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# The On-line Auction Phenomenon: Growth, Strategies, Promise, and Problems

*Gillian Ku and Deepak Malhotra*

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*Summarizing panel discussions between auction practitioners and researchers at Northwestern University, this essay reviews the recent growth of on-line auction sites and addresses some of their key benefits and costs. We also describe recent research on bidder behavior, focusing on bidder reactions to different auction mechanisms. We believe that there is immense potential for communication and collaboration between auction practitioners and researchers. Such dialogue could supply researchers timely, real-world auction data. Simultaneously, the on-line auction community would gain information about the mechanics of auction formats and their effects on bidder behavior.*

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**I**nternet auctions are a remarkable modern-day phenomenon. Some of the “dot com” sites, such as eBay and Amazon.com, have become household names. Others like Sothebys.com and Yahoo! Auctions have been built around brands that are already well known. Most others (e.g., uBid, DealDeal.com, etc.) are less familiar but are gaining reputations as viable markets for the exchange of goods and services. An increasing number of consumers are visiting and trading on Internet auction sites. Some of these buyers and sellers are new to auctions entirely, let alone to on-line auctions. Others have some expertise in auctions and therefore bid strategically, taking

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**Gillian Ku** and **Deepak Malhotra** are both doctoral students at the Kellogg School of Management at Northwestern University, Evanston, Ill. 60208. Ku (whose e-mail address is [gku@kellogg.northwestern.edu](mailto:gku@kellogg.northwestern.edu)) is focusing her research on auctions as decision-making processes. Malhotra’s research primarily involves issues of interpersonal trust and reciprocity; his e-mail address is [d-malhotra@kellogg.northwestern.edu](mailto:d-malhotra@kellogg.northwestern.edu).

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into consideration the format and rules of the auction site and the probable bidding behavior of competing bidders who may be novices or experts.

Some recent research (Lucking-Reiley 2000a; 2000c) provides some eye-opening statistics regarding the huge growth in Internet auctions: In the autumn of 1998, 142 auction websites, 90 percent of which conducted business-to-consumer (B2C) transactions, generated almost \$100 million of trade each month. For eBay, the industry leader, transaction volume grew from \$70 million in November of 1998 to \$190 million in July of 1999. Over this same time period, eBay experienced a 13 percent monthly growth rate. Estimates suggest that, in 2000, eBay had five million auctions on its site at any given time and that it hosted two million transactions each week (Lucking-Reiley 2000c). With eBay only six years old, the Internet auction market has clearly grown extremely quickly, and the impact on the way consumers purchase goods is striking. In addition to B2C auction sites, there are an increasing number of sites that provide an arena for business-to-business (B2B) transactions. These sites use auctions to offer large organizations a marketplace to trade on such items as shipping routes and machinery parts.

All types of goods and services are now being auctioned on the Internet, ranging from computers and electronics to vacation packages, from household goods, wine, and art to limited editions of books and collectibles. For many people, on-line auctions have become a hobby or an enjoyable pastime, while for numerous others, an integral part of their daily routine. For instance, eBay has set up a "community" link that consists of numerous chat rooms and help boards tailored to individuals who want to talk about their on-line bidding experiences, both good and bad.

All of this activity has not been lost on researchers from various fields who have begun to study Internet auctions. Some researchers are trying to grasp the reasons underlying the success of on-line auction sites while others are using the available data to develop or refine theories of auction design and bidding strategy. Still others are interested in the potential consequences (sociological, psychological, and economic) of a shift from face-to-face to computer-mediated transactions.

This essay, which summarizes discussions between auction practitioners and researchers at a September 2000 conference at Northwestern University,<sup>1</sup> reviews recent trends in the types of Internet auction sites that have proliferated and research relating to on-line bidder behavior and Internet auction design. First, we describe the growth of on-line auction sites and address some of the key benefits and costs of these auctions. Next, we describe bidders and their bidding, with a focus on how bidding strategies differ across different auction formats. Each section will offer some observations about emerging trends and potential areas of research. We believe there is immense potential for knowledge gain in studying on-line auctions, which necessitates increased dialogue and cooperation between auction sites and researchers in uncovering this knowledge. Through communication and collaboration, researchers will be afforded an opportunity to gather

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field data that are both timely and representative of high-stakes decision making, while the on-line auction community will be able to gain valuable insight into the mechanics of differing auction formats and their effects on bidder behavior.

### **On-line Auction Sites**

The auction site is one of many exchange formats that have flourished on the Internet. Examples of these exchange mechanisms include old-fashioned barter trade (e.g., Who's Bartering.com), on-line catalogs where goods are sold for a fixed price (e.g., L.L.Bean), auction sites, and hybrids of the above forms. These markets provide specialized trading venues for specific businesses and individuals who may have a multitude of needs and wants. In particular, auctions allow sellers to offer items for which they are unsure of the value or price.

Auction sites can be categorized by their structure, i.e., the auction mechanism. McAfee and McMillan (1987) describe four basic formats: English, Dutch, first-price sealed-bid, and second-price sealed-bid auctions. In an English auction, bids are placed successively, raising the price until one bidder remains. In live English auctions, bids are either announced by the auctioneer or called out by bidders. "Winners" pay what they bid and receive the object. Dutch auctions reverse this process. The auctioneer begins by calling out a high price and then lowers the "ask" until one bidder accepts the price. Unlike English auctions, where many bidders can participate and many bids can be made, Dutch auctions end with the first and only bid. In sealed-bid auctions, all bidders submit secret bids simultaneously. In first-price sealed-bid auctions, the highest bidder wins the item for the amount that was bid. In second-price sealed-bid auctions, the highest bidder again wins but pays an amount equal to the amount bid by the second-highest bidder.

In addition to these formats, two other types are somewhat common in on-line auctions: reverse auctions and double-sided auctions. Unlike the four basic auction formats, in which many bidders may vie to purchase a single item, reverse auctions include many sellers who compete to supply a good or goods to a single buyer. For example, FreeMarkets conducts on-line auctions for industrial parts, raw materials, commodities and services, and suppliers compete for the purchase orders of large buying organizations. At FreeMarkets, suppliers bid against one another in real time by lowering their prices.

In double-sided auctions, multiple bidders and multiple sellers bid simultaneously. Perhaps the most familiar example is the buying and selling of stocks on the New York Stock Exchange. An interesting example of a double-sided auction on the Internet is the Hollywood Stock Exchange ([www.hsx.com](http://www.hsx.com)) where traders use "Hollywood Dollars" to trade on the potential of movies, music albums, stars, and recording artists. By expressing their preferences in quantifiable terms, traders on the Hollywood Stock Exchange actually provide the movie and music industries with valuable

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information about the probable success or failure of a project. All of these auction formats can be found on the Internet (see Lucking-Reiley 1999 and 2000a for an extensive treatment of on-line auction sites and their different formats).

Many auction sites also use variations of, or have additions to, these auction types. The most common addition is the use of a proxy bidding system. A proxy system automates the bidding process so that buyers do not have to be present for the duration of the auction. This is particularly useful when auctions last for several days (or even weeks). In a bid-by-proxy system, buyers submit their maximum bids (the highest they are willing to pay). If a buyer's maximum exceeds the current bid, the auction site automatically raises the current bid by a fixed increment for the proxy bidder. The system repeats this process until a competitor surpasses the proxy bidder's maximum. When multiple bidders submit proxies, the process of automatic bids competing with each other continues (with automatic counter-bids, automatic counter-counter bids, etc.) until the potential buyer with the highest stated limit remains unchallenged (with a bid equal to the second-highest bidder's top bid plus the bid increment). E-mail notifications are sent to bidders when their submitted maximums are surpassed. Theoretically, the proxy bid system turns an auction into a second-price sealed-bid auction. However, unlike the traditional second-priced sealed-bid auction, the proxy bid system allows bidders to submit new maximums if and when their originally stated bid limit has been surpassed.

Ironically, as McAfee and McMillan (1987: 702) observed about the second-price sealed-bid auction, "While this auction has useful theoretical properties, it is seldom used in practice." Indeed, many (and perhaps most) auction sites now have a proxy bidding system in place. For instance, uBid, which primarily uses an English auction design in its auctions, allows the use of the "Bid Butler." For bidders who are not able or do not wish to track the entire auction, the "Bid Butler" automatically bids on their behalf. As explained by uBid (2000) in its on-line help section:

Using Bid Butler is just like having someone watch over your auctions when you're not there to make sure you always have a winning bid. . . You tell your Bid Butler how much you are willing to pay for an item. . . [and] Bid Butler ensures that you get the best deal by submitting the smallest incremental bid possible to keep you a winner!

At most sites, bidders are encouraged to submit their maximum bids and are notified when their submitted maximums have been surpassed. Bidders can then submit a new, larger maximum if they so choose.

At some auction sites, where the bidding dynamic is more complex, special "house rules" have been introduced to determine winners. uBid often offers multiple units of the same item and buyers are able to bid for several units at the same time. For instance, a seller may hold an auction for three identical computers, and a buyer may bid \$1,000 each for the three

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computers (or a different amount for each). Since buyers are specifying both their willingness to pay and the quantity they are willing to purchase, uBid uses the following rules to determine the winner. First, bid prices are compared and the highest bidder wins the quantity ordered. Second, bid quantity is compared. If two bidders offer the same per unit price but request different quantities, the buyer with the larger order is supplied first. Third, initial bid time is compared. All else being equal, early bidders beat late bidders. Many other auction sites (e.g., Amazon.com) also use time of bid as a tiebreaker.

Another feature available at various auction sites is the use of reserve prices. Traditional auction theory states that sellers should publicly announce the price below which they will not sell the item, i.e., their reserve price. On average, a positive reserve price decreases the probability of a sale but may increase the final selling price (McAfee and McMillan 1987). Various on-line auction sites allow sellers to set reserve prices. Interestingly, some auction sites, such as eBay, allow sellers to set them in secret. With a secret reserve price, bidders are aware that a reserve price exists for the item and whether it has been surpassed, but they are unaware of the actual value of the reserve price.

It is also noteworthy that an increasing number of auction sites, primarily those conducting B2B transactions, are focusing on forward transactions rather than just spot transactions. For example, Logistics.com, which specializes in bringing shippers and carriers together, equips both parties with the technology to analyze optimal shipping loads and routes so that long-term contracts can be developed and bid upon. Indeed, B2B websites may represent the next generation of on-line auction sites, providing venues that allow buyers and sellers to move away from single-item, one-shot trades to multi-item, long-term trading partnerships that increase value for both parties. B2B transactions tend to entail greater value than B2C transactions, thereby making such innovations more attractive. For instance, since 1995, FreeMarkets has generated over \$25 billion in total market volume from around 17,500 on-line auctions of materials, commodities, and services (FreeMarkets 2002).

### **Pros and Cons of On-line Auction Sites**

The great advantage that on-line auction sites have over traditional auction venues is their ability to bring buyers and sellers together in a virtual, asynchronous environment and provide them with the information and tools necessary to make educated choices and trades. This reflects the power of the Internet. In traditional auction houses, not only do buyers and sellers have to come to a common space to trade, but they also usually have to be at this location at the same time. The goods being transacted also have to be brought to this location. These factors are inconvenient and may create prohibitive transaction costs. Internet auctions do not have these problems.

Another noteworthy strength of on-line auction sites is the ease of connecting buyers and sellers. Search engines commonly link buyers to auction

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sites, narrowing and simplifying the process of locating an item. This allows many on-line auction sites to create trades that increase the total volume of transactions in the economy. For example, Sothebys.com believes that 100 percent of sales on its on-line site are new and additional revenues to the auction house's traditionally handled properties (Moffett 2000). In other words, the goods that are auctioned off would otherwise never have been traded. As Lucking-Reiley (2000a: 231-232) notes:

Online auctions do quite a bit to improve the matching of buyers and sellers. Before the advent of online auctions, buyers were most likely to have found . . . collectibles through chance encounters at garage sales or in a few highly specialized dealer shops.

A third advantage of on-line auction sites is that they provide buyers and sellers with greater information. With the World Wide Web, potential buyers are able to "shop around" for items, sellers, and auction sites that best suit their preferences. Even if an item is not purchased, on-line markets (and their derivative search engines) have increased the level of awareness in consumers, providing them with valuable product and price information. The transparency of bid data on auction sites also enhances a buyer's ability to bid wisely, in an informed manner. A bid history is a chronological listing of the bids that have been submitted "thus far" in the auction, typically listing the bidder (using some identification name, number, or e-mail address) and the time and amount of the bid. Auction sites such as eBay and Amazon.com post the bid history of each current item, allowing buyers and sellers to follow along as the bidding progresses. Bid histories provide potential buyers with access to valuable information regarding the price, the amount of competition, the behavior of other bidders, the seller's reserve price (if relevant), etc., all of which can inform a person's next bid. Similarly, sellers can track the demand for their items. In addition to posting bid histories for current items, auction sites even keep a record of recently completed auctions, increasing the amount of information available. Arguably, the availability of all this information leads to more efficient outcomes, and also, presumably, more satisfaction.

On-line auctions obviously provide many clear benefits to users. However, the Internet marketplace does not solve all of the problems that buyers and sellers face, and in fact, it creates some that did not previously exist. The most obvious problem stems from barriers to access. Internet auctions require that buyers and sellers have access to the Internet, know how to use it, and be sufficiently comfortable with buying and selling on line. As technology becomes more affordable for the masses, and as the next generation of buyers and sellers (people who have grown up with the Internet) take to transacting on line, we may see an emphatic shift toward computer-mediated trading.

It appears that the United States is leading the charge as the foremost "e-nation" in the world. In many other countries, however, the shift to trad-

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ing on line will likely take longer. As an illustrative example, Axel Ockenfels (2000) reports that, when he presents his research on Internet auctions in Germany, he begins his presentation by explaining the concept of eBay whereas such an introduction is usually unnecessary for U.S. audiences. Indeed, international differences in the level of Internet use and cross-cultural differences in the willingness to engage in computer-mediated vs. face-to-face interactions will likely remain important issues in B2B as well as B2C markets.

A second, more significant problem with the use of auctions, and particularly with on-line auctions, is that items are typically traded on the basis of only one issue — price. In most cases, the good or service being auctioned is sold to the buyer who is willing to pay the highest amount. This is entirely reasonable for such items as art works or other collectibles that are traditionally offered at auction houses, but may not be so reasonable for many other goods and services. The problem with basing a sale on price alone is that it disallows potential gains to both parties that can result from a process of integrative negotiation. As an analogy, consider a job negotiation. An offer is made and the employer and the potential employee negotiate the offer. If the only issue is salary, the two are simply haggling and the negotiation is strictly distributive (i.e., one person gains to the extent that the other loses). If, however, they increase the number of negotiable issues (e.g., vacation time, flex time, choice of projects, yearly bonus, parking spot, health coverage, etc.), they may reach an agreement that favors both of them. Auctions provide no room for logrolling, or trading on issues, because there is only one issue. Often, price is the only relevant issue (e.g., in the case of collectibles). However, in some situations (e.g., purchase of automobiles and trucking services), buyers and sellers would be better served by a marketplace that allows discussion and negotiation over multiple issues.

A third problem posed by on-line auction sites relates to the issue of time. Patience is not just a virtue on line, it is often a necessity. Because the Internet provides an asynchronous venue that is quite beneficial, on-line auctions can last from several days to a month or more. As a result, both buyers and sellers must be willing to wait for the final result. If individuals are under time constraints to purchase or sell items, Internet auction sites may not provide the best exchange mechanism. It is unclear whether the tradeoff between providing flexibility through asynchronous interaction and providing a rapid transaction pace with which people in today's economy are comfortable has been adequately addressed by auction sites.

A more serious issue, one that has received considerable attention from both researchers and auction sites, concerns the reliability and reputation of buyers, sellers, and auction sites themselves. Both buyers and sellers tend to approach auction sites and potential trading partners cautiously. Indeed, transacting with a virtually anonymous "other" necessarily entails risks. Many questions are relevant to on-line traders, such as: How has this person behaved in the past with other trading partners? How reliable are products

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and services that cannot be inspected before bidding begins? What sorts of rules have been established if a buyer receives a faulty product or insufficient service? And, how can sellers be assured of payment in a timely fashion?

It is difficult to know how often buyers or sellers renege on their parts of the agreement; however, the problem is sufficiently large that auction sites have begun to adopt measures to curtail fraud and resolve disputes. Amazon.com and eBay have instituted seller and buyer ratings, where buyers rate sellers based on the quality of the product or service sold and on the overall buying experience. Similarly, sellers rate buyers based on whether and how promptly they pay for purchases. These websites have varying and often complex rating systems, with scores and colored symbols indicating the level of "trustworthiness" of buyers and sellers. Such systems are designed to assist potential buyers and sellers by helping to weed out charlatans since those with bad reputations will have a harder time finding business. However, these systems do not preclude charlatans from logging on to the auction site under a different "user name" or from establishing an account on a different auction site. To address this issue, eBay encourages buyers to report questionable sellers (sellers who are selling inappropriate items, for instance) to the site-sponsored Community Watch, adding another layer of protection and regulation to the on-line auction experience.

Services other than rating and consumer feedback systems have also been established to reduce fraud in the transaction process. For example, buyers are now able to make credit card payments on-line through services such as Amazon.com Payments, eBay's Billpoint, and PayPal. For sellers, the cost of these services is offset by greater confidence in receiving prompt and accurate payment. With the use of Tradenable (formerly known as i-escrow.com), an on-line escrow service, a neutral third party temporarily holds the buyer's payment while the buyer has an opportunity to inspect the purchase. To reduce potential conflicts and increase the likelihood of "clean" trades, auction sites often provide links to such services. These services make would-be fraudulent behavior less likely to be successful, and hence, reduce the probability of disputes. At times, however, it is unclear whether the buyer or seller is at fault. For example, did the buyer withhold payment justifiably because the seller did not deliver as promised?

In the event a dispute does arise, major on-line auction sites have also established dispute resolution services. Amazon.com has an "A-to-z Guarantee" for buyers. For items under this guarantee, Amazon.com will reimburse the buyer the cost of the transaction in the event that payment is made and the buyer subsequently finds that the purchase is substantially different from what was advertised. To avoid "getting caught in the middle," eBay subsidizes the costs of hiring a neutral third party, SquareTrade, to resolve conflicts that may arise. If a dispute arises, eBay traders can connect directly to SquareTrade from the eBay website. Amazon.com payments, Billpoint, PayPal, Tradenable, Amazon.com's A-to-z Guarantee, and SquareTrade are



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only a few of the many support services that have sprung up around on-line auction sites to reduce the likelihood of conflicts by discouraging frauds, resolve conflicts when they do occur, and make the trading experience more comfortable for individuals.

Finally, buyers, sellers, and on-line auction businesses also face a problem that is moral in nature. Even in our free market system, not all types of trades are legal. For instance, in September 1999, there was an attempt to auction a human kidney on eBay. The bidding had reached \$5.7 million when eBay finally closed down the auction (Harmon 1999). Other trades, while technically legal, still are morally questionable. Many people feel strongly that adult-only items should be kept out of the hands of underage individuals. Although steps have been taken to prevent underage individuals from purchasing such items, it is unclear how successful these efforts have been. For instance, on eBay, only registered users can enter "mature audiences" pages and individuals have to be eighteen years of age or older to register. However, this is not a great deterrent to underage individuals who are intent on bidding on adult-only items — the registration process itself does not require proof of age. All that is required is a valid credit card numbers.

Another ethical issue faced by sellers and auction sites concerns the possibility of collusion in on-line auctions. Taking an example from live (rather than on-line) auctions, Weber (1997) studied the auction of spectrum licenses by the Federal Communications Commission (FCC). He found that the organizations that bid in these auctions hired game theorists and other experts to analyze the "activity rules" (auction rules) developed by the FCC and to find loopholes that could be used to the organizations' advantage. It appeared that these particular auctions had been reduced to coordination games where bidders signaled to each other (e.g., by using the last digits of their bid amounts or carefully timed bid withdrawals), indicating lots that they were interested in or threatening to raise bids on other lots. The FCC has since revised its rules in an attempt to minimize these coordination games. Nonetheless, gains to bidders from collusion and coordination remain high in live auctions and potentially in on-line auctions as well.

Although it is unclear how prevalent such collusive behavior is in on-line auctions, it is easy to see both why and how people might go about behaving thus. Some auction sites use a bidder's e-mail address as their user name, making contact between bidders easy. Even when more creative user names are used, many auction sites encourage contact between bidders for purposes of sharing information and community building. As bidders get increasingly savvy and strategic, auction sites may well be struggling to keep up, altering house rules or auction formats, setting up an increasing number of restrictions, and having to invest money in monitoring and control efforts. For instance, eBay has strict rules against "shilling" or the practice of bidding up one's own or one's friends' auctions, reserving the right to suspend perpetrators from trading on eBay.

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In summary, the myriad of on-line auction sites provides buyers and sellers useful and powerful tools to trade with one another. Although some problems persist and others arise from moving to an on-line environment, various steps have been taken to help create reliable and secure trades. Nonetheless, a “buyer (and seller) beware” attitude is not unwarranted. The formats and functions of these auction sites are still evolving, with new marketplaces being established all the time. For example, in the fall of 2000, entertainment giant Disney launched an auction site in conjunction with eBay. On a smaller scale, local newspapers are beginning to have on-line auction sites. The increasing number of sites conducting B2C and B2B auctions will likely change the way both individuals and organizations obtain resources and services.

With all of these on-line auction sites competing against one another, a real question is survival. Are there sufficient transactions to be made to sustain all of these sites, or will buyers be drawn to particular sites because of brand strength, preferred auction formats, or sufficient support services? It is incumbent upon auction sites to capitalize on their strengths and to address the problems highlighted above. To do so, however, may require greater collaboration with researchers who are ready, willing, and able to invest the time and energy required to answer some of the tough questions facing auction sites. Indeed, the academic community may prove to be of great benefit to those dealing with such issues as trust and reputation, the pros and cons of varying auction formats, the use of conflict resolution methodologies, and the increasingly central role of the Internet in everyday life. To provide a flavor for the types of research that may be of use to auction sites, we now turn to some of the research that scholars have conducted on a particularly relevant domain in the study of on-line auctions — bidder behavior.

## **Bidder Behavior**

Bidders are the lifeblood of the on-line auction phenomenon. More and more people are visiting on-line auction sites and many of them are actively bidding. The skill of these bidders varies, and, while some bidders are new to the game and to the rules of auctions, others are seasoned pros.

Several studies have looked at the bidding strategies of on-line traders. For instance, Roth and Ockenfels (in press) investigated the effects of different auction mechanisms on rational bidding behavior. In particular, they focused on the effectiveness of the strategy of “sniping” on eBay and Amazon.com. Sniping refers to the practice of waiting until the final moments of an auction to submit a bid. The idea behind sniping is not to bid too early lest a bidding war ensue. Sniping has become such a prevalent tactic in on-line auctions that various software programs have been developed to ensure that a person can snipe at exactly the right moment. Such software is programmed to take the bidder’s sniping bid and place it as close to the end of the auction as possible. Roth and Ockenfels (in press) found that sniping is

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much more prevalent on sites that use fixed, predetermined ending times (e.g., eBay) rather than flexible ending times (e.g., Amazon.com).

Amazon.com allows bidding to continue past the listed end time as long as bidding is active. Specifically, during the last ten minutes of the auction, Amazon.com automatically extends the ending time by ten minutes whenever a bidder submits a bid; the auction ends only when the listed end time has passed and no bid has been received for a period of ten minutes. The Amazon.com format is akin to a live auctioneer announcing, "Going, going, gone!" prior to closing the auction. In contrast, when a bidder on eBay places a bid in the closing moments of the auction, there is a high probability that no one else will have a chance to place a competing bid since the auction will stop exactly at the listed end time. On eBay, snipers may thus be able to pay less for an item than they would if each bidder had an opportunity to bid up to their reservation buying prices.

Sniping is certainly bad news for sellers, and may explain why auction sites such as Amazon.com have instituted flexible ending times. If bids submitted in the closing moments automatically extend the ending time for the auction, other buyers will likely have enough time to place their competing bids, making sniping ineffective. Consistent with this, Roth and Ockenfels (in press) found that on eBay, 40 percent of computer auctions and 59 percent of antique auctions had final bids in the last five minutes. In contrast, on Amazon.com, where ending times are flexible, the percentage of final bids in the last five minutes of auctions was approximately 3 percent each for computer and antique auctions.

Other research has focused on the use of reserve prices in on-line auctions. As mentioned earlier, some auction sites allow sellers to set reserve prices. These may be kept secret or made public. Lucking-Reiley (2000b) found that setting publicly known reserve prices (rather than no reserve prices) reduced the number of bidders and increased the frequency with which items remained unsold. However, he also found an increase in revenues when the item sold. These findings are consistent with classic economic theory (Lucking-Reiley 2000b; McAfee and McMillan 1987). In another study, Katkar and Lucking-Reiley (2000) compared public with secret reserve prices. Analyses of auctions involving Pokémon trading cards on eBay provided evidence that secret reserve prices (as compared to public reserve prices) reduced the probability of a sale and lowered the revenues of successful auctions. The data showed that only 46 percent of auctions with secret reserve prices resulted in a sale, whereas 70 percent of auctions with public reserve prices resulted in a sale, even though the reserve prices in each auction type were equal in value. On average, the auctions with public reserve prices generated 90 percent higher revenues (equivalent to \$0.61 per item) than those with secret reserve prices.

In a study with a different focus, Malhotra and Murnighan (2000) investigated the phenomenon of "auction fever" in Internet auctions, analyzing the sale of life-sized fiberglass cows that had been part of a public art exhibi-

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tion in Chicago. They found that bidders in these auctions often bid past the limits they had set for themselves. To explain this behavior, they developed and tested three models of bidder behavior. The rational choice model predicted that bidders would only bid past a stated limit strategically (e.g., using the behavior of others to assess the value of the item being sold) and never bid past their true reservation price for an item. The escalation of commitment model predicted that bidders who had invested more time in the auction would be more likely to bid past their set limits if and when these limits were reached. Finally, the competitive arousal model predicted that bidders would be more likely to bid past their limits “in the heat of the moment” when the end of the auction was near and when few others were competing with them. Analysis revealed considerable support for the competitive arousal model and some support for escalation of commitment. There was little evidence to support a rational choice model. Malhotra and Murnighan (2000) concluded that time pressure and competition combined to create auction fever, lending support to the notion that not all on-line bidding is rational and calculated.

This selective review of the research on bidding behavior in on-line auctions provides a flavor for the types of issues that researchers are interested in understanding. However, just as the evolving marketplace itself is not well defined and understood, similarly, bidder reactions and behaviors have yet to be fully explored.

## **Conclusion**

Despite increasing investment in research on on-line auctions, our understanding of this phenomenon remains limited. In our view, the key to understanding and solving on-line auction problems and to utilizing and profiting (as individuals, organizations, and as a society) from the strengths of this system is collaboration between researchers and auction sites.

The advent of on-line auctions and on-line marketplaces, and indeed the Internet itself, took both researchers and auctioneers by some surprise. Many in the private sector are looking for advice from researchers, and many in academia are looking for the opportunity to conduct meaningful research in the private sector. Sites such as eBay, Amazon.com, uBid, Sothebys.com, and Yahoo! Auctions conduct millions of transactions and have access to important, useful data. Researchers have the tools and expertise to analyze these data and provide answers to some of the tough problems that the auction community faces.

Auction sites provide fertile ground for field experiments, for both quantitative and qualitative research, and for both the development and testing of theory. At the same time, theory and empirical findings are likely to be integral components of any successful on-line enterprise — those who learn what works and why will be better equipped than those who are innovating blindly. Communication and collaboration between auction sites and

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researchers in the field of Internet auctions, and various related fields, is a recipe for success for all parties involved.

## NOTES

1. This essay is based on material presented by two groups of auction practitioners and scholars who met at the Kellogg School of Management at Northwestern University, Evanston, Ill., from 15-17 September, 2000. The symposium, *Auctions and negotiations.com: A conference on electronic exchange*, was sponsored by the Dispute Resolution Research Center. Dr. Jeanne Brett served as chair for the symposium, while Dr. Keith Murnighan chaired the two sessions on auctions. The speakers for the practitioner panel were Peter Sheth-Voss (Logistics.com), Sam Kinney (FreeMarkets), Preston McAfee (Spectrum), Craig Moffett (Sothebys.com), and Bob Weber (Spectrum). The speakers for the scholar panel were Peter Kollock (University of California at Los Angeles), David Lucking-Reiley (Vanderbilt University), Deepak Malhotra (Northwestern University), and Axel Ockenfels (University of Magdeburg).

## REFERENCES

- FreeMarkets. 2002. FreeMarkets news and events. <http://www.freemarket.com/news/default.asp>
- Harmon, A. 1999. Auction for a kidney pops up on eBay's site. *New York Times*. 3 September 1999: A13.
- Katkar, R. and D. Lucking-Reiley. 2000. Public versus secret reserve prices in eBay auctions: Results of a Pokémon field experiment. Manuscript in preparation.
- Lucking-Reiley, D. 1999. Using field experiments to test equivalence between auction formats: Magic on the Internet. *American Economic Review* 89(5): 1063-1080.
- . 2000a. Auctions on the Internet: What's being auctioned, and how? *Journal of Industrial Economics* 48(3): 227-252.
- . 2000b. Field experiments on the effects of reserve prices in auctions: More magic on the Internet. Manuscript in preparation.
- . 2000c. Researcher auctions panel discussion, chaired by J. K. Murnighan. *Auctions and negotiations.com: A conference on electronic exchange*, a symposium sponsored by the Dispute Resolution Research Center, Northwestern University, Evanston, Ill. 15-17 September 2000.
- Malhotra, D. and J. K. Murnighan. 2000. Milked for all their worth: Competitive arousal and escalation in the Chicago cow auctions. Mimeo. Kellogg School of Management, Northwestern University.
- McAfee, R. P. and J. McMillan. 1987. Auctions and bidding. *Journal of Economic Literature* 25(2): 699-738.
- Moffett, C. 2000. Practitioner auctions panel discussion, chaired by J. K. Murnighan. *Auctions and negotiations.com: A conference on electronic exchange*, a symposium sponsored by the Dispute Resolution Research Center, Northwestern University, Evanston, Ill. 15-17 September 2000.
- Ockenfels, A. 2000. Researcher auctions panel discussion, chaired by J. K. Murnighan. *Auctions and negotiations.com: A conference on electronic exchange*, a symposium sponsored by the Dispute Resolution Research Center, Northwestern University, Evanston, Ill. 15-17 September 2000.
- Roth, A. E. and A. Ockenfels. In press. Last-minute bidding and the rules for ending second-price auctions: Evidence from eBay and Amazon auctions on the Internet. *American Economic Review*.
- uBid on-line help section. 2000. <http://www.ubid.com/help/topic10.asp>
- Weber, R. 1997. Making more from less: Strategic demand reduction in the FCC Spectrum auctions. *The Journal of Economics and Management Strategy* 6(3): 529-548.