that real bargaining costs have changed in recent years.

Since Christie's and Sotheby's operate much as a duopoly with respect to the sale of major works of art, there is a strong incentive for them to collude in the setting of sellers' commissions. Evidence of their collusion has recently emerged in the major criminal trial of Alfred Taubman, Chairman of Sotheby's, in New York City, who was found guilty of price fixing in 2001. (Price fixing is a criminal offence in the United States, and penalties may include both incarceration and monetary fines.) Testimony in the trial by the former president of Sotheby's indicated that executives anticipated higher profits as a result of collusion that were in the tens of millions of dollars. Ashenfelter and Graddy (2005) provide an economic analysis of this price-fixing scandal.

The declining price anomaly

The empirical study of auctions has led to some findings that have challenged some theories of auction behavior and also led to new theoretical work. One of the most prominent examples is the discovery of what is now called the *declining price anomaly* in wine auctions by Ashenfelter (1989).

The existence of this anomaly has now been found in the sale of many other items, including paintings (Beggs and Graddy (1997)), condominiums (Ashenfelter and Genesove (1992)), and cattle (Englebrecht-Wiggans and Kahn (1992))! Although not much discussed, it

seems to be common knowledge among auctioneers that, when identical lots of wine are sold in a single auction, prices are more likely to decline than to increase with later lots. This does not mean that price declines always occur, but they are far more common than would be expected by chance alone. Most auctioneers are aware that later bidders on similar items are more likely to pay lower prices, but they are uncomfortable about revealing this information to uninformed bidders. Apparently most bidders, like economists, expect to see identical items sold at identical prices! When inexperienced bidders see exceptions to this rule they may think something unethical is going on. As a result, auctions are set up to disguise this regularity. For example, the auctioneer will usually offer smaller lots of the same item before larger lots. Since most bidders see nothing anomalous in quantity discounts, declining per unit prices seem more acceptable.

Auctioneers have another device for limiting the extent to which bidders are likely to see price declines for identical items. When a series of lots of identical items is offered, the winning bidder on the first lot has the option of immediately taking all the subsequent lots at the same price.[6] This rule has two effects. On one hand, for a bidder who wants some (but not all) of the items on offer, it increases the risk of waiting for the lower prices that may materialize with later lots. Risk-averse buyers are thus forced to pay a real price for any attempt to exploit the typical pattern of price declines: they may lose the opportunity to buy any of the lots they want. Thus this rule increases the seller's revenue so long as there are risk-averse buyers. In addition, since the option to purchase several lots is often exercised, bidders will in this case see a uniform price for all items.

[6] Since the buyer must exercise this option immediately, this rule does not establish an option value for risk-neutral traders which could be used to explain the price decline anomaly. Here is the reason. Since the option expires as soon as it is purchased, it is only of value if it is exercised. If it is exercised, however, there will be no price decline. Thus the existence of an option value is not consistent with the price declines.

These results suggest that risk aversion or quantity constraints play a significant role in real auction markets. Indeed, assuming bidders are risk averse may simply be a convenient analytical device for dealing with the fact that many bidders at auctions are buying to fill orders and are effectively quantity-constrained. In fact, the mechanism used in practice by the auctioneers that gives the first buyer the option to purchase subsequent lots at an identical price is clearly related to the optimal auction design suggested by Maskin and Riley (1984) when there are risk-averse bidders.

Since the first discussion of the declining price anomaly in Ashenfelter (1989), over 30 papers have been published on this subject, both trying to explain the anomaly, and documenting the anomaly in other auction markets.

The information in auction results: an externality

Some of the most fascinating stories about auctions involve the surprising *discovery* of a highly valued artwork in an auction where prices were expected to be very low. This kind of story illustrates one way that regular auctions confer information benefits that are typically not captured by the profits of the auctioneer. In essence, the presence of an auction system provides a way for an uninformed seller to obtain approximately the market value for the items they own without the necessity of becoming informed. So long as there are two well-informed buyers in the room who do not collude, the price the object attains will be the same as if the seller was well informed in the first instance.

The value of a public auction system as protection for uninformed sellers has long been understood in Europe, but it is not widely appreciated in the United States. In both Sweden and Austria, for example, auction houses have sometimes been run as state-owned monopolies. The major auction houses in both the USA and England are certainly not state-owned, but they are

watched with some care by institutions like the Metropolitan Museum of Art, which disposes of its property only through public auctions.

The basic problem is that the public auction system provides a method for setting values, but these values can be used for determining prices in transactions outside the auction system. In other words, the auction system allows traders to make private transactions outside the auction system, but if everyone traded in this way there would be no auctions in the first place. It is probable that the inability of auctioneers to capture a significant part of the benefits of the information they produce leads to less use of the auction system than is optimal for society.

Auctioneers and accurate information

The theoretical literature about auctions emphasizes that there are good reasons for auctioneers to provide truthful information about the items being sold (Milgrom and Weber, 1982). The basic idea is that revealing information tends to remove uncertainty and make low bidders more aggressive; this puts upward pressure on the bidding of the others, which is in the interest of the auctioneer. It may seem surprising to some, but auctioneers do appear to act consistently with this prediction.

For example, auction houses typically go to considerable effort to estimate the price that an item offered for sale will fetch. Predicting the price at which a unique item will sell requires considerable expertise, so it is of some interest to see just how good these predictions are. The usual practice is for the auctioneer to provide a high estimate and a low estimate in an auction catalogue.

Ashenfelter's (1989) results generally show that auction houses are truthful; the average of the auctioneer's high and low estimate is very highly correlated with the price actually

received. Furthermore, Abowd and Ashenfelter (1988) find that auctioneer's price estimates are far better predictors of prices fetched than hedonic price functions.

The details of the arrangements for price fixing revealed by Diana Brooks, the CEO of Sotheby's, during the Christie's-Sotheby's price-fixing trial provide further insight into the role of experts at auction houses. Brooks reported that at one point her boss, Chairman Alfred Taubman, proposed that the auction houses collude in providing clients with similar estimates of the value of their art. Brooks reported that this was impossible because she could not simply tell Christie's departmental experts, who produce the estimates, to do a dishonest job without causing a breakdown in the conspiracy.

Since Abowd and Ashenfelter (1988), many papers have looked at the issue of whether pre-sale estimates are truly unbiased. Some of this research has found systematic over and undervaluation, based on various characteristics of the items being sold. However, in most of these papers the biases are small and appear unintentional. The one exception to this body of work is Mei and Moses (2005), who conclude that estimates for expensive paintings are intentionally biased upwards in order to increase revenue. Most recently, however, McAndrew, Smith and Thompson (forthcoming) have found that once unsold items are taken into account, the auction house estimates are unbiased.

In sum, auctioneers do seem to provide genuine expertise in predicting prices. Perhaps honesty is an auctioneer's most profitable policy rule.

References

Abowd, John, and Orley Ashenfelter (1988), "Art Auctions: Price Indices and Sale Rates for Impressionist and Contemporary Pictures," mimeo, Department of Economics, Princeton University.

Ashenfelter, Orley (1989), "How Auctions Work for Wine and Art," *Journal of Economic Perspectives*, 3: 23–36.

Ashenfelter, Orley, and David Genesove (1992), "Testing for Price Anomalies in Real-Estate Auctions," *American Economic Review*, 82: 501–505.

Ashenfelter, Orley, and Kathryn Graddy (2005), "Anatomy of the Rise and Fall of a Price-Fixing Conspiracy: Auctions at Sotheby's and Christie's," *Journal of Competition Law and Economics*, 1: 3–20.

Beggs, Alan, and Kathryn Graddy (1997), "Declining Values and the Afternoon Effect: Evidence from Art Auctions," *Rand Journal of Economics*, 28: 544–65.

Beggs, Alan, and Kathryn Graddy (2008), "Failure to Meet the Reserve Price: The Impact on the Returns to Art," *Journal of Cultural Economics*, 32: 301–320.

Engelbrecht-Wiggans, Richard, and Charles Kahn (1992), "An Empirical Analysis of Dairy Cattle Auctions," mimeo, University of Illinois.

Graham, Daniel A., and Robert C. Marshall (1987), "Collusive Bidder Behavior at Single-Object Second-Price and English Auctions," *Journal of Political Economy*, 95, December: 1217–39.

Maskin, Eric, and John Riley (1984), "Optimal Auction with Risk Averse Buyers," *Econometrica*, 52, November: 1473–1518.

Mei, Jianping, and Michael Moses (2005), "Vested Interest and Biased Price Estimates: Evidence from an Auction Market," *Journal of Finance*, 60, 2409–2436.

McAndrew, Clare, James L. Smith, and Rex Thompson (forthcoming), "The Impact of Reservation Prices on the Perceived Bias of Expert Appraisals of Fine Art," *Journal of Applied Econometrics*.

Milgrom, Paul R., and Robert J. Weber (1982), "A Theory of Auctions and Competitive Bidding," *Econometrica*, 50, September: 1089–1122.

Mortensen, Dale T. (1970), "Job Search, the Duration of Unemployment, and the Phillips Curve," *The American Economic Review*, 60, December: 847–62.

Riley, John C., and William F. Samuelson (1981), "Optimal Auctions," *The American Economic Review*, 71, June: 381–92.

Table 1
Average Sale Rates by Department

Department	Average Sold Lot Value		No. of Auctions in Sample	Sale Rate (% of Lots Sold)		% Sold by Value	
	1996	1995		Mean	Std. dev	Mean	Std. dev.
Impressionist	£122,820	£135,430	8	71%	(0.11)	80%	(0.10)
Old Masters Drawings	£50,670	£29,210	4	77%	(0.09)	89%	(0.08)
Contemporary	£36,820	£36,840	7	79%	(0.04)	87%	(0.06)
British Pictures	£29,710	£23,560	7	78%	(0.14)	83%	(0.17)
Old Master Pictures	£29,180	£6,560	11	73%	(0.15)	82%	(0.15)
Continental Pictures	£21,810	£10,450	7	72%	(0.11)	79%	(0.10)
Clocks	£14,340	£5,130	4	88%	(0.03)	89%	(0.07)
Jewellery	£12,190	£6,750	8	86%	(0.05)	89%	(0.04)
Furniture	£11,670	£8,220	25	85%	(0.09)	92%	(0.06)
Silver	£11,080	£5,910	10	87%	(0.11)	92%	(0.07)
Sculpture	£11,070	£6,340	5	78%	(0.21)	81%	(0.20)
Modern British Pictures	£10,340	£7,190	9	70%	(0.05)	81%	(0.05)
Victorian Pictures	£9,460	£8,400	6	66%	(0.13)	75%	(0.11)
British Drawings & Watercolours	£9,160	£3,400	14	72%	(0.14)	87%	(0.10)
Rugs & Carpets	£9,160	£3,700	8	80%	(0.17)	85%	(0.14)
Topographical Pictures	£8,640	£8,010	2	68%	(0.13)	81%	(0.00)
Islamic	£6,670	£6,950	5	68%	(0.22)	82%	(0.12)
Cars	£5,750	£7,610	6	71%	(0.16)	65%	(0.22)
Chinese Works of Art	£5,640	£6,400	8	70%	(0.19)	79%	(0.16)
Books & Manuscripts	£5,220	£4,270	15	81%	(0.12)	86%	(0.09)
Russian Works of Art	£4,490	£5,480	4	64%	(0.14)	69%	(0.15)
Japanese	£4,410	£2,840	5	72%	(0.04)	76%	(0.05)
Musical Instruments	£3,960	£4,110	5	77%	(0.05)	76%	(0.16)
Watches	£3,870	£2,190	6	71%	(0.09)	81%	(0.11)
Prints-Old Modern and Contemporary	£3,850	£4,230	8	81%	(0.12)	92%	(0.09)
Miniatures	£3,350	£3,260	2	82%	(0.05)	92%	(0.07)
Antiquities	£3,260	£3,640	3	57%	(0.08)	66%	(0.13)
Porcelain and Glass	£2,700	£2,600	14	76%	(0.12)	85%	(0.10)
Tribal Art	£2,650	£2,090	3	67%	(0.08)	75%	(0.19)
Photographica	£2,580	£1,660	3	61%	(0.27)	79%	(0.08)
Modern Guns	£2,510	£3,620	5	93%	(0.06)	94%	(0.04)
Garden Statuary	£2,120	£1,540	4	91%	(0.10)	91%	(0.11)
Arms & Armour	£1,890	£2,400	4	96%	(0.03)	99%	(0.01)
Frames	£1,800	£2,260	4	81%	(0.15)	85%	(0.14)
Stamps	£830	£650	22	78%	(0.13)	82%	(0.12)
Wine	£690	£580	37	89%	(0.09)	91%	(0.08)

Table 2
Buyer's Commissions for Selected Locations at Christie's and Sotheby's Auction Houses

Effective June 1, 2008 (Sotheby's) **Effective June 2, 2008 (Christie's)**	**Amount of Hammer Price**	**Buyer's Commission**
London	up to GBP 25,000 above GBP 25,000 - GBP 500,000 above GBP 500,000	25% 20% 12%
[London Wine]	All amounts	15%
France	up to EUR 15,000* above EUR 15,000 - EUR 800,000* above EUR 800,000	25% 20% 12%
New York	up to USD 50,000 above USD 50,000 - USD 1,000,000 above USD 1,000,000	25% 20% 12%
[NY Wine]	All amounts	21%**
Hong Kong	up to HKD 400,000 above HKD 400,000 - HKD 8,000,000 above HKD 8,000,000	25% 20% 12%

*The cut-off at Christie's is EUR 20,000 rather than EUR 15,000

**Commissions at Christie's are 20%; at Sotheby's, 21%