

What Really Matters in Auction Design

Paul Klemperer

Auctions have become enormously popular in recent years. Governments are now especially keen, using auctions to sell mobile-phone licenses, operate decentralized electricity markets, privatize companies and for many other purposes. The growth of e-commerce has led to many business-to-business auctions for goods whose trade was previously negotiated bilaterally.

Economists are proud of their role in pushing for auctions; for example, Coase (1959) was among the first to advocate auctioning the radio spectrum. But many auctions—including some designed with the help of leading academic economists—have worked very badly.

For example, six European countries auctioned off spectrum licenses for “third-generation” mobile phones in 2000. In Germany and the United Kingdom, the spectrum sold for over 600 euros per person (\$80 billion in all, or over 2 percent of GDP). But in Austria, the Netherlands, Italy and Switzerland, the revenues were just 100, 170, 240 and 20 euros per person, respectively. To be sure, investors became more skeptical about the underlying value of the spectrum during 2000 (and they are even more skeptical today). But this is just a fraction of the story. The Netherlands auction was sandwiched between the U.K. and German auctions, and analysts and government officials predicted revenues in excess of 400 euros per person from the Italian and Swiss auctions just a few days before they began (Michelson, 2000; Roberts, 2000; Total Telecom, 2000; Klemperer, 2002). These other auctions were fiascoes primarily because they were poorly designed.

So what makes a successful auction?

What really matters in auction design are the same issues that any industry

■ *Paul Klemperer is the Edgeworth Professor of Economics, Oxford University, England. His e-mail address is <paul.klemperer@economics.ox.ac.uk>, and his website is <<http://www.paulklemperer.org>>.*

regulator would recognize as key concerns: discouraging collusive, entry-detering and predatory behavior. In short, good auction design is mostly good elementary economics.

By contrast, most of the extensive auction literature (as summarized in, for example, Klemperer, 1999a, 2000a) is of second-order importance for *practical* auction design. The auction literature largely focuses on a fixed number of bidders who bid noncooperatively, and it emphasizes issues such as the effects of risk aversion, correlation of information, budget constraints and complementarities. Auction theorists have made important progress on these topics from which other economic theory has benefited, and auction theory has also been fruitfully applied in political economy, finance, law and economics, labor economics and industrial organization, often in contexts not usually thought of as auctions (Klemperer, 2001a). But most of this literature is of much less use for actually designing auctions.

This paper will list and give examples of some critical pitfalls in auction design and discuss what to do about them. We show that ascending and uniform-price auctions are both very vulnerable to collusion and very likely to deter entry into an auction. We consider including a final sealed-bid stage into an otherwise-ascending auction to create an “Anglo-Dutch” auction, and we emphasize the need for stronger antitrust policy in auction markets.

Collusion

A first major set of concerns for practical auction design involves the risk that participants may explicitly or tacitly collude to avoid bidding up prices. Consider a multiunit (simultaneous) *ascending* auction. (This is just like the standard auction used, for example, to sell a painting in Sotheby’s or Christies—the price starts low, and competing bidders raise the price until no one is prepared to bid any higher, and the final bidder then wins the prize at the final price bid. However, in this case, several objects are sold at the same time, with the price rising on each of them independently, and none of the objects is finally sold until no one wishes to bid again on any of the objects.) In such an auction, bidders can use the early stages, when prices are still low, to signal who should win which objects and then tacitly agree to stop pushing up prices.

For example, in 1999, Germany sold ten blocks of spectrum by a simultaneous ascending auction with the rule that any new bid on a block had to exceed the previous high bid by at least 10 percent. Mannesman’s first bids were 18.18 million deutschmarks per megahertz on blocks 1–5 and 20 million DM per MHz on blocks 6–10; the only other credible bidder—T-Mobil—bid even less in the first round. One of T-Mobil’s managers then said (Stuewe, 1999, p. 13): “There were no agreements with Mannesman. But [T-Mobil] interpreted Mannesman’s first bid as an offer.” The point is that 18.18 plus a 10 percent raise equals approximately 20. It seems T-Mobil understood that if it bid 20 million DM per MHz on blocks 1–5,

but did not bid again on blocks 6–10, the two companies would then live and let live with neither company challenging the other on the other's half. Exactly that happened. So the auction closed after just two rounds with each of the bidders acquiring half the blocks for the same low price (Jehiel and Moldovanu, 2001; Grimm, Riedel and Wolfstetter, 2001).

Ascending auctions can also facilitate collusion by offering a mechanism for punishing rivals. The threat of punishment may be implicit; for example, it was clear to T-Mobil that Mannesman would retaliate with high bids on blocks 1–5 if T-Mobil continued bidding on blocks 6–10. But an ascending auction can also allow more explicit options for punishment.

In a multilicense U.S. spectrum auction in 1996–1997, U.S. West was competing vigorously with McLeod for lot number 378: a license in Rochester, Minnesota. Although most bids in the auction had been in exact thousands of dollars, U.S. West bid \$313,378 and \$62,378 for two licenses in Iowa in which it had earlier shown no interest, overbidding McLeod, who had seemed to be the uncontested high bidder for these licenses. McLeod got the point that it was being punished for competing in Rochester and dropped out of that market. Since McLeod made subsequent higher bids on the Iowa licenses, the “punishment” bids cost U.S. West nothing (Cramton and Schwartz, 1999).

A related phenomenon can arise in one special kind of sealed-bid auction, namely a *uniform-price* auction in which each bidder submits a sealed bid stating what price it would pay for different quantities of a homogenous good, like electricity (that is, it submits a demand function), and then the good is sold at the single price determined by the lowest winning bid. In this format, bidders can submit bids that ensure that any deviation from a (tacit or explicit) collusive agreement is severely punished: each bidder bids very high prices for smaller quantities than its collusively agreed share. Then, if any bidder attempts to obtain more than its agreed share (leaving other firms with less than their agreed shares), all bidders will have to pay these very high prices. However, if everyone sticks to their agreed shares, then these very high prices will never need to be paid. As a result, deviation from the collusive agreement is unprofitable.¹

The electricity regulator in the United Kingdom believes the market in which distribution companies purchase electricity from generating companies has fallen prey to exactly this kind of “implicit collusion” (Office of Gas and Electricity Markets, 1999, pp. 173–174). “Far from being the success story trumpeted around the world, the story of the U.K. generation market and the development of competition has been something of a disaster,” reported *Power U.K.* (1999; see also

¹ Since, with many units, the lowest winning bid in a uniform-price auction is typically not importantly different from the highest losing bid, this auction is analogous to an ascending auction (in which every winner pays the runner-up's willingness-to-pay). The “threats” that support collusion in a uniform-price auction are likewise analogous to the implicit threats supporting collusion in an ascending auction. Collusion in a uniform-price auction is harder if supply is uncertain, since this reduces the number of points on the bid schedule that are inframarginal and can be used as threats (Klemperer and Meyer, 1989; Back and Zender, 1993, 1999).

von der Fehr and Harbord, 1998; Newbery, 1998; Wolfram, 1998, 1999). In addition, a frequently repeated auction market such as that for electricity is particularly vulnerable to collusion, because the repeated interaction among bidders expands the set of signaling and punishment strategies available to them and allows them to learn to cooperate (Klemperer, 2002).

Much of the kind of behavior discussed so far is hard to challenge legally. Indeed, trying to outlaw it all would require cumbersome rules that would restrict bidders' flexibility and might generate inefficiencies, without being fully effective. It would be much better to solve these problems with better auction designs.

Entry Deterrence and Predation

The second major area of concern of practical auction design is to attract bidders, since an auction with too few bidders risks being unprofitable for the auctioneer (Bulow and Klemperer, 1996) and potentially inefficient. Ascending auctions are often particularly poor in this respect, since they can allow some bidders to deter the entry, or depress the bidding, of rivals.

In an ascending auction, there is a strong presumption that the firm that values winning the most will be the eventual winner, because even if it is outbid at an early stage, it can eventually top any opposition. As a result, other firms have little incentive to enter the bidding and may not do so if they have even modest costs of bidding.

Consider, for example, Glaxo's 1995 takeover of the Wellcome drugs company. After Glaxo's first bid of 9 billion pounds, Zeneca expressed willingness to offer about 10 billion pounds if it could be sure of winning, while Roche considered an offer of 11 billion pounds. But certain synergies made Wellcome worth a little more to Glaxo than to the other firms, and the costs of bidding were tens of millions of pounds. Eventually, neither Roche nor Zeneca actually entered the bidding, and Wellcome was sold at the original bid of 9 billion pounds, literally a billion or two less than its shareholders might have received. Wellcome's own chief executive admitted "there was money left on the table" (Wighton, 1995a, b).

While ascending auctions are particularly vulnerable to lack of entry, other auction forms can result in similar problems if the costs of entry and the asymmetries between bidders are too large.

The 1991 U.K. sale of television franchises by a sealed-bid auction is a dramatic example. While the regions in the South and Southeast, Southwest, East, Wales and West, Northeast and Yorkshire all sold in the range of 9.36 to 15.88 pounds per head of population, the only—and therefore winning—bid for the Midlands region was made by the incumbent firm and was just one-twentieth of one penny (!) per head of population. Much the same happened in Scotland, where the only bidder for the Central region generously bid one-seventh of one penny per capita. What had happened was that bidders were required to provide very detailed

region-specific programming plans. In each of these two regions, the only bidder figured out that no one else had developed such a plan.²

Another issue that can depress bidding in some ascending auctions is the “winner’s curse.” This problem applies when bidders have the same, or close to the same, actual value for a prize, but they have different information about that actual value (what auction theorists call the “common values” case). The winner’s curse reflects the danger that the winner of an auction is likely to be the party who has most greatly overestimated the value of the prize. Knowing about the winner’s curse will cause everyone to bid cautiously. But weaker firms must be especially cautious, since they must recognize that they are only likely to win when they have overestimated the value by even more than usual. Therefore, an advantaged firm can be less cautious, since beating very cautious opponents need not imply one has overestimated the prize’s value. Because the winner’s curse affects weak firms much more than strong ones, and because the effect is self-reinforcing, the advantaged bidder wins most of the time. And because its rivals bid extremely cautiously, it also generally pays a low price when it does win (Klemperer, 1998).

The bidding on the Los Angeles license in the 1995 U.S. auction for mobile-phone broadband licenses illustrates this problem. While the license’s value was hard to estimate, it was probably worth similar amounts to several bidders. But Pacific Telephone, which already operated the local fixed-line telephone business in California, had distinct advantages from its database on potential local customers, its well-known brand-name and its familiarity with doing business in California. The auction was an ascending one. The result was that the bidding stopped at a very low price. In the end, the Los Angeles license yielded only \$26 per capita. In Chicago, by contrast, the main local fixed-line provider was ineligible to compete, and it was not obvious who would win, so the auction yielded \$31 per capita even though Chicago was thought less valuable than Los Angeles because of its lower household incomes, lower expected population growth and more dispersed population (Klemperer, 1998; Bulow and Klemperer, 2002). For formal econometric evidence for the FCC auctions more broadly, see Klemperer and Pagnozzi (2002).

Of course, the “winner’s curse” problem exacerbates the problem that weaker bidders may not bother to participate in an ascending auction. GTE and Bell Atlantic made deals that made them ineligible to bid for the Los Angeles license, and MCI failed to enter this auction at all. Similarly, takeover battles are essentially ascending auctions, and there is empirical evidence that a firm that makes a takeover bid has a lower risk of facing a rival bidder if the firm has a larger shareholding or “toehold” in the target company (Betton and Eckbo, 2000).

Because outcomes in an ascending auction can be dramatically influenced by a seemingly modest advantage, developing such an advantage can be an effective predatory strategy. An apparent example was the 1999 attempt by BSkyB (Rupert Murdoch’s satellite television company) to acquire Manchester United (England’s

² While I have advised the U.K. government on several auctions, I have never had anything to do with television licenses!

most successful soccer club). The problem was the advantage this would give BSkyB in the auction of football television rights. Since Manchester United receives 7 percent of the Premier League's television revenues, BSkyB would have received 7 percent of the price of the league's broadcasting rights, whoever won them. So BSkyB would have had an incentive to bid more aggressively in an ascending auction to push up the price of the rights, and knowing this, other potential bidders would have faced a worse "winner's curse" and backed off. BSkyB might have ended up with a lock over the television rights, with damaging effects on the television market more generally. Largely for this reason, the U.K. government blocked the acquisition.³

A strong bidder also has an incentive to create a reputation for aggressiveness that reinforces its advantage. For example, when Glaxo was bidding for Wellcome, it made it clear that it "would almost certainly top a rival bid" (Wighton, 1995b). Similarly, before bidding for the California phone license, Pacific Telephone announced in the *Wall Street Journal* that "if somebody takes California away from us, they'll never make any money" (Cauley and Carnevale, 1994, p. A4). Pacific Telephone also hired one of the world's most prominent auction theorists to give seminars to the rest of the industry to explain the winner's curse argument that justifies this statement, and it reinforced the point in full-page ads that ran in the newspapers of the cities where its major competitors were headquartered (Koselka, 1995, p. 63). It also made organizational changes that demonstrated its commitment to winning the Los Angeles license.

Predation may be particularly easy in repeated ascending auctions, such as in a series of spectrum auctions. A bidder who buys assets that are complementary to assets for sale in a future auction or who simply bids very aggressively in early auctions can develop a reputation for aggressiveness (Bikhchandani, 1988). Potential rivals in future auctions will be less willing to participate and will bid less aggressively if they do participate (Klemperer, 2002).

Finally, because an ascending auction often effectively blocks the entry of "weaker" bidders, it encourages "stronger" bidders to bid jointly or to collude; after all, they know that no one else can enter the auction to steal the collusive rents they create. In the disastrous November 2000 Swiss sale of four third-generation mobile-phone licenses, there was considerable initial interest from potential bidders. But weaker bidders were put off by the auction form—at least one company hired bidding consultants and then gave up after learning that the ascending-bidding rules would give the company very little chance against stronger rivals. Moreover, the government permitted last-minute joint-bidding agreements—essentially officially sanctioned collusion. In the week before the auction, the field shrank from nine bidders to just four bidders for the four licenses! Since no bidder was allowed

³ Although the term "toehold effect," coined by Bulow, Huang and Klemperer (1999) and Klemperer (1998) in the related context of takeover battles (see above), entered the popular press, and these papers were cited by the U.K. Monopolies and Mergers Commission (1999) report, which effectively decided the issue, neither I nor my coauthors had any involvement in this case.

to take more than one license, the sale price was determined by the reserve price, which was just one-thirtieth of the U.K. and German per capita revenues and one-fiftieth of what the Swiss had once hoped for!

Other Pitfalls

Reserve Prices

Many of the disasters above were greatly aggravated by failure to set a proper reserve price (the minimum amount the winner is required to pay). Take the previous example. It was ridiculous for the Swiss government to set its reserve at just one-thirtieth of the per capita revenue raised by the German and U.K. governments for similar properties. Since the government's own spokesman predicted just five days prior to the auction that twenty times the reserve price would be raised, what was the government playing at?

Inadequate reserve prices also increase the incentives for predation and may encourage collusion that would not otherwise have been in all bidders' interests. A stronger bidder in an ascending auction has a choice between either tacitly colluding to end the auction quickly at a low price or forcing the price up to drive out weaker bidders. The lower the reserve price at which the auction can be concluded, the more attractive is the first option. This factor may have been an important contributor to several of the fiascos we have discussed.

Political Problems

Serious reserve prices are often opposed not only by industry groups, but also by government officials for whom a very embarrassing outcome is that the reserve price is not met, the object is not sold, and the auction is seen as a "failure."

Similarly, standard (first-price) sealed-bid auctions—in which the bidders simultaneously make "best and final" offers, and the winner pays the price he bid—can sometimes be very embarrassing for bidders, as BSCH (Spain's biggest bank) found out when Brazil privatized the Sao Paulo state bank Banespa. When the bids were opened, BSCH's managers were horrified to learn that their bid of over 7 billion reals (\$3.6 billion) was more than three times the runner-up's bid and that they were therefore paying 5 billion reals (\$2.5 billion) more than was needed to win. In other auctions, meanwhile, losers who have just narrowly underbid the winners have found it equally hard to explain themselves to their bosses and shareholders. So firms, or at least their managers, can oppose first-price auctions.

On the other hand, a *second-price* sealed-bid auction—in which the winner pays the runner-up's bid—can be embarrassing for the auctioneer if the winner's actual bid is revealed to be far more than the runner-up's, even if the auction design was both efficient and maximized expected revenue. McMillan (1994) reports a second-price New Zealand auction in which the winner bid NZ \$7 million but paid the runner-up's bid of NZ \$5,000. New Zealand should have set a minimum reserve price that the winner had to pay, but even if that had been politically possible, the

winner would probably have bid more than it had to pay, so this might have been an economically but not politically sensible auction.

Loopholes

In some cases, the auction rules may leave gaping loopholes for behavior to game the auction. In 2000, Turkey auctioned two telecom licenses sequentially, with an additional twist that set the reserve price for the second license equal to the selling price of the first. One firm then bid far more for the first license than it could possibly be worth if the firm had to compete in the telecom market with a rival holding the second license. But the firm had rightly figured that no rival would be willing to bid that high for the second license, which therefore remained unsold, leaving the firm without a rival operating the second license!

As another example, McMillan (1994) reports an Australian auction for satellite-television licenses in which two bidders each made large numbers of different sealed bids on the same objects and then, after considerable delays, defaulted on those bids they did not like after the fact—since the government had neglected to impose any penalties for default. More recently, the U.S. spectrum auctions have been plagued by bidders “winning” licenses and subsequently defaulting on their commitments, often after long delays. (Spectrum auctions in India also recently fell into the same trap.) If default costs are small, then bidders are bidding for *options* on prizes rather than the prizes themselves. Furthermore, if smaller, underfinanced firms can avoid commitments through bankruptcy, then an auction actually favors these bidders over better-financed competitors who cannot default.

Credibility of the Rules

It may not be credible for the auctioneer to punish a bidder violating the auction rules when just one bidder needs to be eliminated to end an auction, because excluding the offending bidder would end the auction immediately, and it might be hard to impose fines large enough to have a serious deterrent effect. Fines of hundreds of millions or even billions of dollars might have been required to deter improper behavior in some of the European third-generation mobile-phone license auctions. In the Netherlands sale, for example, six bidders competed for five licenses in an ascending auction in which bidders were permitted to win just one license each. One bidder, Telfort, sent a letter to another, Versatel, threatening legal action for damages if Versatel continued to bid! Telfort claimed that Versatel “believes that its bids will always be surpassed by [others’ . . . so it] must be that Versatel is attempting to either raise its competitors’ costs or to get access to their . . . networks.” Many observers felt Telfort’s threats against Versatel were outrageous. However, the government took no action—not even an investigation. As a result, Versatel quit the auction, and the sale raised less than 30 percent of what the Dutch government had forecast based on the results of the United Kingdom’s similar auction just three months earlier.

Ascending auctions are particularly vulnerable to rule breaking by the bidders,

since they necessarily pass through a stage where there is just one or a few excess bidders, and the ascending structure allows a cheat time to assess the success of its strategy (Klemperer, 2001b, 2002). Sealed-bid auctions, by contrast, may be more vulnerable to rule changing by the auctioneer. For example, excuses for not accepting a winning bid can often be found if losing bidders are willing to bid higher. The famous RJR-Nabisco sale went through several supposedly final sealed-bid auctions (Burrough and Helyar, 1990). But if, after a sealed-bid auction, the auctioneer can reopen the auction to higher offers, the auction is really an ascending-bid auction and needs to be recognized as such. In fact, genuine sealed-bid auctions may be difficult to run in takeover battles, especially since a director who turns down a higher bid for his company after running a “sealed-bid auction” may be vulnerable to shareholder lawsuits.

Sealed-bid auctions can also be especially hard to commit to if the auctioneer has any association with a bidder, as, for example, would have been the case in the U.K. football television rights auction discussed earlier if B SkyB (a bidder) had taken over Manchester United (an influential member of the football league, which was the auctioneer).

Committing to future behavior may be a particular problem for governments. For example, it may be difficult to auction a license if the regulatory regime may change, but binding future governments (or even the current government) to a particular regulatory regime may prove difficult.

The credibility of reserve prices is of special importance. If a reserve price is not a genuine commitment not to sell an object if it does not reach its reserve, then it has no meaning, and bidders will treat it as such. For example, returning to the Turkish tale of woe, the government is now considering new arrangements to sell the second license, but at what cost to the credibility of its future auctions?⁴

Market Structure

In some auctions, for example, of mobile-phone licenses, the structure of the industry that will be created cannot be ignored by the auction designer. It is tempting simply to “let the market decide” the industry structure by auctioning many small packages of spectrum, which individual firms can aggregate into larger licenses. But the outcome of an auction is driven by bidders’ profits, not by the welfare of consumers or society as a whole.

The most obvious possible distortion is that since firms’ joint profits in a market are generally greater if fewer competitors are in the market, it is worth more to any group of firms to prevent entry of an additional firm than the additional firm is willing to pay to enter. As a result, too few firms may win a share of spectrum, and these winners may each win too much, in just the same way as a “hands-off” policy

⁴ Reauctioning with a lower reserve price after a delay may sometimes be sensible, to allow further entry if there are high costs of entering the auction (Burguet and Sakovics, 1996; McAfee and McMillan, 1988), but in this case the auctioneer should make clear in advance what will happen if the reserve is not met.

to merger control will tend to create an overly concentrated industry. The Turkish fiasco discussed earlier was a spectacular example of how an auction can be biased toward generating a monopoly.⁵

But this outcome is not the only socially suboptimal possibility. A firm with a large demand may prefer to reduce its demand to end the auction at a low price, rather than raise the price to drive out its rivals, even when the latter course would be socially more efficient (Ausubel and Cramton, 1998). There can also be too many winners if firms collude to divide the spoils at a low price. In the Austrian third-generation mobile spectrum sale, for example, six firms competed for twelve identical lots in an ascending auction and, not surprisingly, seemed to agree to divide the market so each firm won two lots each at not much more than the very low reserve price. Perhaps six winners was the efficient outcome. But we certainly cannot tell from the behavior in the auction. It was rumored that the bidding lasted only long enough to create some public perception of genuine competition and to reduce the risk of the government changing the rules.

Thus, it may sometimes be wiser to predetermine the number of winners by auctioning off fewer larger licenses, but limiting bidders to one license apiece, rather than to auction many licenses and to allow bidders to buy as many as they wish.

When is Auction Design Less Important?

The fact that collusion, entry deterrence and, more generally, buyer market power is the key to auction problems suggests that auction design may not matter very much when there is a large number of potential bidders for whom entry to the auction is easy. For example, though much ink has been spilt on the subject of government security sales, auction design may not matter much for either price or efficiency in this case. Indeed, the U.S. Treasury's recent experiments with different kinds of auctions yielded inconclusive results (Simon, 1994; Malvey, Archibald and Flynn, 1996; Nyborg and Sundaresan, 1996; Reinhart and Belzar, 1996; Ausubel and Cramton, 1998), and the broader empirical literature is also inconclusive. Of course, even small differences in auction performance can be significant when such large amounts of money are involved, and collusion has been an issue in some government security sales, so further research is still warranted.⁶

Solutions

Making the Ascending Auction More Robust

Much of our discussion has emphasized the vulnerability of ascending auctions to collusion and predatory behavior. However, ascending auctions have several

⁵ Similarly, the recent July 2001 Greek second-generation spectrum auction led to a more concentrated telecom market than seems likely to be socially efficient.

⁶ These views are personal. I have advised U.K. government agencies on the related issue of the sale of gold. See Klemperer (1999b) for more discussion.

virtues, as well. An ascending auction is particularly likely to allocate the prizes to the bidders who value them the most, since a bidder with a higher value always has the opportunity to rebid to top a lower-value bidder who may initially have bid more aggressively.⁷ Moreover, if there are complementarities between the objects for sale, a multiunit ascending auction makes it more likely that bidders will win efficient bundles than in a pure sealed-bid auction in which they can learn nothing about their opponents' intentions. Allowing bidders to learn about others' valuations during the auction can also make the bidders more comfortable with their own assessments and less cautious, and it often raises the auctioneer's revenues if information is "affiliated" in the sense of Milgrom and Weber (1982).

A number of methods to make the ascending auction more robust are clear enough. For example, bidders can be forced to bid "round" numbers, the exact increments can be prespecified, and bids can be made anonymous. These steps make it harder to use bids to signal other buyers. Lots can be aggregated into larger packages to make it harder for bidders to divide the spoils, and keeping secret the number of bidders remaining in the auction also makes collusion harder (Cramton and Schwartz, 2000; Salant, 2000). Ausubel's (1998) suggested modification of the ascending auction mitigates the incentive of bidders to reduce their demands to end the auction quickly at a low price. Sometimes it is possible to pay bidders to enter an auction; for example, "white knights" can be offered options to enter a takeover battle against an advantaged bidder.

But while these measures can be useful, they do not eliminate the risks of collusion or of too few bidders. An alternative is to choose a different type of auction.

Using Sealed-Bid Auctions

In a standard sealed-bid auction (or "first-price" sealed-bid auction), each bidder simultaneously makes a single "best and final" offer. As a result, firms are unable to retaliate against bidders who fail to cooperate with them, so collusion is much harder than in an ascending auction. Tacit collusion is particularly difficult since firms are unable to use the bidding to signal. True, both signaling and retaliation are possible in a series of sealed-bid auctions, but collusion is still usually harder than in a series of ascending auctions.

From the perspective of encouraging more entry, the merit of a sealed-bid auction is that the outcome is much less certain than in an ascending auction. An

⁷ This applies in many "common values" and "private values" settings (Maskin, 1992), but is not necessarily the same as maximizing efficiency. When bidders are firms, it ignores consumer welfare (which is likely to favor a more widely dispersed ownership than firms would choose), and, of course, it ignores government revenue. We assume governments (as well as other auctioneers) care about revenue because of the substantial deadweight losses (perhaps 33 cents per dollar raised) of raising government funds through alternative methods (Ballard, Shoven and Whalley, 1985). Resale is not a perfect substitute for an efficient initial allocation, because even costless resale cannot usually ensure an efficient outcome in the presence of incomplete information (Myerson and Satterthwaite, 1983; Cramton, Gibbons and Klemperer, 1987).

advantaged bidder will probably win a sealed-bid auction, but it must make its single final offer in the face of uncertainty about its rivals' bids, and because it wants to get a bargain, its sealed-bid will not be the maximum it could be pushed to in an ascending auction. So "weaker" bidders have at least some chance of victory, even when they would surely lose an ascending auction (Vickrey, 1961, appendix III). It follows that potential entrants are likely to be more willing to enter a sealed-bid auction than an ascending auction.

A sealed-bid auction might even encourage bidders who enter only to resell, further increasing the competitiveness of the auction. Such bidders seem less likely to enter an ascending auction, since it is generally more difficult to profit from reselling to firms one has beaten in an ascending auction.

Because sealed-bid auctions are more attractive to entrants, they may also discourage consortia from forming. If the strong firms form a consortium, they may simply attract other firms into the bidding in the hope of beating the consortium. So strong firms are more likely to bid independently in a sealed-bid auction, making this auction much more competitive.

Consistent with all this, there is some evidence from timber sales that sealed-bid auctions attract more bidders than ascending auctions do and that this makes sealed-bid auctions considerably more profitable for the seller, and this seems to be believed in this industry (Mead and Schneipp, 1989; Rothkopf and Engelbrecht-Wiggans, 1993), even though conditional on the number of bidders, sealed-bid auctions seem only slightly more profitable than ascending auctions (Hansen, 1986).

Furthermore, in the "common values" case that bidders have similar actual values for a prize, the "winner's curse" problem for a weaker bidder is far less severe in a sealed-bid auction. Winning an ascending auction means the weaker bidder is paying a price that the stronger rival is unwilling to match—which should make the weaker bidder very nervous. But the weaker player has a chance of winning a sealed-bid auction at a price the stronger rival *would* be willing to match, but didn't. Since beating the stronger player isn't necessarily bad news in a sealed-bid auction, the weaker player can bid more aggressively. So auction prices will be higher, even for a given number of bidders (Klemperer, 1998; Bulow, Huang and Klemperer, 1999).⁸

But while sealed-bid auctions have many advantages, they are not without flaws. Mainly, by giving some chance of victory to weaker bidders, sealed-bid auctions are less likely than ascending auctions to lead to efficient outcomes. Moreover, in standard sealed-bid auctions in which winners pay their own bids, bidders need to have good information about the distribution of their rivals' values to bid intelligently (Persico, 2000). By contrast, in an ascending or uniform-price auction the

⁸ In Milgrom and Weber's (1982) model, sealed-bid auctions are less profitable than ascending auctions if signals are "affiliated." But they assume symmetric bidders, and the effect does not seem large in practice (Riley and Li, 1997). Sealed-bid auctions are generally more profitable if bidders are risk averse or budget constrained (Klemperer, 2000a).

best strategy of a bidder who knows its own value is just to bid up to that value, and winners' payments are determined by the bids of nonwinners. So "pay-your-bid" sealed-bid auctions may discourage potential bidders who have only small amounts to trade and for whom the costs of obtaining market information might not be worth paying. For example, in March 2001, the U.K. electricity regulator replaced the problematic uniform-price auction we described earlier by an exchange market followed by a "pay-your-bid" sealed-bid auction, which makes collusion harder, because bids can no longer be used as costless threats. But a major concern is that the new trading arrangements may deter potential entrants from investing the sunk costs necessary to enter the electricity market.⁹

However, the entry problem in many-unit auctions is much less serious if small bidders can buy from larger intermediaries who can aggregate smaller bidders' demands and bid in their place, as, for example, occurs in auctions of Treasury bills. And the entry problem is also alleviated if smaller bidders are permitted to make "noncompetitive bids," that is, to state demands for fixed quantities for which they pay the average winning price, as is also the case in some Treasury bill auctions.

The Anglo-Dutch Auction

A solution to the dilemma of choosing between the ascending (often called "English") and sealed-bid (or "Dutch") forms is to combine the two into a hybrid, the "Anglo-Dutch," which often captures the best features of both and was first described and proposed in Klemperer (1998).

For simplicity, assume a single object is to be auctioned. In an Anglo-Dutch auction, the auctioneer begins by running an ascending auction in which price is raised continuously until all but two bidders have dropped out. The two remaining bidders are then each required to make a final sealed-bid offer that is not lower than the current asking price, and the winner pays the winning bid. The process is much like the way houses are often sold, although, unlike in many house sales, the procedure the auctioneer will follow in an Anglo-Dutch auction is clearly specified in advance.

Another auction with similar features—and probably similar motivations to the Anglo-Dutch—is W.R. Hambrecht's *OpenBook* auction for corporate bonds. The early bidding is public and ascending, but bidders can make final sealed bids in the last hour. Although all bidders are permitted to make final bids, higher bidders in the first stages are given an advantage that is evidently large enough to induce serious bidding early on (Hall, 2001, p. 71).

The process also has some similarity to auctions on eBay (by far the world's most successful e-commerce auctioneer), which are ascending auctions, but with a fixed ending time so that many bidders often bid only in the last few seconds in essentially sealed-bid style. eBay attracts far more bidders than its rival, Yahoo, which runs a

⁹ Also, the new arrangements may not fully resolve the collusion problem anyway since the market is so frequently repeated (Klemperer, 1999b).

standard ascending auction with a traditional “going, going, gone” procedure that does not close the auction until there have been no bids for 10 minutes.

The main value of the Anglo-Dutch procedure arises when one bidder (for example, the incumbent operator of a license that is to be reaucted) is thought to be stronger than potential rivals. Potential rivals might be unwilling to enter a pure ascending-bid auction against the strong bidder, who would be perceived to be a sure winner. But the sealed bid at the final stage induces some uncertainty about which of the two finalists will win, and entrants are attracted by the knowledge that they have a chance to make it to this final stage. So the price may easily be higher even by the end of the first ascending stage of the Anglo-Dutch auction than if a pure ascending auction were used.

The Anglo-Dutch should capture the other advantages of the sealed-bid auction discussed in the previous section. Collusion will be discouraged because the final sealed-bid round allows firms to renege on any deals without fear of retaliation and because the Anglo-Dutch auction eliminates the stage of the ascending auction when just one excess bidder remains, at which point the rules against collusion and predation may not be credible.

Consortium formation will also be discouraged. Imagine there are two strong bidders for an item. In an ascending auction they are unlikely to be challenged if they form a consortium, so they have an incentive to do so. But in an Anglo-Dutch auction, forming the consortium would open up an opportunity for new entrants who would now have a chance to make it to the final sealed-bid stage. So the strong firms are much less likely to bid jointly.

But the Anglo-Dutch should also capture much of the benefit of an ascending auction. It will be more likely to sell to the highest valuer than a pure sealed-bid auction, both because it directly reduces the numbers allowed into the sealed-bid stage and also because the two finalists can learn something about each other's and the remaining bidders' perceptions of the object's value from behavior during the ascending stage.

When the Anglo-Dutch auction is extended to contexts in which individual bidders are permitted to win multiple units and there are complementarities between the objects, the ascending stage makes it more likely that bidders will win efficient bundles than in a pure sealed-bid auction.

Finally, I conjecture that the ascending stages of the Anglo-Dutch auction may extract most of the information that would be revealed by a pure ascending auction, raising revenues if bidders' information is “affiliated,” while the sealed-bid stage may do almost as well as a pure sealed-bid auction in capturing extra revenues due to the effects of bidders' risk aversion, budget constraints and asymmetries. This suggests the Anglo-Dutch auction may outperform ascending and sealed-bid auctions even if it attracts no additional bidders.

In short, the Anglo-Dutch auction often combines the best of both the ascending and the sealed-bid worlds.

Antitrust

Effective antitrust is critical to fighting collusion and predation in auctions. But antitrust enforcement in the context of auctions seems much lighter than in “ordinary” economic markets.

The U.S. Department of Justice has pursued some auction signaling cases, but the legal status of many of the kinds of behavior discussed in this article remains ambiguous, and collusion in takeover battles for companies is legal in the United States.

European antitrust has been even weaker, as evidenced by T-Mobile’s willingness to confirm explicitly the signaling behavior described earlier. True, when apparently similar behavior was observed in the more recent German third-generation spectrum auction, firms refused to confirm officially that they were signaling to rivals to end the auction. Even so, the *Financial Times* reported that “[o]ne operator has privately admitted to altering the last digit of its bid in a semi-serious attempt to signal to other participants that it was willing to accept [fewer lots to end the auction]” (Roberts and Ward, 2000, p. 21). This kind of signaling behavior could perhaps be challenged as an abuse of “joint dominance” under European law. But European regulators have showed no interest in pursuing such matters.

Firms are also permitted to make explicit statements about auctions that would surely be unacceptable if made about a “normal” economic market. For example, before the Austrian third-generation spectrum auction, Telekom Austria, the largest incumbent and presumably the strongest among the six bidders, said it “would be satisfied with just two of the 12 blocks of frequency on offer” and “if the [5 other bidders] behaved similarly it should be possible to get the frequencies on sensible terms,” but “it would bid for a third frequency block if one of its rivals did” (Crossland, 2000). It seems inconceivable that a dominant firm in a “normal” market would be allowed to make the equivalent offer and threat that it “would be satisfied with a market share of just one-sixth” and “if the other five firms also stick to one-sixth of the market each, it should be possible to sell at high prices,” but “it would compete aggressively for a larger share, if any of its rivals aimed for more than one-sixth.”¹⁰

Just as damaging has been the European authorities’ acceptance of joint-bidding agreements that are, in effect, open collusion. Combinations that are arranged very close to the auction date (as in the example of Switzerland discussed earlier) should be particularly discouraged since they give no time for entrants to emerge to threaten the new coalition. One view is that auction participants should

¹⁰ Similarly, during the German third-generation spectrum auction, MobilCom told a newspaper that “should [Debitel] fail to secure a license [it could] become a ‘virtual network operator’ using MobilCom’s network while saving on the cost of the license” (Benoit, 2000, p. 28). This translates roughly to a firm in a “normal” market saying it “would supply a rival should it choose to exit the market,” but MobilCom’s remarks went unpunished.

generally be restricted to entities that exist when the auction is first announced, although exceptions would clearly be necessary.

The antitrust agencies' response to predation in auction markets has also been feeble. Dominant bidders such as Glaxo and Pacific Telephone in the examples above are apparently allowed to make open threats that they will punish new entrants. For example, Glaxo's letting it be known that it "would almost certainly top a rival bid," would roughly translate to an incumbent firm in a "normal" economic market saying it "would almost certainly undercut any new entrant's price."¹¹

Regulators should take such threats seriously and treat auction markets more like "ordinary" economic markets.

Tailoring Auction Design to the Context

Good auction design is *not* "one size fits all." It must be sensitive to the details of the context. A good example of this lesson—and of our other principles—is afforded by the recent European third-generation (UMTS) mobile-phone license auctions.

The United Kingdom, which ran the first of these auctions, originally planned to sell just *four* licenses.¹² In this case, the presence of exactly four incumbent operators who had the advantages of existing brand names and networks suggested that an ascending auction might deter new firms from bidding strongly in the auction or even from entering at all. So the government planned an Anglo-Dutch auction. An ascending stage would have continued until just five bidders remained, after which the five survivors would have made sealed bids, required to be no lower than the current price level, for the four licenses.¹³ The design performed extremely well in laboratory experiments in both efficiency and revenue generation.

But when it became possible to sell *five* licenses, an ascending auction made more sense. Because no bidder was permitted to win more than one license, at least one license had to be sold to a new entrant. This would be a sufficient carrot to

¹¹ Similarly, Pacific Telephone's remark that "if somebody takes California away from us, they'll never make any money" seems to correspond to threatening that "if anyone tries to compete with us, we'll cut the price until they lose money." Further, Pacific Telephone's hiring of an auction theorist to explain the winner's curse to competitors might correspond to hiring an industrial economist to explain the theory of the difficulties of entering new markets to potential entrants.

¹² I was the principal auction theorist advising the U.K. government's Radiocommunications Agency, which designed and ran the recent U.K. mobile-phone license auction. Ken Binmore had a leading role and supervised experiments testing the proposed designs. Other academic advisors included Tilman Borgers, Jeremy Bulow, Philippe Jehiel and Joe Swierzbinski.

¹³ It was proposed that all four winners would pay the fourth-highest sealed bid. Since the licenses were not quite identical, a final simultaneous ascending stage would have followed to allocate them more efficiently among the winners. The sealed-bid stage could be run using an ascending mechanism that would hide the actual bids even from the auctioneer, if this would reduce political problems. See Klemperer (1998, 2001b, 2002), Radiocommunications Agency (1998a, b) and Binmore and Klemperer (2002) for more details.

attract several new entrants in the U.K. context in which it was very unclear which new entrant(s) might be successful.¹⁴ Because licenses could not be divided, bidders could not collude to divide the market without resort to side payments. As a result, the problems of collusion and entry deterrence were minimal, and a version of an ascending auction was therefore used for efficiency reasons. The auction was widely judged a success; nine new entrants bid strongly against the incumbents, creating intense competition and record-breaking revenues of 22.5 billion pounds.

The Netherlands' sale came next. Their key blunder was to follow the actual British design when they had an equal number (five) of incumbents and licenses. It was not hard to predict (indeed, prior to the auction, an early draft of this paper, quoted in the Dutch press and Maasland, 2000, *did* predict) that very few entrants would show up. Netherlands antitrust policy was as dysfunctional as the auction design, allowing the strongest potential entrants to make deals with incumbent operators. In the end, just one weak new entrant (Versatel) competed with the incumbents. As we have already discussed, with just one excess bidder in an ascending auction, it was unsurprising when the weak bidder quit early amid allegations of predation, at less than 30 percent of the per capita U.K. prices. Six months later, the Dutch parliament began an investigation into the auction process.

A version of the Anglo-Dutch design would probably have worked better in the Netherlands context. There are reasons to believe Versatel would have bid higher in the sealed-bid stage than the price at which it quit the ascending auction. In addition, the fear of this would have made the incumbents bid higher. Furthermore, the "hope and dream" that a sealed-bid stage gives weaker bidders might have attracted more bidders and discouraged the formation of the joint-bidding consortia.

The Italian government thought it had learned from the Netherlands fiasco. It also chose roughly the U.K. design, but stipulated that if there were no more "serious" bidders (as defined by prequalification conditions) than licenses, then the number of licenses could, and probably would, be reduced. At first glance, this seemed a clever way to avoid an uncompetitive auction, but (as I and others argued) the approach was fundamentally flawed. First, it is putting the cart before the horse to create an unnecessarily concentrated mobile-phone market to make an auction look good. Second, our earlier discussion demonstrates that a rule that allows the possibility that there will be just one more bidder than license does *not* guarantee a competitive ascending auction! Also, it was clear that the number of likely entrants into an ascending auction was much smaller than it had been for the United Kingdom, in large part because weaker potential entrants had figured out

¹⁴ In large part, this was because the United Kingdom ran the first third-generation auction. Going to market first was a deliberate strategy of the auction team, and the sustained marketing campaign was also important. The U.K. auction attracted 13 bidders who then learnt about others' strengths, and none of the eight subsequent auctions had more than seven bidders.

from the earlier auctions that they were weaker and that they therefore had little chance of winning such an auction. In the event, just six bidders competed for five licenses, and the auction ended amid allegations of collusion after less than two days of bidding with per capita revenues below 40 percent of the U.K. level, about half the amount the government was expecting. Again, an Anglo-Dutch or pure sealed-bid design would probably have performed better.

Klemperer (2001b, 2002) discusses the 2000–2001 European spectrum auctions in much more detail.

Conclusion

Much of what we have said about auction design is no more than an application of standard antitrust theory. The key issues in both fields are collusion and entry. The signaling and punishment strategies that support collusion in auctions are familiar from “ordinary” industrial markets, as are firms’ verbal encouragement to collude and the predatory threats they make. Our point that even modest bidding costs may be a serious deterrent to potential bidders is analogous to the industrial-organization point that the contestability of a market is nonrobust to even small sunk costs of entry. We also argued that because an ascending auction is more likely than a sealed-bid auction to be won by the strongest firm, the ascending auction may therefore be less attractive to bidders and may therefore be less profitable than a sealed-bid auction; this is just an example of the standard industrial organization argument that a market that is in principle more competitive (for example, “Bertrand” rather than “Cournot”) is less attractive to enter and so may in fact be less competitive. A particular feature of auction markets is that “winner’s curse” effects may mean that sealed-bid and Anglo-Dutch auctions not only attract more firms than ascending auctions, but may also lead to better outcomes for the auctioneer for a given number of firms. But there is no justification for the current feebleness of antitrust policy in auction markets: regulators should treat them much more like “ordinary” economic markets.

However, none of our examples of auction failures should be taken as an argument against auctions in general. Most auctions work extremely well. Occasionally—for example, when there are too few potential bidders or large costs of supplying necessary information to bidders—a form of structured negotiations may be better, but an auction is usually more attractive to potential buyers, who are crucial to a sale’s success (Bulow and Klemperer, 1996). Even relatively unsuccessful auctions, such as the Netherlands and Italian spectrum auctions, were probably more successful than the “beauty contest” administrative hearings used to allocate third-generation spectrum in several other European countries. For example, the Spanish beauty contest yielded just 13 euros per head of population, but generated considerable political and legal controversy and a widespread perception that the outcome was both unfair and inefficient, all problems that are typical of such procedures (Binmore and Klemperer, 2002; Klemperer, 2000b). The difficulties

with the French beauty contest mean that France has not only missed its government's originally planned date for allocation of the spectrum (already by a year at the time of writing), but also missed European Union deadlines.

In conclusion, the most important features of an auction are its robustness against collusion and its attractiveness to potential bidders. Failure to attend to these issues can lead to disaster. Furthermore, anyone setting up an auction would be foolish to follow past successful designs blindly; auction design is *not* "one size fits all." While the sealed-bid auction performs well in some contexts, and the Anglo-Dutch auction is ideal in other contexts, the ascending auction has also frequently been used very successfully. In the practical design of auctions, local circumstances matter, and the devil is in the details.

■ *I was the principal auction theorist advising the U.K. government's Radiocommunications Agency, which designed and ran the recent U.K. mobile-phone license auction described here, and have advised several other U.K. government agencies, but the views expressed in this paper are mine alone. Although some observers thought some of the behavior described above warranted investigation, I do not intend to suggest that any of it violates any applicable rules or laws. I am very grateful to many colleagues, including Sushil Bikhchandani, Nils-Henrik von der Fehr, Tim Harford, Emiel Maasland, Margaret Meyer, Mike Rothkopf, David Salant, Rebecca Stone, Timothy Taylor, Chuck Thomas, Tommaso Valletti, Michael Waldman, Mark Williams and especially my coauthors Jeremy Bulow and Marco Pagnozzi, for helpful advice.*

References

- Ausubel, Lawrence M.** 1998. "An Efficient Ascending-Bid Auction for Multiple Objects." Mimeo, University of Maryland.
- Ausubel, Lawrence M. and Peter Cramton.** 1998. "Demand Reduction and Inefficiency in Multi-Unit Auctions." Mimeo, University of Maryland.
- Ausubel, Lawrence M., Peter Cramton, Preston McAfee and John McMillan.** 1997. "Synergies in Wireless Telephony: Evidence from the Broadband PCS Auction." *Journal of Economics and Management Strategy*. Fall, 6:3, pp. 497–527.
- Back, Kerry and Jaime F. Zender.** 1993. "Auctions of Divisible Goods." *Review of Financial Studies*. Winter, 6:4, pp. 733–64.
- Back, Kerry and Jaime F. Zender.** 1999. "Auctions of Divisible Goods with Endogenous Supply." Working Paper, Washington University in St. Louis and University of Arizona.
- Ballard, Charles L., John B. Shoven and John Whalley.** 1985. "General Equilibrium Computations of the Marginal Welfare Costs of Taxes in the United States." *American Economic Review*. March, 75:1, pp. 128–38.
- Benoit, Bertrand.** 2000. "Bidders Warned in German 3G Phone Auction." *Financial Times*. August 2, p. 28.
- Betton, Sandra and Espen B. Eckbo.** 2000. "Toeholds, Bid Jumps, and Expected Payoffs in Takeovers." *Review of Financial Studies*. Winter, 13:4, pp. 841–82.
- Bikhchandani, Sushil.** 1988. "Reputation in Repeated Second-Price Auctions." *Journal of Economic Theory*. October, 46:1, pp. 97–119.
- Binmore, Ken and Paul D. Klemperer.** 2002. "The Biggest Auction Ever: The Sale of the British 3G Telecom Licences." *Economic Journal*. Forthcoming.

- Bulow, Jeremy I. and Paul D. Klemperer.** 1996. "Auctions versus Negotiations." *American Economic Review*. March, 86:1, pp. 180–94
- Bulow, Jeremy I. and Paul D. Klemperer.** 2002. "Prices and the Winner's Curse." *Rand Journal of Economics*. Forthcoming.
- Bulow, Jeremy I., Ming Huang and Paul D. Klemperer.** 1999. "Toeholds and Takeovers." *Journal of Political Economy*. June, 107:3, pp. 427–54.
- Burguet, Roberto and Jozsef Sakovics.** 1996. "Reserve Prices Without Commitment." *Games and Economic Behavior*. August, 15:2, pp. 149–64.
- Burrough, Brian and John Helyar.** 1990. *Barbarians at the Gate: The Fall of RJR Nabisco*. London: Arrow.
- Cauley, Leslie and Mary Lu Carnevale.** 1994. "Wireless Giants, Some Surprise Players to Seek New Generation of Licenses." *Wall Street Journal*. October 31, p. A4.
- Coase, Ronald H.** 1959. "The Federal Communications Commission." *Journal of Law and Economics*. October, 2, pp. 1–40.
- Cramton, Peter and Jessie A. Schwartz.** 1999. "Collusive Bidding in the FCC Spectrum Auctions." Working Paper, University of Maryland.
- Cramton, Peter and Jesse A. Schwartz.** 2000. "Collusive Bidding: Lessons from the FCC Spectrum Auctions." *Journal of Regulatory Economics*. May, 17:3, pp. 229–52.
- Cramton, Peter, Robert Gibbons and Paul D. Klemperer.** 1987. "Dissolving a Partnership Efficiently." *Econometrica*. 55:3, pp. 615–32.
- Crossland, David.** 2000. "Austrian UMTS Auction Unlikely to Scale Peaks." *Reuters*. October 31. Available at <http://www.totaltele.com>.
- Fehr, Nils-Henrik von der and David Harbord.** 1998. "Competition in Electricity Spot Markets: Economic Theory and International Experience." Memorandum No. 5/1998, Department of Economics, University of Oslo.
- Grimm, Veronika, Frank Riedel and Elmar Wolfstetter.** 2001. "Low Price Equilibrium in Multi-Unit Auctions: The GSM Spectrum Auction in Germany." Working Paper, Humboldt Universitat zu Berlin.
- Hall, Robert E.** 2001. *Digital Dealing*. New York: W. W. Norton.
- Hansen, Robert G.** 1986. "Sealed-Bid versus Open Auctions: The Evidence." *Economic Inquiry*. January, 24:1, pp. 125–42.
- Jehiel, Phillipe and Benny Moldovanu.** 2001. "The UMTS/IMT-2000 License Auctions." Working Paper, University College London and University of Mannheim.
- Klemperer, Paul D.** 1998. "Auctions With Almost Common Values: The 'Wallet Game' and its Applications." *European Economic Review*. May, 42:3-5, pp. 757–69.
- Klemperer, Paul D.** 1999a. "Auction Theory: A Guide to the Literature." *Journal of Economic Surveys*. 13:3, pp. 227–86. Also reprinted in *The Current State of Economic Science, Volume 2*. 1999. Shri Bhagwan Dahiya, ed. Rohtak, India: Spellbound, pp. 711–66.
- Klemperer, Paul D.** 1999b. "Applying Auction Theory to Economics." Oxford Department of Economics Discussion Paper, April.
- Klemperer, Paul D.** ed. 2000a. *The Economic Theory of Auctions*. Cheltenham, U.K.: Edward Elgar.
- Klemperer, Paul D.** 2000b. "Spectrum on the Block." *Wall Street Journal (Asia)*. May 10, p. 8. Also at <http://www.paulklemperer.org>.
- Klemperer, Paul D.** 2001a. "Why Every Economist Should Learn Some Auction Theory." Forthcoming in *Advances in Economics and Econometrics: Invited Lectures to Eighth World Congress of the Econometric Society*. M. Dewatripont, L. Hansen and S. Turnovsky, eds. Cambridge, U.K.: Cambridge University Press. Also at <http://www.paulklemperer.org>.
- Klemperer, Paul D.** 2001b. "What Really Matters in Auction Design." Working Paper version, Nuffield College, Oxford University Discussion Paper. Also at <http://www.paulklemperer.org>.
- Klemperer, Paul D.** 2002. "How (Not) to Run Auctions: The European 3G Telecom Auctions." *European Economic Review*. Forthcoming. Also at <http://www.paulklemperer.org>.
- Klemperer, Paul D. and Margaret A. Meyer.** 1989. "Supply Function Equilibria in Oligopoly Under Uncertainty." *Econometrica*. November, 57:6, pp. 1243–277.
- Klemperer, Paul D. and Marco Pagnozzi.** 2002. "Advantaged Bidders and Spectrum Prices: An Empirical Analysis." Forthcoming.
- Koselka, Rita.** 1995. "Playing Poker with Craig McCaw." *Forbes*. July 3, pp. 62–3.
- Maasland, Emiel.** 2000. "Veilingmiljarden Zijn een Fictie (Billions from Auctions: Wishful Thinking)." *Economisch Statistische Berichten*. June 9, p. 479. Translation available at <http://www.paulklemperer.org>.
- Malvey, Paul F., Christine M. Archibald and Sean T. Flynn.** 1996. "Uniform-Price Auctions: Evaluation of the Treasury Experience." Working Paper, U.S. Treasury.
- Maskin, Eric S.** 1992. "Auctions and Privatization," in *Privatization*. H. Siebert, ed. Tubingen: Mohr, pp. 115–36.
- McAfee, R. Preston and John McMillan.** 1988. "Search Mechanisms." *Journal of Economic Theory*. February, 44:1, pp. 99–123.

- McMillan, John.** 1994. "Selling Spectrum Rights." *Journal of Economic Perspectives*. Summer, 8:3, pp. 145–62.
- Mead, Walter J. and Mark Schneipp.** 1989. "Competitive Bidding for Federal Timber in Region 6, An Update: 1983–1988." Community and Organization Research Institute, University of California, Santa Barbara, Contractor Report, USDA Award No. 40-3187-8-1683, June.
- Michelson, Marcel.** 2000. "Swiss 3G Auction Set to Become Battle of Giants." *Reuters*. November 9. Available at (<http://www.totaltele.com>).
- Milgrom, Paul R. and Robert J. Weber.** 1982. "A Theory of Auctions and Competitive Bidding." *Econometrica*. September, 50:5, pp. 1089–122.
- Myerson, Roger B. and Mark A. Satterthwaite.** 1983. "Efficient Mechanisms for Bilateral Trading." *Journal of Economic Theory*. April, 29:2, pp. 265–81.
- Newbery, David M.** 1998. "Competition, Contracts, and Entry in the Electricity Spot Market." *RAND Journal of Economics*. 29:4, pp. 726–49.
- Nyborg, Kjell and Suresh Sundaresan.** 1996. "Discriminatory versus Uniform Treasury Auctions: Evidence from When-Issued Transactions." *Journal of Financial Economics*. September, 42:1, pp. 63–104.
- Office of Gas and Electricity Markets.** 1999. "The New Electricity Trading Arrangements, July." At (<http://www.open.gov.uk/offer/reta.htm>).
- Persico, Nicola.** 2000. "Information Acquisition in Auctions." *Econometrica*. 68:1, pp. 135–48.
- Power U.K.** 1999. "The Problems with the Pool." August 31, 66, p. 14.
- Radiocommunications Agency.** 1998a. "UMTS Auction Design." UMTS Auction Consultative Group Paper 14 of 1998. Available as UACG(98)14 at (<http://www.spectrumbauctions.gov.uk>).
- Radiocommunications Agency.** 1998b. "UMTS Auction Design 2." UMTS Auction Consultative Group Paper 16 of 1998. Available as UACG(98)16 at (<http://www.spectrumbauctions.gov.uk>).
- Reinhart, Vincent and Gregory Belzer.** 1996. "Some Evidence on Bid Sharing and the Use of Information in the U.S. Treasury's Auction Experiment." Working Paper, Board of Governors of the Federal Reserve System.
- Riley, John G. and Huagang Li.** 1997. "Auction Choice: A Numerical Analysis." Mimeo, University of California at Los Angeles.
- Roberts, Dan.** 2000. "Phone Numbers that Could Well Result in Panic." *Financial Times*. October 19, p. 38.
- Roberts, Dan and Andrew Ward.** 2000. "Little Gold at the End of the Spectrum." *Financial Times*. November 3, p. 21.
- Rothkopf, Michael H. and Richard Engelbrecht-Wiggans.** 1993. "Misapplications Reviews: Getting the Model Right: The Case of Competitive Bidding." *Interfaces*. May, 23:3, pp. 99–106.
- Salant, David.** 2000. "Auctions and Regulation: Reengineering of Regulatory Mechanisms." *Journal of Regulatory Economics*. May, 17:3, pp. 195–204.
- Simon, David P.** 1994. "The Treasury's Experiment with Single-Price Auctions in the Mid-1970s: Winner's or Taxpayer's Curse?" *Review of Economics and Statistics*. November, 76:4, pp. 754–60.
- Stuwe, Heinz.** 1999. "Auktion von Telefonfrequenzen: Spannung bis zur letzten Minute." *Frankfurter Allgemeine Zeitung*. October 29.
- Total Telecom.** 2000. "Italy's UMTS Auction to Start October." *Reuters*. October 12. Available at (<http://www.totaltele.com>).
- U.K. Monopolies and Mergers Commission.** 1999. *British Sky Broadcasting Group and Manchester United: A Report on the Proposed Merger*. Cm 4305. London: The Stationery Office.
- Vickrey, William.** 1961. "Counterspeculation, Auctions, and Competitive Sealed Tenders." *Journal of Finance*. 16, pp. 8–37.
- Wighton, David.** 1995a. "Wellcome Accepts Glaxo Bid and Criticises Trust." *Financial Times*. March 8, p. 27.
- Wighton, David.** 1995b. "Wellcome Still Smarting Over Handling of Trust's Stake." *Financial Times*. March 8, p. 32.
- Wolfram, Catherine D.** 1998. "Strategic Bidding in a Multiunit Auction: An Empirical Analysis of Bids to Supply Electricity in England and Wales." *RAND Journal of Economics*. 29:4, pp. 703–25.
- Wolfram, Catherine D.** 1999. "Measuring Duopoly Power in the British Electricity Spot Market." *American Economic Review*. September, 89:4, pp. 805–26.

This article has been cited by:

1. Elisabetta Iossa, Simon Loertscher, Leslie M. Marx, Patrick Rey. 2024. Coordination in the Fight against Collusion. *American Economic Journal: Microeconomics* 16:1, 224-261. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
2. Christoph P. Kiefer, Pablo del Río. 2024. Analysing the impact of renewable energy auctions on market concentration. *Renewable Energy* 221, 119664. [[Crossref](#)]
3. Olivier Bochet, Manshu Khanna, Simon Siegenthaler. 2024. Beyond Dividing the Pie: Multi-Issue Bargaining in the Laboratory. *Review of Economic Studies* 91:1, 163-191. [[Crossref](#)]
4. Yafei Li, Yifei Li, Yun Peng, Xiaoyi Fu, Jianliang Xu, Mingliang Xu. 2024. Auction-Based Crowdsourced First and Last Mile Logistics. *IEEE Transactions on Mobile Computing* 23:1, 180-193. [[Crossref](#)]
5. W. Benedikt Schmal. 2023. Vice versa: The decoupling of content and topic heterogeneity in collusion research. *Journal of Economic Surveys* 3. . [[Crossref](#)]
6. Johannes Bracher, Lotta Rüter, Fabian Krüger, Sebastian Lerch, Melanie Schienle. 2023. Direction Augmentation in the Evaluation of Armed Conflict Predictions. *International Interactions* 49:6, 989-1004. [[Crossref](#)]
7. Robert Marquez, Rajdeep Singh. 2023. Selling Assets: Are Sellers Better Off with Strong Buyers?. *Management Science* 86. . [[Crossref](#)]
8. Akshay Sreekumar, Adhithyan Sakthivelu, Lynne Kiesling. 2023. Auction Theory and Device Bidding Functions for Transactive Energy Systems: A Review. *Current Sustainable/Renewable Energy Reports* 10:3, 102-111. [[Crossref](#)]
9. Dengjun Zhang, Geir Sogn-Grundvåg. 2023. Reserve Prices and Bidder Participation in an English Auction: The Case of Atlantic Cod in Norway. *Marine Resource Economics* 38:3, 249-261. [[Crossref](#)]
10. Pedro Meirelles Villas-Bôas, José Maria Ferreira Jardim da Silveira, Fernando Rocha Villas-Bôas. 2023. Stakeholder Perspectives on Energy Auctions: A Case Study in Roraima, Brazil. *Energies* 16:14, 5359. [[Crossref](#)]
11. C.K. Woo, J. Zarnikau, C.H. Tsai, K.H. Cao, H.S. Qi, R. Li. 2023. Regional revenues of solar and wind generation in Texas. *Energy Policy* 178, 113586. [[Crossref](#)]
12. David Henriques. 2023. A combinatorial auction to sell TV broadcasting rights in league sports. *Telecommunications Policy* 47:6, 102539. [[Crossref](#)]
13. Lia Fauziah Syam, Suharno Suharno, Nunung Kusnadi. 2023. Keragaan Kelembagaan Pasar Lelang dalam Pemasaran Produk Pertanian. *Jurnal Agribisnis Indonesia* 11:1, 122-135. [[Crossref](#)]
14. Stefan Seifert, Silke Hüttel. 2023. Is there a risk of a winner's curse in farmland auctions?. *European Review of Agricultural Economics* 50:3, 1140-1177. [[Crossref](#)]
15. Khadijeh Naboureh, Ahmad Makui, Seyed Jafar Sajadi, Ehram Safari. 2023. Online Hybrid Dutch Auction with both private and common value components and counteracting overpayments. *Electronic Commerce Research and Applications* 59, 101247. [[Crossref](#)]
16. Min-Yang Lee, Chad Demarest. 2023. Groundfish quota prices. *Fisheries Research* 260, 106605. [[Crossref](#)]
17. Daniel Garrett, Andrey Ordin, James W Roberts, Juan Carlos Suárez Serrato. 2023. Tax Advantages and Imperfect Competition in Auctions for Municipal Bonds. *The Review of Economic Studies* 90:2, 815-851. [[Crossref](#)]
18. Liad Blumrosen, Eilon Solan. 2023. Selling spectrum in the presence of shared networks: The case of the Israeli 5G auction. *Telecommunications Policy* 47:2, 102481. [[Crossref](#)]

19. Peng Hao, Jun-Peng Guo, Eoghan O'Neill, Yong-Heng Shi. 2023. When Will First-Price Work Well? The Impact of Anti-Corruption Rules on Photovoltaic Power Generation Procurement Auctions. *Sustainability* **15**:4, 3441. [[Crossref](#)]
20. John L. Teall. Introduction to Securities Trading and Markets 1-34. [[Crossref](#)]
21. Anna Bolz. Peculiarities of the Art Market 23-106. [[Crossref](#)]
22. Chi-Keung Woo, Jay Zarnikau, Asher Tishler, Kang Hua Cao. 2023. Insuring a Small Retail Electric Provider's Procurement Cost Risk in Texas. *Energies* **16**:1, 393. [[Crossref](#)]
23. Antonio Rosato. 2023. Loss aversion in sequential auctions. *Theoretical Economics* **18**:2, 561-596. [[Crossref](#)]
24. Alexander L. Brown, Jinliang Liu, Michael Tsoi. 2023. Is There a Better Way to Elicit Valuations than the BDM?. *SSRN Electronic Journal* **215**. . [[Crossref](#)]
25. C.K. Woo, Kang Hua Cao, Han Steffan QI, Jay Zarnikau, Raymond Li. 2023. Short-term procurement of an optimal mix of solar and wind capacities in Texas. *SSRN Electronic Journal* **92**. . [[Crossref](#)]
26. C.K. Woo, Kang Hua Cao, Han Steffan QI, Raymond Li, Jay Zarnikau. 2023. Efficient Frontiers for Short-term Spot and Forward Solar Energy Sales in Texas. *SSRN Electronic Journal* **39**. . [[Crossref](#)]
27. Yuan Shi. 2023. Disentangling the information structure in the bankruptcy liquidation auctions. *SSRN Electronic Journal* **101**. . [[Crossref](#)]
28. Lars Holger Ehlers, Morten B. Jensen, Henrik Schack. 2022. Competitive tenders on analogue hospital pharmaceuticals in Denmark 2017–2020. *Journal of Pharmaceutical Policy and Practice* **15**:1. . [[Crossref](#)]
29. Yilun Cui, Lei Yang, Ruidong Li, Xiaohua Xu. 2022. Online Double Auction for Wireless Spectrum Allocation With General Conflict Graph. *IEEE Transactions on Vehicular Technology* **71**:11, 12222-12234. [[Crossref](#)]
30. Pablo del Río, Christoph P. Kiefer. 2022. An analytical framework to assess the influence of deployment support on market concentration in the wind energy sector. *Energy Strategy Reviews* **44**, 100965. [[Crossref](#)]
31. Olivier Mesly, Maria Petrescu, Alexandra Mesly. 2022. Terminology Matters: A Review on the Concept of Economic Predation. *Journal of Economic Issues* **56**:4, 959-987. [[Crossref](#)]
32. Julio Peña-Torres, Roberto Muñoz, Felipe Quezada. 2022. Entry Deterrence and Collusion at Repeated Multiunit Auctions of ITQs. *Marine Resource Economics* **37**:4, 437-465. [[Crossref](#)]
33. Lucas G.L. Brandão, Philipp Ehrl. 2022. The impact of transmission auctions on Brazilian electric power companies. *Utilities Policy* **78**, 101412. [[Crossref](#)]
34. Xiaoyuan Qi, Ying Han. 2022. The design of the intertemporal trading ratio of carbon quotas. *Journal of Cleaner Production* **370**, 133481. [[Crossref](#)]
35. Xueqing Li, Weifeng Liu, Junwu Zhu. 2022. Research on wireless spectrum allocation and utility evaluation of cross-domain multi-slot radio. *Computers and Electrical Engineering* **103**, 108329. [[Crossref](#)]
36. Yong-Jae Choi. 2022. Spectrum auctions in a thin market: The Korean case. *Telecommunications Policy* **46**:8, 102369. [[Crossref](#)]
37. Anselma Wörner, Verena Tiefenbeck, Felix Wortmann, Arne Meeuw, Liliane Ableitner, Elgar Fleisch, Inês Azevedo. 2022. Bidding on a Peer-to-Peer Energy Market: An Exploratory Field Study. *Information Systems Research* **33**:3, 794-808. [[Crossref](#)]
38. Xianhao Chen, Lan Zhang, Yawei Pang, Bin Lin, Yuguang Fang. 2022. Timeliness-Aware Incentive Mechanism for Vehicular Crowdsourcing in Smart Cities. *IEEE Transactions on Mobile Computing* **21**:9, 3373-3387. [[Crossref](#)]

39. Santosh Kumar Yadav, Rakesh Kumar. 2022. Scalable Profit Optimized Incentive Mechanism for Resources in Cloudlet Based Mobile Edge Computing Framework. *Wireless Personal Communications* **125**:1, 159-207. [[Crossref](#)]
40. Akram Esmaeili Avval, Farzad Dehghanian, Mohammadali Pirayesh. 2022. Auction design for the allocation of carbon emission allowances to supply chains via multi-agent-based model and Q-learning. *Computational and Applied Mathematics* **41**:4. . [[Crossref](#)]
41. Khadijeh Naboureh, Ahmad Makui, Seyed Jafar Sajadi. 2022. Online hybrid Dutch auction approach for selling toxic assets under asymmetric bidders and the possibility of collusion. *Electronic Commerce Research and Applications* **53**, 101142. [[Crossref](#)]
42. John Rolfe, Steven Schilizzi, Md Sayed Iftekhhar. 2022. Increasing environmental outcomes with conservation tenders: The participation challenge. *Conservation Letters* **15**:3. . [[Crossref](#)]
43. David Evans, Andrew Reeson. 2022. The Performance of a Repeated Discriminatory Price Auction for Ecosystem Services. *Environmental and Resource Economics* **81**:4, 787-806. [[Crossref](#)]
44. Francisco Álvarez, Pablo del Río. 2022. Is small always beautiful? Analyzing the efficiency effects of size heterogeneity in renewable electricity auctions. *Energy Economics* **106**, 105698. [[Crossref](#)]
45. Fernando Martínez-Santos, Zoraida Frias, Álvaro Escribano. 2022. What drives spectrum prices in multi-band spectrum markets? An empirical analysis of 4G and 5G auctions in Europe. *Applied Economics* **54**:5, 536-553. [[Crossref](#)]
46. Florian Hoffmann, Vladimir Vladimirov. 2022. Negotiating Compensation. *SSRN Electronic Journal* **98**. . [[Crossref](#)]
47. Sumukha Vasisht, M Pranav, D B Srinivas. A Secured Auctioning Process Using Task Auctioning Algorithm 1-5. [[Crossref](#)]
48. Natalia Fabra. 2021. The energy transition: An industrial economics perspective. *International Journal of Industrial Organization* **79**, 102734. [[Crossref](#)]
49. Mordechai E. Schwarz. 2021. Auctions with endogenous opting-out fees and recursive winning procedures from the Talmud. *International Journal of Economic Theory* **17**:4, 345-374. [[Crossref](#)]
50. Ari Hyytinen. 2021. Shared problem solving and design thinking in entrepreneurship research. *Journal of Business Venturing Insights* **16**, e00254. [[Crossref](#)]
51. Guillermo Takano. 2021. The competitive performance of public-private partnership markets. The case of unsolicited proposals in Peru. *Utilities Policy* **72**, 101274. [[Crossref](#)]
52. Tra Huong Thi Le, Nguyen H. Tran, Yan Kyaw Tun, Minh N. H. Nguyen, Shashi Raj Pandey, Zhu Han, Choong Seon Hong. 2021. An Incentive Mechanism for Federated Learning in Wireless Cellular Networks: An Auction Approach. *IEEE Transactions on Wireless Communications* **20**:8, 4874-4887. [[Crossref](#)]
53. Sven Heim, Georg Götz. 2021. Do Pay-As-Bid Auctions Favor Collusion? Evidence from Germany's market for reserve power. *Energy Policy* **155**, 112308. [[Crossref](#)]
54. Qing Chuan Ye, Jason Rhuggenaath, Yingqian Zhang, Sicco Verwer, Michiel Jurgen Hilgeman. 2021. Data driven design for online industrial auctions. *Annals of Mathematics and Artificial Intelligence* **89**:7, 675-691. [[Crossref](#)]
55. Milad Afzalan, Farrokh Jazizadeh. 2021. Quantification of Demand-Supply Balancing Capacity among Prosumers and Consumers: Community Self-Sufficiency Assessment for Energy Trading. *Energies* **14**:14, 4318. [[Crossref](#)]
56. Alexander Teytelboym, Shengwu Li, Scott Duke Kominers, Mohammad Akbarpour, Piotr Dworzak. 2021. Discovering Auctions: Contributions of Paul Milgrom and Robert Wilson*. *The Scandinavian Journal of Economics* **123**:3, 709-750. [[Crossref](#)]

57. Pacharasut Sujarittanonta, Ajalavat Viriyavipart. 2021. Deterring collusion with a reserve price: an auction experiment. *Experimental Economics* **24**:2, 536-557. [[Crossref](#)]
58. Stephanie Rosch, Sharon Raszap Skorbiansky, Collin Weigel, Kent D. Messer, Daniel Hellerstein. 2021. Barriers to Using Economic Experiments in Evidence-Based Agricultural Policymaking. *Applied Economic Perspectives and Policy* **43**:2, 531-555. [[Crossref](#)]
59. Logan Robert Bingham, Riccardo Da Re, José G. Borges. 2021. Ecosystem Services Auctions: The Last Decade of Research. *Forests* **12**:5, 578. [[Crossref](#)]
60. Geir Sogn-Grundvåg, Dengjun Zhang, Bent Dreyer. 2021. Competition in a fish auction: The case of Atlantic cod in Northern Norway. *Fisheries Research* **235**, 105826. [[Crossref](#)]
61. Leandro Arozamena, Andres Fioriti, Federico Weinschelbaum. 2021. From auction theory to market design: Paul Milgrom and Robert Wilson's contributions to Economics. *Estudios económicos* **38**:76, 279-296. [[Crossref](#)]
62. James Shortle, Markku Ollikainen, Antti Iho. Water Quality Auctions 319-345. [[Crossref](#)]
63. Zhuoming Zhu, Shengling Wang, Rongfang Bie, Xiuzhen Cheng. AERM: An Attribute-Aware Economic Robust Spectrum Auction Mechanism 142-153. [[Crossref](#)]
64. Choong Seon Hong, Latif U. Khan, Mingzhe Chen, Dawei Chen, Walid Saad, Zhu Han. Incentive Mechanisms for Federated Learning 71-128. [[Crossref](#)]
65. Huw Dixon. Paul David Klempner (1956-) 711-733. [[Crossref](#)]
66. Robert S. Marquez. 2021. Selling assets: Are sellers better off with strong buyers?. *SSRN Electronic Journal* **90**. . [[Crossref](#)]
67. Michelle Connolly, Jackie Xiao, Renhao Tan, Zhao Ting Lim. 2021. Within- and Cross-Auction Geographic License Complementarities in FCC Spectrum Auctions. *SSRN Electronic Journal* **104**. . [[Crossref](#)]
68. Nikhil Agarwal, Eric Budish. Market design 1-79. [[Crossref](#)]
69. Leah H. Palm-Forster, Kent D. Messer. Experimental and behavioral economics to inform agri-environmental programs and policies 4331-4406. [[Crossref](#)]
70. David J. Freeman, Erik O. Kimbrough, J. Philipp Reiss. 2020. Opportunity cost, inattention and the bidder's curse. *European Economic Review* **129**, 103543. [[Crossref](#)]
71. David Barrus, Frank Scott. 2020. Single Bidders and Tacit Collusion in Highway Procurement Auctions. *The Journal of Industrial Economics* **68**:3, 483-522. [[Crossref](#)]
72. Philippe Jehiel, Laurent Lamy. 2020. On the Benefits of Set-Asides. *Journal of the European Economic Association* **18**:4, 1655-1696. [[Crossref](#)]
73. Karim L. Anaya, Michael G. Pollitt. 2020. Reactive power procurement: A review of current trends. *Applied Energy* **270**, 114939. [[Crossref](#)]
74. Ulrike Malmendier, Adam Szeidl. 2020. Fishing for fools. *Games and Economic Behavior* **122**, 105-129. [[Crossref](#)]
75. Jeroen Hinloopen, Sander Onderstal, Leonard Treuren. 2020. Cartel stability in experimental first-price sealed-bid and English auctions. *International Journal of Industrial Organization* **71**, 102642. [[Crossref](#)]
76. Tomoya Kazumura, Debasis Mishra, Shigehiro Serizawa. 2020. Strategy-proof multi-object mechanism design: Ex-post revenue maximization with non-quasilinear preferences. *Journal of Economic Theory* **188**, 105036. [[Crossref](#)]
77. De Liu, Adib Bagh. 2020. Preserving Bidder Privacy in Assignment Auctions: Design and Measurement. *Management Science* **66**:7, 3162-3182. [[Crossref](#)]

78. Visa Pitkänen, Signe Jauhiainen, Ismo Linnosmaa. 2020. Low risk, high reward? Repeated competitive biddings with multiple winners in health care. *The European Journal of Health Economics* 21:4, 483-500. [[Crossref](#)]
79. Joyce Delnoij, Kris De Jaegher. 2020. Competing first-price and second-price auctions. *Economic Theory* 69:1, 183-216. [[Crossref](#)]
80. Alireza Akbari-Dibavar, Behnam Mohammadi-Ivatloo, Kazem Zare. Electricity Market Pricing: Uniform Pricing vs. Pay-as-Bid Pricing 19-35. [[Crossref](#)]
81. Michael G. Pollitt. Power Market Reform in China: Lessons from Guangdong 103-152. [[Crossref](#)]
82. Alim Gurtuev, Zaur Ivanov. 2020. Comparison of different land distribution mechanisms for a land-hungry region. *E3S Web of Conferences* 164, 07017. [[Crossref](#)]
83. Bernhard Kasberger. 2020. When Can Auctions Maximize Post-Auction Welfare?. *SSRN Electronic Journal* . [[Crossref](#)]
84. Martin Hagen. 2020. Collusion-proof Mechanisms for Multi-Unit Procurement. *SSRN Electronic Journal* 81. . [[Crossref](#)]
85. Thomas Greve, Marta Rocha. 2020. Policy and Theoretical Implications of the Zero-subsidy Bids in the German Offshore Wind Tenders. *The Energy Journal* 41:4, 89-104. [[Crossref](#)]
86. Satoshi Takahashi, Yoichi Izunaga, Naoki Watanabe. 2019. VCG mechanism for multi-unit auctions and appearance of information: a subject experiment. *Evolutionary and Institutional Economics Review* 16:2, 357-374. [[Crossref](#)]
87. Baocheng Geng, Swastik Brahma, Pramod K. Varshney. A Truthful Mechanism For Mobility Management In Unmanned Aerial Vehicles Networks 401-405. [[Crossref](#)]
88. Nianxia Cao, Swastik Brahma, Baocheng Geng, Pramod K. Varshney. 2019. Optimal Auction Design With Quantized Bids for Target Tracking via Crowdsensing. *IEEE Transactions on Computational Social Systems* 6:5, 847-857. [[Crossref](#)]
89. David R. Munro, Stephen J. Rassenti. 2019. Combinatorial clock auctions: Price direction and performance. *Games and Economic Behavior* 117, 195-217. [[Crossref](#)]
90. Anselma Wörner, Arne Meeuw, Liliane Ableitner, Felix Wortmann, Sandro Schopfer, Verena Tiefenbeck. 2019. Trading solar energy within the neighborhood: field implementation of a blockchain-based electricity market. *Energy Informatics* 2:S1. . [[Crossref](#)]
91. Paul Milgrom. 2019. Auction Market Design: Recent Innovations. *Annual Review of Economics* 11:1, 383-405. [[Crossref](#)]
92. Antoine Feuillet, Nicolas Scelles, Christophe Durand. 2019. A winner's curse in the bidding process for broadcasting rights in football? The cases of the French and UK markets. *Sport in Society* 22:7, 1198-1224. [[Crossref](#)]
93. E. Glen Weyl. 2019. Price Theory. *Journal of Economic Literature* 57:2, 329-384. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
94. Kei-Ichiro Inaba. 2019. The behaviour of bidders in quantitative-easing auctions of sovereign bonds in Japan: Determinants of the popularity of the 9 to 10-year maturity segment. *The Quarterly Review of Economics and Finance* 72, 206-214. [[Crossref](#)]
95. Qian Wang, Jing Huang, Yanjiao Chen, Xin Tian, Qian Zhang. 2019. Privacy-Preserving and Truthful Double Auction for Heterogeneous Spectrum. *IEEE/ACM Transactions on Networking* 27:2, 848-861. [[Crossref](#)]
96. Marco Pagnozzi, Krista J. Saral. 2019. Auctions with limited liability through default or resale. *Journal of Economic Behavior & Organization* 159, 51-74. [[Crossref](#)]

97. Benjamin D. Leibowicz, Kunal Punjabi, Eric O'Shaughnessy, Robert Margolis. 2019. Rules of the rooftop: Platform design and price reductions in an online solar photovoltaic marketplace in the United States. *Energy Research & Social Science* **48**, 194-204. [[Crossref](#)]
98. David J. Teece. 2019. A capability theory of the firm: an economics and (Strategic) management perspective. *New Zealand Economic Papers* **53**:1, 1-43. [[Crossref](#)]
99. Topias Kokkinen, Heikki Kokkinen, Seppo Yrjölä. Location Dependent Spectrum Valuation of Private LTE and 5G Networks in Europe 306-319. [[Crossref](#)]
100. Ralf Dewenter, Ulrich Heimeshoff. Regulierung 189-262. [[Crossref](#)]
101. Jeroen Hinloopen, Sander Onderstal, Leonard Treuren. 2019. Cartel Stability in Experimental Auctions. *SSRN Electronic Journal* **107**. . [[Crossref](#)]
102. Tony Ke, Yuting Zhu. 2019. Market Based Incentive Compatibility. *SSRN Electronic Journal* **103**. . [[Crossref](#)]
103. Caleb M. Koch. 2019. Implementation with Secrets. *SSRN Electronic Journal* . [[Crossref](#)]
104. Olivier Bochet, Manshu Khanna, Simon Siegenthaler. 2019. Beyond Dividing the Pie: An Experimental Study on Bargaining over Multiple Issues. *SSRN Electronic Journal* **9**. . [[Crossref](#)]
105. Diego Aycinena, Lucas Rentschler. 2018. Auctions with endogenous participation and an uncertain number of bidders: experimental evidence. *Experimental Economics* **21**:4, 924-949. [[Crossref](#)]
106. Xiao Han, Shashi Kant, Yi Xie. 2018. Bidder's private value distributions in standing timber auctions in the Jiangxi Province of China. *Canadian Journal of Forest Research* **48**:12, 1441-1455. [[Crossref](#)]
107. Mikael Rönqvist, Sophie D'Amours, Marc-André Carle, Riadh Azouzi. 2018. Timber selling policies using bundle-based auction: The case of public forests in Québec. *Forest Policy and Economics* **96**, 9-18. [[Crossref](#)]
108. Marie-Christin Haufe, Karl-Martin Ehrhart. 2018. Auctions for renewable energy support – Suitability, design, and first lessons learned. *Energy Policy* **121**, 217-224. [[Crossref](#)]
109. Alison Watts. 2018. Generalized Second Price Auctions over a Network. *Games* **9**:3, 67. [[Crossref](#)]
110. Ming Li, Weixian Liao, Xuhui Chen, Jinyuan Sun, Xiaoxia Huang, Pan Li. 2018. Economic-Robust Transmission Opportunity Auction for D2D Communications in Cognitive Mesh Assisted Cellular Networks. *IEEE Transactions on Mobile Computing* **17**:8, 1806-1819. [[Crossref](#)]
111. Rafael S. Ferreira, Carmen L. T. Borges, Luiz A. N. Barroso. 2018. Combinatorial and Simultaneous Descending Auctions for Electricity Transmission Concessions. *IEEE Transactions on Power Systems* **33**:4, 4111-4123. [[Crossref](#)]
112. Pantelis Koutroumpis, Martin Cave. 2018. Auction design and auction outcomes. *Journal of Regulatory Economics* **53**:3, 275-297. [[Crossref](#)]
113. Ari Hyytinen, Sofia Lundberg, Otto Toivanen. 2018. Design of public procurement auctions: evidence from cleaning contracts. *The RAND Journal of Economics* **49**:2, 398-426. [[Crossref](#)]
114. Audrey Hu, Theo Offerman, Liang Zou. 2018. How Risk Sharing May Enhance Efficiency of English Auctions. *The Economic Journal* **128**:610, 1235-1256. [[Crossref](#)]
115. Diego Aycinena, Hernán Bejarano, Lucas Rentschler. 2018. Informed entry in auctions. *International Journal of Game Theory* **47**:1, 175-205. [[Crossref](#)]
116. Erik Eduardo Rego, Celma de Oliveira Ribeiro. 2018. Successful Brazilian experience for promoting wind energy generation. *The Electricity Journal* **31**:2, 13-17. [[Crossref](#)]
117. John Moore, Carine Staropoli. Horizontal and Vertical Agreements in PPPs 203-240. [[Crossref](#)]
118. John L. Teall. Introduction to Securities Trading and Markets 1-31. [[Crossref](#)]

119. Xiangping Zhai, Tianqi Zhou, Chunsheng Zhu, Bing Chen, Weidong Fang, Kun Zhu. 2018. Truthful Double Auction for Joint Internet of Energy and Profit Optimization in Cognitive Radio Networks. *IEEE Access* **6**, 23180-23190. [[Crossref](#)]
120. Michelle P. Connolly, Nelson SS, Azeem Zaman, Christopher Roark, Akshaya Trivedi. 2018. The Evolution of U.S. Spectrum Values Over Time. *SSRN Electronic Journal* . [[Crossref](#)]
121. Shivam Gupta, Milind Dawande, Ganesh Janakiraman, Shouqiang Wang. 2018. Procurement with Cost and Non-Cost Attributes: Cost-Sharing Mechanisms. *SSRN Electronic Journal* . [[Crossref](#)]
122. Ángel Hernando-Veciana, Fabio Michelucci. 2018. Inefficient rushes in auctions. *Theoretical Economics* **13**:1, 273-306. [[Crossref](#)]
123. Atila Abdulkadiroğlu, Nikhil Agarwal, Parag A. Pathak. 2017. The Welfare Effects of Coordinated Assignment: Evidence from the New York City High School Match. *American Economic Review* **107**:12, 3635-3689. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
124. Scott Duke Kominers, Alexander Teytelboym, Vincent P Crawford. 2017. An invitation to market design. *Oxford Review of Economic Policy* **33**:4, 541-571. [[Crossref](#)]
125. Ernesto Cassetta, Umberto Monarca, Consuelo Rubina Nava, Linda Meleo. 2017. Is the answer blowin' in the wind (auctions)? An assessment of the Italian support scheme. *Energy Policy* **110**, 662-674. [[Crossref](#)]
126. Jorge Holzer, Geret DePiper, Douglas Lipton. 2017. Buybacks with costly participation. *Journal of Environmental Economics and Management* **85**, 130-145. [[Crossref](#)]
127. Sabine Vogler, Margit Gombocz, Nina Zimmermann. 2017. Tendering for off-patent outpatient medicines: lessons learned from experiences in Belgium, Denmark and the Netherlands. *Journal of Pharmaceutical Health Services Research* **8**:3, 147-158. [[Crossref](#)]
128. Hong Wang. 2017. Information acquisition versus information manipulation in multi-period procurement markets. *Information Economics and Policy* **40**, 48-59. [[Crossref](#)]
129. Murat GUNDUZ, H. Volkan KARACAN. 2017. ASSESSMENT OF ABNORMALLY LOW TENDERS: A MULTINOMIAL LOGISTIC REGRESSION APPROACH. *Technological and Economic Development of Economy* **23**:6, 848-859. [[Crossref](#)]
130. Gary Madden, Hiroaki Suenaga. 2017. The determinants of price in 3G spectrum auctions. *Applied Economics* **49**:32, 3129-3140. [[Crossref](#)]
131. Aniol Llorente-Saguer, Ro'i Zultan. 2017. Collusion and information revelation in auctions. *European Economic Review* **95**, 84-102. [[Crossref](#)]
132. Peter Anker. 2017. From spectrum management to spectrum governance. *Telecommunications Policy* **41**:5-6, 486-497. [[Crossref](#)]
133. Esther Duflo. 2017. The Economist as Plumber. *American Economic Review* **107**:5, 1-26. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
134. Julia Buwaya, Jose D. P. Rolim. Mobile Crowdsensing from a Selfish Routing Perspective 1457-1463. [[Crossref](#)]
135. Kent D. Messer, Joshua M. Duke, Lori Lynch, Tongzhe Li. 2017. When Does Public Information Undermine the Efficiency of Reverse Auctions for the Purchase of Ecosystem Services?. *Ecological Economics* **134**, 212-226. [[Crossref](#)]
136. William B. Holmes. 2017. Environmental services auctions under regulatory threat. *Land Use Policy* **63**, 584-591. [[Crossref](#)]
137. Jing Wang, Dejun Yang, Jian Tang, Mustafa Cenk Gursoy. 2017. Enabling Radio-as-a-Service With Truthful Auction Mechanisms. *IEEE Transactions on Wireless Communications* **16**:4, 2340-2349. [[Crossref](#)]

138. Ling Tang, Jiaqian Wu, Lean Yu, Qin Bao. 2017. Carbon allowance auction design of China's emissions trading scheme: A multi-agent-based approach. *Energy Policy* **102**, 30-40. [[Crossref](#)]
139. Tong Liu, Yanmin Zhu, Hongzi Zhu, Jiadi Yu, Yuanyuan Yang, Fan Ye. 2017. Online Pricing for Efficient Renewable Energy Sharing in a Sustainable Microgrid. *The Computer Journal* **32**. . [[Crossref](#)]
140. Jalal Eddine Bahbouhi, Najem Moussa. 2017. Prisoner's dilemma game model for e-commerce. *Applied Mathematics and Computation* **292**, 128-144. [[Crossref](#)]
141. Maarten Janssen, Vladimir Karamychev. 2017. Raising rivals' cost in multi-unit auctions. *International Journal of Industrial Organization* **50**, 473-490. [[Crossref](#)]
142. Martin Bichler, Jacob K. Goeree. 2017. Frontiers in spectrum auction design. *International Journal of Industrial Organization* **50**, 372-391. [[Crossref](#)]
143. Nguyen Cong Luong, Ping Wang, Dusit Niyato, Yonggang Wen, Zhu Han. 2017. Resource Management in Cloud Networking Using Economic Analysis and Pricing Models: A Survey. *IEEE Communications Surveys & Tutorials* **19**:2, 954-1001. [[Crossref](#)]
144. David Freeman, Erik O. Kimbrough, J. Philipp Reiss. 2017. Opportunity Cost, Inattention and the Bidder's Curse. *SSRN Electronic Journal* . [[Crossref](#)]
145. Esther Dufló. 2017. The Economist as Plumber. *SSRN Electronic Journal* **93**. . [[Crossref](#)]
146. Tomoya Kazumura, Debasis Mishra, Shigehiro Serizawa. 2017. Strategy-Proof Multi-Object Auction Design: Ex-Post Revenue Maximization with No Wastage. *SSRN Electronic Journal* . [[Crossref](#)]
147. Gerardo Ferrara, Xin Li. 2017. Central Counterparty Auction Design. *SSRN Electronic Journal* . [[Crossref](#)]
148. Scott Duke Kominers, Alexander Teytelboym, Vincent P. Crawford. 2017. An Invitation to Market Design. *SSRN Electronic Journal* **33**. . [[Crossref](#)]
149. Robert Marquez, Rajdeep Singh. 2017. Asymmetric Auctions with Endogenous Participation. *SSRN Electronic Journal* . [[Crossref](#)]
150. Xiao Chen, Min Liu, Yaqin Zhou, Zhongcheng Li, Shuang Chen, Xiangnan He. 2017. A Truthful Incentive Mechanism for Online Recruitment in Mobile Crowd Sensing System. *Sensors* **17**:1, 79. [[Crossref](#)]
151. Maarten Janssen, Vladimir Karamychev. 2016. Spiteful bidding and gaming in combinatorial clock auctions. *Games and Economic Behavior* **100**, 186-207. [[Crossref](#)]
152. Jing Wang, Jian Tang, Dejun Yang, Erica Wang, Guoliang Xue. Quality-Aware and Fine-Grained Incentive Mechanisms for Mobile Crowdsensing 354-363. [[Crossref](#)]
153. Javier Contreras, Yeny E. Rodríguez. 2016. Incentives for wind power investment in Colombia. *Renewable Energy* **87**, 279-288. [[Crossref](#)]
154. Shun-Cheng Zhan, Shi-Chung Chang. 2016. Double Auction Design for Short-Interval and Heterogeneous Spectrum Sharing. *IEEE Transactions on Cognitive Communications and Networking* **2**:1, 83-94. [[Crossref](#)]
155. Yili Hong, Chong (Alex) Wang, Paul A. Pavlou. 2016. Comparing Open and Sealed Bid Auctions: Evidence from Online Labor Markets. *Information Systems Research* **27**:1, 49-69. [[Crossref](#)]
156. Hong Zhang, Hongbo Jiang, Bo Li, Fangming Liu, Athanasios V. Vasilakos, Jiangchuan Liu. 2016. A Framework for Truthful Online Auctions in Cloud Computing with Heterogeneous User Demands. *IEEE Transactions on Computers* **65**:3, 805-818. [[Crossref](#)]
157. Edward C. Rosenthal, Eric M. Eisenstein. 2016. A rescheduling and cost allocation mechanism for delayed arrivals. *Computers & Operations Research* **66**, 20-28. [[Crossref](#)]

158. Gerrit Anders, Florian Siefert, Alexander Schiendorfer, Hella Seebach, Jan-Philipp Steghöfer, Benedikt Eberhardinger, Oliver Kosak, Wolfgang Reif. Specification and Design of Trust-Based Open Self-Organising Systems 17-54. [[Crossref](#)]
159. Changyan Yi, Jun Cai. Fundamentals of Mechanism Design 17-34. [[Crossref](#)]
160. Kelechi Hilary Anabi, Rosdiadee Nordin, Nor Fadzilah Abdullah. 2016. Database-Assisted Television White Space Technology: Challenges, Trends and Future Research Directions. *IEEE Access* **4**, 8162-8183. [[Crossref](#)]
161. Ayan Bhattacharya. 2016. Can Transparency Hurt Investors in Over-The-Counter Markets?. *SSRN Electronic Journal* . [[Crossref](#)]
162. Hema Yoganasimhan. 2016. Estimation of Beauty Contest Auctions. *Marketing Science* **35**:1, 27-54. [[Crossref](#)]
163. Simon Loertscher, Leslie M. Marx, Tom Wilkening. 2015. A Long Way Coming: Designing Centralized Markets with Privately Informed Buyers and Sellers. *Journal of Economic Literature* **53**:4, 857-897. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
164. Tao Jing, Fan Zhang, Wei Cheng, Yan Huo, Xiuzhen Cheng. 2015. Online auction-based relay selection for cooperative communication in CR networks. *EURASIP Journal on Wireless Communications and Networking* **2015**:1. . [[Crossref](#)]
165. Xuanheng Li, Miao Pan, Yang Song, Yi Sun, Yuguang Fang. Economic-Robust Session Based Spectrum Trading in Multi-Hop Cognitive Radio Networks 1-6. [[Crossref](#)]
166. Gary Madden, Walter Mayer, Chen Wu, Thien Tran. 2015. The forecasting accuracy of models of post-award network deployment: An application of maximum score tests. *International Journal of Forecasting* **31**:4, 1153-1158. [[Crossref](#)]
167. Dian Sheng, Zhi-Chun Li, Yi-bin Xiao, Xiaowen Fu. 2015. Slot auction in an airport network with demand uncertainty. *Transportation Research Part E: Logistics and Transportation Review* **82**, 79-100. [[Crossref](#)]
168. Chi Harold Liu, Jun Fan, Pan Hui, Jie Wu, Kin K. Leung. 2015. Toward QoI and Energy Efficiency in Participatory Crowdsourcing. *IEEE Transactions on Vehicular Technology* **64**:10, 4684-4700. [[Crossref](#)]
169. Oliver Kosak, Gerrit Anders, Florian Siefert, Wolfgang Reif. An Approach to Robust Resource Allocation in Large-Scale Systems of Systems 1-10. [[Crossref](#)]
170. Fabian Lang, Andreas Fink. 2015. Collaborative machine scheduling: Challenges of individually optimizing behavior. *Concurrency and Computation: Practice and Experience* **27**:11, 2869-2888. [[Crossref](#)]
171. Philippe Jehiel, Laurent Lamy. 2015. On Discrimination in Auctions with Endogenous Entry. *American Economic Review* **105**:8, 2595-2643. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
172. Settapong Malisuwan, Noppadol Tiamnara, Nattakit Suriyakrai. 2015. A Study of Spectrum Valuation Methods in Telecommunication Services. *International Journal of Trade, Economics and Finance* **6**:4, 241-246. [[Crossref](#)]
173. Pablo Ballesteros-Pérez, Martin Skitmore, Raj Das, Maria Luisa del Campo-Hitschfeld. 2015. Quick Abnormal-Bid-Detection Method for Construction Contract Auctions. *Journal of Construction Engineering and Management* **141**:7. . [[Crossref](#)]
174. Gerrit Anders, Alexander Schiendorfer, Florian Siefert, Jan-Philipp Steghöfer, Wolfgang Reif. 2015. Cooperative Resource Allocation in Open Systems of Systems. *ACM Transactions on Autonomous and Adaptive Systems* **10**:2, 1-44. [[Crossref](#)]
175. Bernard Lebrun. 2015. Revenue-superior variants of the second-price auction. *Economic Theory* **59**:2, 245-275. [[Crossref](#)]

176. Shun-Cheng Zhan, Chun-Ting Chou, Shi-Chung Chang. Auction-based spectrum sharing among heterogeneous secondary networks 2160-2165. [[Crossref](#)]
177. Jing Wang, Dejun Yang, Jian Tang, Mustafa Cenk Gursoy. Radio-as-a-Service: Auction-based model and mechanisms 3567-3572. [[Crossref](#)]
178. Yuchao Zhang, Ke Xu, Haiyang Wang, Jiangchuan Liu, Yifeng Zhong, Wenlong Chen. Performance and incentive of teamwork-based channel allocation in spectrum access networks 255-260. [[Crossref](#)]
179. Gérard Marty. 2015. Le processus d'encastrement et de désencastrement des enchères de bois public. *Revue du MAUSS* n° 45:1, 355-376. [[Crossref](#)]
180. William S. Comanor, H. E. Frech. 2015. Economic Rationality and the Areeda-Turner Rule. *Review of Industrial Organization* 46:3, 253-268. [[Crossref](#)]
181. Gary Madden, Ismail Saglam, Inayat Hussain. 2015. Spectrum auction designs and revenue variations. *Applied Economics* 47:17, 1748-1763. [[Crossref](#)]
182. LUCA RUBINI. 2015. 'The wide and the narrow gate': Benchmarking in the SCM Agreement after the Canada-Renewable Energy/FIT Ruling. *World Trade Review* 14:2, 211-237. [[Crossref](#)]
183. Ming Li, Pan Li, Linke Guo, Xiaoxia Huang. PPER: Privacy-preserving economic-robust spectrum auction in wireless networks 909-917. [[Crossref](#)]
184. Nianxia Cao, Swastik Brahma, Pramod K. Varshney. 2015. Target Tracking via Crowdsourcing: A Mechanism Design Approach. *IEEE Transactions on Signal Processing* 63:6, 1464-1476. [[Crossref](#)]
185. Patricia Crifo, Vanina D. Forget, Sabrina Teyssier. 2015. The price of environmental, social and governance practice disclosure: An experiment with professional private equity investors. *Journal of Corporate Finance* 30, 168-194. [[Crossref](#)]
186. Fabio Martignon, Stefano Paris, Ilario Filippini, Lin Chen, Antonio Capone. 2015. Efficient and Truthful Bandwidth Allocation in Wireless Mesh Community Networks. *IEEE/ACM Transactions on Networking* 23:1, 161-174. [[Crossref](#)]
187. David E.M. Sappington. Regulation, Economic Theory of 166-171. [[Crossref](#)]
188. Alessandro Avenali, Tiziana D'Alfonso, Claudio Leporelli, Giorgio Matteucci, Alberto Nastasi, Pierfrancesco Reverberi. 2015. An incentive pricing mechanism for efficient airport slot allocation in Europe. *Journal of Air Transport Management* 42, 27-36. [[Crossref](#)]
189. Luca Rubini. 2015. 'The Wide and the Narrow Gate'. Benchmarking in the SCM Agreement after the Canada Renewable Energy/Fit Ruling. *SSRN Electronic Journal* . [[Crossref](#)]
190. Ari Hyytinen, Sofia Lundberg, Otto Toivanen. 2015. Design of Public Procurement Auctions: Evidence from Cleaning Contracts. *SSRN Electronic Journal* . [[Crossref](#)]
191. Fernando Carvalho, Flavio Feferman, Peter Knight, Glenn A. Woroch. 2015. Private-Public Partnerships for Expanding Broadband Access: Lessons from the Cinturro Digital do Ceara Network in Brazil. *SSRN Electronic Journal* . [[Crossref](#)]
192. Settapong Malisuan, Noppadol Tiamnara, Nattakit Suriyakrai. 2015. Radio Spectrum Valuation by Using Censored Regression Method. *American Journal of Industrial and Business Management* 05:11, 648-655. [[Crossref](#)]
193. Feng Tian, Di Li, Shuyu Li, Lei Wang, Naigao Jin, Liang Sun. RTDA: A Novel Reusable Truthful Double Auction Mechanism for Wireless Spectrum Management 14-27. [[Crossref](#)]
194. Günter Knieps. Auctions 87-99. [[Crossref](#)]
195. Xuanheng Li, Miao Pan, Yang Song, Yi Sun, Yuguang Fang. Economic-Robust Session Based Spectrum Trading in Multi-Hop Cognitive Radio Networks 1-6. [[Crossref](#)]
196. Vivek Bhattacharya, James W. Roberts, Andrew Sweeting. 2014. Regulating bidder participation in auctions. *The RAND Journal of Economics* 45:4, 675-704. [[Crossref](#)]

197. Charles J. Thomas, Bart J. Wilson. 2014. Horizontal Product Differentiation in Auctions and Multilateral Negotiations. *Economica* **81**:324, 768-787. [[Crossref](#)]
198. Jeroen Hinloopen, Sander Onderstal. 2014. Going once, going twice, reported! Cartel activity and the effectiveness of antitrust policies in experimental auctions. *European Economic Review* **70**, 317-336. [[Crossref](#)]
199. Ping-chuan Wen, Bi Fu. Analysis on evolutionary game theory of the collusion and competition strategies between telecom operators 263-270. [[Crossref](#)]
200. Rohit Prasad, Rajat Kathuria. 2014. The value of 1800MHz and 2100MHz spectrums in India and implications for auction design. *Telecommunications Policy* **38**:3, 223-235. [[Crossref](#)]
201. Tan Le, Mihaela Beluri, Martino Freda, Jean-Louis Gauvreau, Scott Laughlin, Pekka Ojanen. On a new incentive and market based framework for multi-tier shared spectrum access systems 477-488. [[Crossref](#)]
202. Per Molander. 2014. Public procurement in the european union: The case for national threshold values. *Journal of Public Procurement* **14**:2, 181-214. [[Crossref](#)]
203. Tao Jing, Fan Zhang, Wei Cheng, Yan Huo, Xiuzhen Cheng. Online Auction Based Relay Selection for Cooperative Communications in CR Networks 482-493. [[Crossref](#)]
204. Graeme J. Doole, Louise Blackmore, Steven Schilizzi. 2014. Determinants of cost-effectiveness in tender and offset programmes for Australian biodiversity conservation. *Land Use Policy* **36**, 23-32. [[Crossref](#)]
205. Audrey Hu, T. J. S. Offerman, Liang Zou. 2014. How Risk Sharing May Enhance Efficiency in English Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
206. Aniol Llorente-Saguer, Ro'i Zultan. 2014. Auction Mechanisms and Bidder Collusion: Bribes, Signals and Selection. *SSRN Electronic Journal* . [[Crossref](#)]
207. Omer Dekel, Amos Schurr. 2014. Cognitive Biases in Government Procurement An Experimental Study. *SSRN Electronic Journal* . [[Crossref](#)]
208. William Samuelson. Auctions: Advances in Theory and Practice 323-366. [[Crossref](#)]
209. Anthony M. Kwasnica, Katerina Sherstyuk. Multiunit Auctions 75-108. [[Crossref](#)]
210. Nianxia Cao, Swastik Brahma, Pramod K. Varshney. An incentive-based mechanism for location estimation in wireless sensor networks 157-160. [[Crossref](#)]
211. James W. Roberts. 2013. Unobserved heterogeneity and reserve prices in auctions. *The RAND Journal of Economics* **44**:4, 712-732. [[Crossref](#)]
212. Stéphane Robin, Carine Staropoli. 2013. La contribution de l'économie expérimentale à l'analyse de l'efficacité des marchés. *Revue française d'économie* **Volume XXVIII**:2, 91-120. [[Crossref](#)]
213. Olivier Armantier,, Charles A. Holt,, Charles R. Plott. 2013. A Procurement Auction for Toxic Assets with Asymmetric Information. *American Economic Journal: Microeconomics* **5**:4, 142-162. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
214. Farnoush Farnia, Jean-Marc Frayret, Luc LeBel, Catherine Beaudry. 2013. Multiple-round timber auction design and simulation. *International Journal of Production Economics* **146**:1, 129-141. [[Crossref](#)]
215. Erik Eduardo Rego. 2013. Reserve price: Lessons learned from Brazilian electricity procurement auctions. *Energy Policy* **60**, 217-223. [[Crossref](#)]
216. Gerrit Anders, Jan-Philipp Steghofer, Florian Siefert, Wolfgang Reif. A Trust- and Cooperation-Based Solution of a Dynamic Resource Allocation Problem 1-10. [[Crossref](#)]
217. Damien Geradin, Christos Malamataris. 2013. 2012 Framework on Public Compensation for SGEIs: Application in the Postal Sector. *Competition and Regulation in Network Industries* **14**:3, 241-264. [[Crossref](#)]

218. Wei Xu, He Huang, Yu-e Sun, Fanzhang Li, Yanqin Zhu, Shukui. DATA: A double auction based task assignment mechanism in crowdsourcing systems 172-177. [[Crossref](#)]
219. Zhili Chen, He Huang, Yu-e Sun, Liusheng Huang. 2013. True-MCSA: A Framework for Truthful Double Multi-Channel Spectrum Auctions. *IEEE Transactions on Wireless Communications* **12**:8, 3838-3850. [[Crossref](#)]
220. Anthony M. Kwasnica, Katerina Sherstyuk. 2013. MULTIUNIT AUCTIONS. *Journal of Economic Surveys* **27**:3, 461-490. [[Crossref](#)]
221. Nicolai Pogrebnyakov, Carleen F. Maitland. 2013. Intra-regional diffusion of spectrum license allocation policies. *info* **15**:4, 23-42. [[Crossref](#)]
222. John Moore. 2013. Stabilité externe et anticipation des offres concurrentielles par les ententes dans les marchés publics : une analyse empirique. *Revue d'économie industrielle* :141, 21-50. [[Crossref](#)]
223. Eshien Chong, Carine Staropoli, Anne Yvrande-Billon. 2013. Enchères ou négociations dans les marchés publics : une analyse empirique. *Revue d'économie industrielle* :141, 51-72. [[Crossref](#)]
224. Pablo Ballesteros-Pérez, M^a. Carmen González-Cruz, Antonio Cañavate-Grimal, Eugenio Pellicer. 2013. Detecting abnormal and collusive bids in capped tendering. *Automation in Construction* **31**, 215-229. [[Crossref](#)]
225. Robert Griffin. 2013. Auction designs for allocating wind energy leases on the U.S. outer continentalshelf. *Energy Policy* **56**, 603-611. [[Crossref](#)]
226. Gary Madden, Aaron Morey. 2013. Regulator flexibility and the administrative allocation licensing of 3G spectrum. *Applied Economics* **45**:13, 1713-1718. [[Crossref](#)]
227. Erik Eduardo Rego, Virginia Parente. 2013. Brazilian experience in electricity auctions: Comparing outcomes from new and old energy auctions as well as the application of the hybrid Anglo-Dutch design. *Energy Policy* **55**, 511-520. [[Crossref](#)]
228. Ming Li, Pan Li, Miao Pan, Jinyuan Sun. Economic-robust transmission opportunity auction in multi-hop wireless networks 1842-1850. [[Crossref](#)]
229. Rohit Jindal, John M. Kerr, Paul J. Ferraro, Brent M. Swallow. 2013. Social dimensions of procurement auctions for environmental service contracts: Evaluating tradeoffs between cost-effectiveness and participation by the poor in rural Tanzania. *Land Use Policy* **31**, 71-80. [[Crossref](#)]
230. Dilek Demirbas, Safa Demirbas. Greenhouse Gas Emissions (GHG) and Economics of Stabilisation 109-159. [[Crossref](#)]
231. Ying-Ju Chen. 2013. Optimal mediated auctions with endogenous participation. *Decision Support Systems* **54**:3, 1302-1315. [[Crossref](#)]
232. Gary Madden, Hasnat Ahmad. 2013. 3G spectrum auction aftermarket network deployment. *Applied Economics Letters* **20**:3, 300-303. [[Crossref](#)]
233. Karla L. Hoffman. Combinatorial Auctions 181-192. [[Crossref](#)]
234. Ronald M. Harstad. Auction and Bidding Models 84-88. [[Crossref](#)]
235. Tao Jing, Fan Zhang, Liran Ma, Wei Li, Xuhao Chen, Yan Huo. Truthful Online Reverse Auction with Flexible Preemption for Access Permission Transaction in Macro-Femtocell Networks 512-523. [[Crossref](#)]
236. John L. Teall. Introduction to Securities Trading and Markets 1-24. [[Crossref](#)]
237. Yang Zhang, Chonho Lee, Dusit Niyato, Ping Wang. 2013. Auction Approaches for Resource Allocation in Wireless Systems: A Survey. *IEEE Communications Surveys & Tutorials* **15**:3, 1020-1041. [[Crossref](#)]
238. Robert Hahn, Peter Passell. 2013. Spectrum Policy and the Evolution of the Wireless Internet: Some Thoughts on Where Economists Agree and Disagree. *The Economist's Voice* **10**:1. . [[Crossref](#)]

239. Aude Schoentgen. 2013. Telecom License Fees & Risks in Sub-Saharan Africa: Towards Better Licensing Policies. *SSRN Electronic Journal* . [[Crossref](#)]
240. Geoffrey Myers. 2013. Spectrum Floors in the UK 4G Auction: An Innovation in Regulatory Design. *SSRN Electronic Journal* . [[Crossref](#)]
241. Hema Yoganarasimhan. 2013. Estimation of Beauty Contest Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
242. Matthew O. Jackson. 2013. Matching, Auctions, and Market Design. *SSRN Electronic Journal* . [[Crossref](#)]
243. Sven Heim, Georg Götz. 2013. Do Pay-as-Bid Auctions Favor Collusion? Evidence from Germany's Market for Reserve Power. *SSRN Electronic Journal* . [[Crossref](#)]
244. Ewan Sutherland. 2013. Bribery and Corruption in Telecommunications - New Approaches to Licencing. *SSRN Electronic Journal* . [[Crossref](#)]
245. Yili Hong, Chong (Alex) Wang, Paul A. Pavlou. 2013. How Does Bid Visibility Matter in Buyer-Determined Auctions? Comparing Open and Sealed Bid Auctions in Online Labor Markets. *SSRN Electronic Journal* . [[Crossref](#)]
246. Dylan T. Gray. 2013. Do Investment Banks Create Value for Target Companies?. *SSRN Electronic Journal* . [[Crossref](#)]
247. De Liu, Adib Bagh. 2013. A Simple Ascending Auction for Assignment Problems. *SSRN Electronic Journal* . [[Crossref](#)]
248. Robert J. Shapiro, Douglas Holtz-Eakin, Coleman Bazelon. 2013. The Economic Implications of Restricting Spectrum Purchases in the Incentive Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
249. Brendan Kretzschmar, Andrew B. Whitford. 2012. Design, Performance and Interstate Collaboration: Insights from the Regional Greenhouse Gas Initiative. *Regional & Federal Studies* **22:4**, 475-498. [[Crossref](#)]
250. . Auctions and Public Goods 436-490. [[Crossref](#)]
251. Eric Zitzewitz. 2012. Forensic Economics. *Journal of Economic Literature* **50:3**, 731-769. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
252. Rong-Gang Cong, Yi-Ming Wei. 2012. Experimental comparison of impact of auction format on carbon allowance market. *Renewable and Sustainable Energy Reviews* **16:6**, 4148-4156. [[Crossref](#)]
253. Brendan Daley, Michael Schwarz, Konstantin Sonin. 2012. Efficient investment in a dynamic auction environment. *Games and Economic Behavior* **75:1**, 104-119. [[Crossref](#)]
254. Davide Aloini, Riccardo Dulmin, Valeria Mininno. 2012. E-reverse auction design: critical variables in a B2B context. *Business Process Management Journal* **18:2**, 219-249. [[Crossref](#)]
255. Osvaldo Cairó, Fernando Rivera-illingworth, Alfredo Hernández, Juan Olarte. 2012. On the formulation of competitive negotiations in Web applications: The Latin-American market case. *Expert Systems with Applications* **39:4**, 4143-4148. [[Crossref](#)]
256. Shyam Sreekumaran Nair, Mary Mathew, Dipanjan Nag. 2012. Effect of firm variables on patent price. *IIMB Management Review* **24:1**, 40-47. [[Crossref](#)]
257. Martin Spann, Gerald Häubl, Bernd Skiera, Martin Bernhardt. 2012. Bid-Elicitation Interfaces and Bidding Behavior in Retail Interactive Pricing. *Journal of Retailing* **88:1**, 131-144. [[Crossref](#)]
258. Talat S. Genc. Equilibrium Predictions in Wholesale Electricity Markets 263-279. [[Crossref](#)]
259. Masabumi Furuhashi. A Robust Multi-unit Ascending-Price Auction with Complementarities against Strategic Manipulation 320-335. [[Crossref](#)]
260. Charles J. Thomas, Bart J. Wilson. 2012. Horizontal Product Differentiation in Auctions and Multilateral Negotiations. *SSRN Electronic Journal* . [[Crossref](#)]

261. Nicolas Petit. 2012. The Oligopoly Problem in EU Competition Law. *SSRN Electronic Journal* . [[Crossref](#)]
262. Lars Boerner, Christiaan van Bochove, Daniel Quint. 2012. Anglo-Dutch Premium Auctions in Eighteenth-Century Amsterdam. *SSRN Electronic Journal* . [[Crossref](#)]
263. Ewan Sutherland. 2012. Bribery and Corruption in Telecommunications – Best Practice in Prevention and Remedies. *SSRN Electronic Journal* . [[Crossref](#)]
264. Ning Neil Yu. 2012. Does Bidder Participation Really Matter? A Comment on Bulow and Klemperer (1996). *SSRN Electronic Journal* . [[Crossref](#)]
265. Dimitrios M. Emiris, Charis A. Marentakis. A Unified Classification Ecosystem for Auctions 15-37. [[Crossref](#)]
266. Audra L. Boone, J. Harold Mulherin. 2011. Do private equity consortiums facilitate collusion in takeover bidding?. *Journal of Corporate Finance* 17:5, 1475-1495. [[Crossref](#)]
267. Amir Danak, Shie Mannor. 2011. A Robust Learning Approach to Repeated Auctions With Monitoring and Entry Fees. *IEEE Transactions on Computational Intelligence and AI in Games* 3:4, 302-315. [[Crossref](#)]
268. Yung-Ming Li, Jhih-Hua Jhang-Li. 2011. Analyzing online B2B exchange markets: Asymmetric cost and incomplete information. *European Journal of Operational Research* 214:3, 722-731. [[Crossref](#)]
269. Audrey Hu, Theo Offerman, Liang Zou. 2011. Premium auctions and risk preferences. *Journal of Economic Theory* 146:6, 2420-2439. [[Crossref](#)]
270. Celine O'Donovan, Stephen Kinsella. 2011. An Experimental Analysis of Irish Electricity Auctions. *The Electricity Journal* 24:9, 96-105. [[Crossref](#)]
271. Thomas W. Hazlett, David Porter, Vernon Smith. 2011. Radio Spectrum and the Disruptive Clarity of Ronald Coase. *The Journal of Law and Economics* 54:S4, S125-S165. [[Crossref](#)]
272. Juergen Landes, Ricardo Buettner. Job Allocation in a Temporary Employment Agency via Multi-dimensional Price VCG Auctions Using a Multi-agent System 182-187. [[Crossref](#)]
273. Maksymilian Kwiek. 2011. REPUTATION AND COOPERATION IN THE REPEATED SECOND-PRICE AUCTIONS. *Journal of the European Economic Association* 9:5, 982-1001. [[Crossref](#)]
274. John Rolfe, Romy Greiner, Jill Windle, Atakelty Hailu. 2011. Testing for allocation efficiencies in water quality tenders across catchments, industries and pollutants: a north Queensland case study*. *Australian Journal of Agricultural and Resource Economics* 55:4, 518-536. [[Crossref](#)]
275. Radosveta Ivanova-Stenzel, Timothy C. Salmon. 2011. The high/low divide: Self-selection by values in auction choice. *Games and Economic Behavior* 73:1, 200-214. [[Crossref](#)]
276. Simon Loertscher, Tom Wilkening. 2011. Auctions and Economic Design. *Australian Economic Review* 44:3, 347-354. [[Crossref](#)]
277. Xiaofeng Liu, Hua Cao. Uniform price versus discriminatory auctions in bond markets: A experimental analysis based on multi-agents system 1791-1794. [[Crossref](#)]
278. Andrew F. Reeson, Luis C. Rodriguez, Stuart M. Whitten, Kristen Williams, Karel Nolles, Jill Windle, John Rolfe. 2011. Adapting auctions for the provision of ecosystem services at the landscape scale. *Ecological Economics* 70:9, 1621-1627. [[Crossref](#)]
279. Jian Chen, He Huang, Robert J. Kauffman. 2011. A public procurement combinatorial auction mechanism with quality assignment. *Decision Support Systems* 51:3, 480-492. [[Crossref](#)]
280. Maarten C.W. Janssen, Vladimir A. Karamychev, Emiel Maasland. 2011. Auctions with flexible entry fees: A note. *Games and Economic Behavior* 72:2, 594-601. [[Crossref](#)]

281. MARCO A. HAAN, LINDA A. TOOLSEMA. 2011. LICENSE AUCTIONS WHEN WINNING BIDS ARE FINANCED THROUGH DEBT *. *The Journal of Industrial Economics* 59:2, 254-281. [[Crossref](#)]
282. Nihat Aktas, Eric De Bodt. Merger Negotiations: Takeover Process, Selling Procedure, and Deal Initiation 261-279. [[Crossref](#)]
283. Matthias Pickl, Franz Wirl. 2011. Auction design for gas pipeline transportation capacity—The case of Nabucco and its open season. *Energy Policy* 39:4, 2143-2151. [[Crossref](#)]
284. Richard Steinberg. Progressive Adaptive User Selection Environment (PAUSE) Auction Procedure . [[Crossref](#)]
285. Karla Hoffman. Spectrum Auctions 147-176. [[Crossref](#)]
286. Osvaldo Cairo, Juan Gabriel Olarte, Fernando Rivera. Negotiation in Electronic Commerce: A Study in the Latin-American Market 306-314. [[Crossref](#)]
287. Audrey Hu, Theo Offerman, Sander Onderstal. 2011. Fighting collusion in auctions: An experimental investigation. *International Journal of Industrial Organization* 29:1, 84-96. [[Crossref](#)]
288. Wedad J. Elmaghraby, Nathan Larson. 2011. Procurement Auctions with Avoidable Fixed Costs: An Experimental Approach. *SSRN Electronic Journal* . [[Crossref](#)]
289. Sander Onderstal, Ailko van der Veen. 2011. Keeping Out Trojan Horses: Auctions and Bankruptcy in the Laboratory. *SSRN Electronic Journal* . [[Crossref](#)]
290. Ronald M. Harstad. 2011. Endogenous Competition Alters the Structure of Optimal Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
291. Hsiang-Chih Hwang. 2011. What Constitutes an International Art Center?. *SSRN Electronic Journal* . [[Crossref](#)]
292. Mark Klein. 2011. Auctions and bidding: A guide for computer scientists. *SSRN Electronic Journal* 3. . [[Crossref](#)]
293. Simon Parsons, Juan A. Rodriguez-Aguilar, Mark Klein. 2011. Auctions and bidding. *ACM Computing Surveys* 43:2, 1-59. [[Crossref](#)]
294. Maarten C. W. Janssen, Vladimir A. Karamychev. 2010. Do Auctions Select Efficient Firms?. *The Economic Journal* 120:549, 1319-1344. [[Crossref](#)]
295. N.D. Subasinghe, S.U.P. Jinadasa. Geophysical applications in exploration of groundwater in the hard crystalline terrains - An example from Sri Lanka 190-194. [[Crossref](#)]
296. Yuan Feng, Baochun Li, Bo Li. Peer-assisted VoD prefetching in double auction markets 275-284. [[Crossref](#)]
297. Enrico H. Gerding, Peter McBurney, Xin Yao. 2010. Market-based control of computational systems: introduction to the special issue. *Autonomous Agents and Multi-Agent Systems* 21:2, 109-114. [[Crossref](#)]
298. Shashi Kant. 2010. Market, timber pricing, and forest management. *The Forestry Chronicle* 86:5, 580-588. [[Crossref](#)]
299. GONZALO REYES. 2010. Market design for the provision of social insurance: the case of disability and survivors insurance in Chile. *Journal of Pension Economics and Finance* 9:3, 421-444. [[Crossref](#)]
300. Dimitrios M. Emiris, Charis A. Marentakis. 2010. A Unified Classification Ecosystem for Auctions. *International Journal of Operations Research and Information Systems* 1:3, 53-74. [[Crossref](#)]
301. Zhen Li, Qi Liao, Aaron Striegel. Toward a Socially Optimal Wireless Spectrum Management 1-6. [[Crossref](#)]
302. Flavio M. Menezes, John Quiggin. 2010. Markets for influence. *International Journal of Industrial Organization* 28:3, 307-310. [[Crossref](#)]

303. Paul Klemperer. 2010. THE PRODUCT-MIX AUCTION: A NEW AUCTION DESIGN FOR DIFFERENTIATED GOODS. *Journal of the European Economic Association* 8:2-3, 526-536. [[Crossref](#)]
304. Youngsun Kwon, Jungsub Lee, Youngkyun Oh. 2010. Economic and policy implications of spectrum license fee payment methods. *Telecommunications Policy* 34:3, 175-184. [[Crossref](#)]
305. ShiGuang Wang, Ping Xu, XiaoHua Xu, ShaoJie Tang, XiangYang Li, Xin Liu. TODA: Truthful Online Double Auction for Spectrum Allocation in Wireless Networks 1-10. [[Crossref](#)]
306. Gérard Marty, Raphaële Préget. 2010. A Socio-Economic Analysis of French Public Timber Sales. *Journal of Sustainable Forestry* 29:1, 15-49. [[Crossref](#)]
307. Dawn G. Gregg, Steven Walczak. 2010. The relationship between website quality, trust and price premiums at online auctions. *Electronic Commerce Research* 10:1, 1-25. [[Crossref](#)]
308. Gary D. Libecap. Rights-Based Management of Tuna Fisheries: Lessons from the Assignment of Property Rights on the Western US Frontier 137-154. [[Crossref](#)]
309. David J. Teece. Technological Innovation and the Theory of the Firm 679-730. [[Crossref](#)]
310. Audrey Hu, Theo Offerman, Liang Zou. 2010. Premium Auctions and Risk Preferences. *SSRN Electronic Journal* . [[Crossref](#)]
311. Imène Brigui-Chtioui, Suzanne Pinson. A Variable Bid Increment Algorithm for Reverse English Auction 41-51. [[Crossref](#)]
312. Roger Vickerman. 2009. Appraising Transport Investments in a Regulatory Regime. *Journal of Infrastructure Systems* 15:4, 273-277. [[Crossref](#)]
313. Gediminas Adomavicius, Alok Gupta, Dmitry Zhdanov. 2009. Designing Intelligent Software Agents for Auctions with Limited Information Feedback. *Information Systems Research* 20:4, 507-526. [[Crossref](#)]
314. Andreas Drexler, Kurt Jørnsten, Diether Knof. 2009. Non-linear anonymous pricing combinatorial auctions. *European Journal of Operational Research* 199:1, 296-302. [[Crossref](#)]
315. Sumon C. Mazumdar, Vikram Nanda, Rahul Surana. 2009. Using Auctions to Price Employee Stock Options: The Case of Zions Bancorporation ESOARS. *Financial Analysts Journal* 65:6, 79-99. [[Crossref](#)]
316. Pär Holmberg. 2009. Supply function equilibria of pay-as-bid auctions. *Journal of Regulatory Economics* 36:2, 154-177. [[Crossref](#)]
317. Eshien Chong, Freddy Huet. 2009. Yardstick Competition, Franchise Bidding and Firms' Incentives to Collude. *Review of Industrial Organization* 35:1-2, 149-169. [[Crossref](#)]
318. Zhi-tao Ren, Rui Zhang. Incentive mechanism analysis for government to regulate public-private partnerships in infrastructure administration 2179-2183. [[Crossref](#)]
319. John Rolfe, Jill Windle, Juliana McCosker. 2009. Testing and Implementing the Use of Multiple Bidding Rounds in Conservation Auctions: A Case Study Application. *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie* 57:3, 287-303. [[Crossref](#)]
320. Thomas W. Hazlett, Roberto E. Muñoz. 2009. A welfare analysis of spectrum allocation policies. *The RAND Journal of Economics* 40:3, 424-454. [[Crossref](#)]
321. Jeremy Bulow,, Paul Klemperer. 2009. Why Do Sellers (Usually) Prefer Auctions?. *American Economic Review* 99:4, 1544-1575. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
322. Juan Carlos Muñoz, Diego Molina. 2009. A multi-unit tender award process: The case of Transantiago. *European Journal of Operational Research* 197:1, 307-311. [[Crossref](#)]
323. Sascha Füllbrunn, Tibor Neugebauer. 2009. Anonymity deters collusion in hard-close auctions: experimental evidence. *New Zealand Economic Papers* 43:2, 131-148. [[Crossref](#)]

324. DAVID CHAMBERS. 2009. Gentlemanly capitalism revisited: a case study of the underpricing of initial public offerings on the London Stock Exchange, 1946–86 1. *The Economic History Review* **62**:s1, 31-56. [[Crossref](#)]
325. Miguel Amaral, Stéphane Saussier, Anne Yvrande-Billon. 2009. Auction procedures and competition in public services: The case of urban public transport in France and London. *Utilities Policy* **17**:2, 166-175. [[Crossref](#)]
326. Audra L. Boone, J. Harold Mulherin. 2009. Is There One Best Way to Sell a Company? Auctions Versus Negotiations and Controlled Sales. *Journal of Applied Corporate Finance* **21**:3, 28-37. [[Crossref](#)]
327. Matthias Sutter, Martin G. Kocher, Sabine Strauß. 2009. Individuals and teams in auctions. *Oxford Economic Papers* **61**:2, 380-394. [[Crossref](#)]
328. X. Zhou, H. Zheng. TRUST: A General Framework for Truthful Double Spectrum Auctions 999-1007. [[Crossref](#)]
329. Dirk Engelmann, Veronika Grimm. 2009. Bidding Behaviour in Multi-Unit Auctions – an Experimental Investigation. *The Economic Journal* **119**:537, 855-882. [[Crossref](#)]
330. Offerman Theo, Onderstal Sander. Making uncompetitive auctions competitive: a survey of experiments 231-266. [[Crossref](#)]
331. Nathan Larson. 2009. Private value perturbations and informational advantage in common value auctions. *Games and Economic Behavior* **65**:2, 430-460. [[Crossref](#)]
332. Florian Englmaier, Pablo Guillén, Loreto Llorente, Sander Onderstal, Rupert Sausgruber. 2009. The chopstick auction: A study of the exposure problem in multi-unit auctions. *International Journal of Industrial Organization* **27**:2, 286-291. [[Crossref](#)]
333. Chung-An Chen. 2009. Antecedents of Contracting–Back-In. *Administration & Society* **41**:1, 101-126. [[Crossref](#)]
334. David Porter, Stephen Rassenti, William Shobe, Vernon Smith, Abel Winn. 2009. The design, testing and implementation of Virginia’s NOx allowance auction. *Journal of Economic Behavior & Organization* **69**:2, 190-200. [[Crossref](#)]
335. Laurent Lamy. 2009. The Shill Bidding Effect versus the Linkage Principle. *Journal of Economic Theory* **144**:1, 390-413. [[Crossref](#)]
336. Jill Windle, John Rolfe, Juliana McCosker, Andrea Lingard. 2009. A conservation auction for landscape linkage in the southern Desert Uplands, Queensland. *The Rangeland Journal* **31**:1, 127. [[Crossref](#)]
337. Jan Boone, Jacob K. Goeree. 2009. Optimal Privatisation using Qualifying Auctions. *The Economic Journal* **119**:534, 277-297. [[Crossref](#)]
338. Paul Klemperer. 2009. A New Auction for Substitutes: Central-Bank Liquidity Auctions, 'Toxic Asset' Auctions, and Variable Product-Mix Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
339. Jeroen Hinloopen, Sander Onderstal. 2009. Going Once, Going Twice, Reported! Cartel Activity and the Effectiveness of Leniency Programs in Experimental Auctions. *SSRN Electronic Journal* **31**. . [[Crossref](#)]
340. Maarten C. W. Janssen, Vladimir A. Karamychev, Emiel Maasland. 2009. Auctions with Flexible Entry Fees. *SSRN Electronic Journal* . [[Crossref](#)]
341. Paul Klemperer. 2009. The Product-Mix Auction: A New Auction Design for Differentiated Goods. *SSRN Electronic Journal* . [[Crossref](#)]
342. Krista Jabs Saral. 2009. An Analysis of Market-Based and Statutory Limited Liability in Second Price Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
343. Roger VICKERMAN. 2009. Regulation, Transport and Regional Performance. *Studies in Regional Science* **39**:1, 5-18. [[Crossref](#)]

344. John Debenham, Carles Sierra. An Agent Architecture for an Uncertain World 273-276. [[Crossref](#)]
345. Damien Geradin, Anne Layne-Farrar, A Jorge Padilla. 2008. Competing Away Market Power? An Economic Assessment of Ex Ante Auctions in Standard Setting. *European Competition Journal* 4:2, 443-462. [[Crossref](#)]
346. Sebastian Klimek, Anne Richter gen. Kemmermann, Horst-Henning Steinmann, Jan Freese, Johannes Isselstein. 2008. Rewarding farmers for delivering vascular plant diversity in managed grasslands: A transdisciplinary case-study approach. *Biological Conservation* 141:11, 2888-2897. [[Crossref](#)]
347. Roger Vickerman. 2008. Provision of public transport under conflicting regulatory regimes. *Transportation Research Part A: Policy and Practice* 42:9, 1176-1182. [[Crossref](#)]
348. T. W. Glebe. 2008. Scoring two-dimensional bids: how cost-effective are agri-environmental auctions?. *European Review of Agricultural Economics* 35:2, 143-165. [[Crossref](#)]
349. Radosveta Ivanova-Stenzel, Timothy C. Salmon. 2008. Revenue equivalence revisited. *Games and Economic Behavior* 64:1, 171-192. [[Crossref](#)]
350. Oliver Hinz, Martin Spann. 2008. The Impact of Information Diffusion on Bidding Behavior in Secret Reserve Price Auctions. *Information Systems Research* 19:3, 351-368. [[Crossref](#)]
351. Flåra Felsvø, Sander Onderstal. Procurement Design . [[Crossref](#)]
352. Thomas W. Hazlett. 2008. Property Rights and Wireless License Values. *The Journal of Law and Economics* 51:3, 563-598. [[Crossref](#)]
353. Nektaria V. Karakatsani, Derek W. Bunn. 2008. Intra-day and regime-switching dynamics in electricity price formation. *Energy Economics* 30:4, 1776-1797. [[Crossref](#)]
354. Gernot Müller, Margarethe Rammerstorfer. 2008. A theoretical analysis of procurement auctions for tertiary control in Germany. *Energy Policy* 36:7, 2620-2627. [[Crossref](#)]
355. Jill Windle, John Rolfe. 2008. Exploring the efficiencies of using competitive tenders over fixed price grants to protect biodiversity in Australian rangelands. *Land Use Policy* 25:3, 388-398. [[Crossref](#)]
356. Lucio Fuentelsaz, Juan Pablo Maicas, Yolanda Polo. 2008. The evolution of mobile communications in Europe: The transition from the second to the third generation. *Telecommunications Policy* 32:6, 436-449. [[Crossref](#)]
357. Kai Rintala, David Root, Graham Ive, Paul Bowen. 2008. Organizing a Bidding Competition for a Toll Road Concession in South Africa: The Case of Chapman's Peak Drive. *Journal of Management in Engineering* 24:3, 146-155. [[Crossref](#)]
358. Anna Alexandrova. 2008. Making Models Count*. *Philosophy of Science* 75:3, 383-404. [[Crossref](#)]
359. Andreas Albers, Christian Kahl. Design and Implementation of Context-Sensitive Mobile Marketing Platforms 273-278. [[Crossref](#)]
360. Dan Levin, Lixin Ye. 2008. Hybrid auctions revisited. *Economics Letters* 99:3, 591-594. [[Crossref](#)]
361. Hiroki Saitoh, Shigehiro Serizawa. 2008. Vickrey allocation rule with income effect. *Economic Theory* 35:2, 391-401. [[Crossref](#)]
362. Sandra Rousseau, Ellen Moons. 2008. The potential of auctioning contracts for conservation policy. *European Journal of Forest Research* 127:3, 183-194. [[Crossref](#)]
363. Helmut Azacis, Roberto Burguet. 2008. Incumbency and entry in license auctions: The Anglo-Dutch auction meets another simple alternative. *International Journal of Industrial Organization* 26:3, 730-745. [[Crossref](#)]
364. Georg Gebhardt, Achim Wambach. 2008. Auctions to implement the efficient market structure. *International Journal of Industrial Organization* 26:3, 846-859. [[Crossref](#)]
365. Julian Barquin. Energy auctions for regulated demand in the Iberian market: a proposal 1-6. [[Crossref](#)]

366. Christian Growitsch, Margarethe Rammerstorfer, Christoph Weber. Redesigning the balancing power market in Germany — a critical assessment 1-6. [[Crossref](#)]
367. John Kagel, Svetlana Pevnitskaya, Lixin Ye. 2008. Indicative bidding: An experimental analysis. *Games and Economic Behavior* **62:2**, 697-721. [[Crossref](#)]
368. Katerina Sherstyuk, Jeremy Dulatre. 2008. Market performance and collusion in sequential and simultaneous multi-object auctions: Evidence from an ascending auctions experiment. *International Journal of Industrial Organization* **26:2**, 557-572. [[Crossref](#)]
369. SANDRO BRUSCO, GIUSEPPE LOPOMO. 2008. BUDGET CONSTRAINTS AND DEMAND REDUCTION IN SIMULTANEOUS ASCENDING-BID AUCTIONS *. *The Journal of Industrial Economics* **56:1**, 113-142. [[Crossref](#)]
370. Thomas W. Hazlett. 2008. Optimal Abolition of FCC Spectrum Allocation. *Journal of Economic Perspectives* **22:1**, 103-128. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
371. Roumen Vragov, Di Shang, Karl R. Lang. Should Online Auctions Employ Dynamic Buyout Pricing Models? 381-381. [[Crossref](#)]
372. David Zetland. 2008. Conflict and Cooperation within an Organization: A Case Study of the Metropolitan Water District of Southern California. *SSRN Electronic Journal* . [[Crossref](#)]
373. Hillary Elmore, Brandon Stephens, L. Jean Camp. 2008. Diffusion and Adoption of IPv6 in the Arin Region. *SSRN Electronic Journal* . [[Crossref](#)]
374. Par Holmberg. 2008. Supply Function Equilibria of Pay-as-Bid Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
375. Marco Pagnozzi. 2007. Bidding to lose? Auctions with resale. *The RAND Journal of Economics* **38:4**, 1090-1112. [[Crossref](#)]
376. Flavio Menezes, John Quiggin. 2007. Games without Rules. *Theory and Decision* **63:4**, 315-347. [[Crossref](#)]
377. David McAdams, Michael Schwarz. 2007. Who pays when auction rules are bent?. *International Journal of Industrial Organization* **25:5**, 1144-1157. [[Crossref](#)]
378. Damien Geradin, Anne Layne-Farrar, Jorge Padilla. Standard setting, RAND licensing and ex ante auctions: The implications of asymmetry 143-154. [[Crossref](#)]
379. Michael H. Rothkopf. 2007. Decision Analysis: The Right Tool for Auctions. *Decision Analysis* **4:3**, 167-172. [[Crossref](#)]
380. Markus Groth. 2007. Ausschreibungen in der Agrarumweltpolitik: Konzeption und Ergebnisse der praktischen Umsetzung eines Modellvorhabens. *Perspektiven der Wirtschaftspolitik* **8:3**, 279-292. [[Crossref](#)]
381. Richmond D. Mathews. 2007. Optimal Equity Stakes and Corporate Control. *Review of Financial Studies* **20:4**, 1059-1086. [[Crossref](#)]
382. Eswaran Subrahmanian. 2007. A commentary on Mirowski's Market Comes to Bits: Evolution, Computation and Markomata in Economic Science: A view from theory-design relationship in engineering. *Journal of Economic Behavior & Organization* **63:2**, 321-332. [[Crossref](#)]
383. Gary D. Libecap. 2007. The Assignment of Property Rights on the Western Frontier: Lessons for Contemporary Environmental and Resource Policy. *The Journal of Economic History* **67:02**. . [[Crossref](#)]
384. Wu Wei-ku, Wen Dan-hui. Preventing Tacit Collusion in Chinese Electricity Reform 1-5. [[Crossref](#)]
385. Michael H. Rothkopf. 2007. Thirteen Reasons Why the Vickrey-Clarke-Groves Process Is Not Practical. *Operations Research* **55:2**, 191-197. [[Crossref](#)]
386. John H. Cawley, Andrew B. Whitford. 2007. Improving the Design of Competitive Bidding in Medicare Advantage. *Journal of Health Politics, Policy and Law* **32:2**, 317-347. [[Crossref](#)]

387. AUDRA L. BOONE, J. HAROLD MULHERIN. 2007. How Are Firms Sold?. *The Journal of Finance* **62**:2, 847-875. [[Crossref](#)]
388. David McAdams, Michael Schwarz. 2007. Credible Sales Mechanisms and Intermediaries. *American Economic Review* **97**:1, 260-276. [[Abstract](#)] [[View PDF article](#)] [[PDF with links](#)]
389. Steven L. Puller. 2007. Pricing and Firm Conduct in California's Deregulated Electricity Market. *Review of Economics and Statistics* **89**:1, 75-87. [[Crossref](#)]
390. Andrew B. Whitford. 2007. Designing Markets: Why Competitive Bidding and Auctions in Government Often Fail To Deliver. *Policy Studies Journal* **35**:1, 61-85. [[Crossref](#)]
391. Susan Athey, Philip A. Haile. Chapter 60 Nonparametric Approaches to Auctions 3847-3965. [[Crossref](#)]
392. Paul L. Joskow. Chapter 16 Regulation of Natural Monopoly 1227-1348. [[Crossref](#)]
393. Anthony M. Kwasnica, Katerina Sherstyuk. 2007. Collusion and Equilibrium Selection in Auctions. *The Economic Journal* **117**:516, 120-145. [[Crossref](#)]
394. Matthias Sutter, Martin G. Kocher, Sabine Strauß. 2007. Individuals and Teams in UMTS-License Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
395. David Chambers. 2007. Gentlemanly Capitalism Revisited: A Case Study of the Underpricing of Initial Public Offerings on the London Stock Exchange 1946-86. *SSRN Electronic Journal* . [[Crossref](#)]
396. Charles A. Holt, William Shobe, Dallas Burtraw, Karen L. Palmer, Jacob K. Goeree. 2007. Auction Design for Selling CO2 Emission Allowances Under the Regional Greenhouse Gas Initiative. *SSRN Electronic Journal* . [[Crossref](#)]
397. Damian R. Beil, Amy Cohn, Amitabh Sinha. 2007. Simplified Bidding and Solution Methodology for Truckload Procurement and Other Vcg Combinatorial Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
398. Leslie M. Marx. 2006. Economics at the Federal Communications Commission. *Review of Industrial Organization* **29**:4, 349-368. [[Crossref](#)]
399. Anne Yvrande-Billon. 2006. THE ATTRIBUTION PROCESS OF DELEGATION CONTRACTS IN THE FRENCH URBAN PUBLIC TRANSPORT SECTOR: WHY COMPETITIVE TENDERING IS A MYTH. *Annals of Public and Cooperative Economics* **77**:4, 453-478. [[Crossref](#)]
400. Cécile Aubert, Philippe Bontems, François Salanié. 2006. LE RENOUVELLEMENT PÉRIODIQUE DES CONTRATS DE CONCESSION: LE CAS DES SERVICES DE L'EAU. *Annals of Public and Cooperative Economics* **77**:4, 495-520. [[Crossref](#)]
401. Carine Staropoli, Céline Jullien. 2006. USING LABORATORY EXPERIMENTS TO DESIGN EFFICIENT MARKET INSTITUTIONS: THE CASE OF WHOLESALE ELECTRICITY MARKETS. *Annals of Public and Cooperative Economics* **77**:4, 555-577. [[Crossref](#)]
402. C.-K. Woo, Debra Lloyd, William Clayton. 2006. Did a local distribution company procure prudently during the California electricity crisis?. *Energy Policy* **34**:16, 2552-2565. [[Crossref](#)]
403. Jean-Pierre Benoît, Juan Dubra. 2006. Information revelation in auctions. *Games and Economic Behavior* **57**:2, 181-205. [[Crossref](#)]
404. Seungjin Han. 2006. Menu theorems for bilateral contracting. *Journal of Economic Theory* **131**:1, 157-178. [[Crossref](#)]
405. Pasquale L. Scandizzo, Marco Ventura. 2006. Bids for the UMTS system: An empirical evaluation of the Italian case. *Telecommunications Policy* **30**:10-11, 533-551. [[Crossref](#)]
406. Pehr-Johan Norbäck, Lars Persson. 2006. Endogenous asset ownership structures in deregulated markets. *European Economic Review* **50**:7, 1729-1752. [[Crossref](#)]
407. William E. Kovacic, Robert C. Marshall, Leslie M. Marx, Matthew E. Raiff. Bidding rings and the design of anti-collusive measures for auctions and procurements 381-411. [[Crossref](#)]

408. Emiel Maasland, Sander Onderstal. 2006. Going, Going, Gone! A Swift Tour of Auction Theory and its Applications. *De Economist* 154:2, 197-249. [[Crossref](#)]
409. William L. Megginson, Dario Scannapieco. 2006. The Financial and Economic Lessons of Italy's Privatization Program. *Journal of Applied Corporate Finance* 18:3, 56-65. [[Crossref](#)]
410. Jacob K. Goeree, Theo Offerman, Arthur Schram. 2006. Using first-price auctions to sell heterogeneous licenses. *International Journal of Industrial Organization* 24:3, 555-581. [[Crossref](#)]
411. Maarten C.W. Janssen. 2006. Auctions as coordination devices. *European Economic Review* 50:3, 517-532. [[Crossref](#)]
412. María-Ángeles de Frutos, Lambros Pechlivanos. 2006. Second-price common-value auctions under multidimensional uncertainty. *Games and Economic Behavior* 55:1, 43-71. [[Crossref](#)]
413. Arvind Ashta. 2006. Wine auctions: More explanations for the declining price anomaly. *Journal of Wine Research* 17:1, 53-62. [[Crossref](#)]
414. Lakeisha Daniel, Andrew Garman, Jane Grady, Marcia Phillips. 2006. E-bidding and Hospital Agency Usage. *JONA: The Journal of Nursing Administration* 36:4, 173-176. [[Crossref](#)]
415. Natalia Fabra, Nils-Henrik von der Fehr, David Harbord. 2006. Designing electricity auctions. *The RAND Journal of Economics* 37:1, 23-46. [[Crossref](#)]
416. Orly Sade, Charles Schnitzlein, Jaime F. Zender. 2006. When Less (Potential Demand) Is More (Revenue): Asymmetric Bidding Capacities in Divisible Good Auctions. *Review of Finance* 10:3, 389-416. [[Crossref](#)]
417. Leigh Tesfatsion. Chapter 16 Agent-Based Computational Economics: A Constructive Approach to Economic Theory 831-880. [[Crossref](#)]
418. Robert Marks. Chapter 27 Market Design Using Agent-Based Models 1339-1380. [[Crossref](#)]
419. Dawn G. Gregg, Steven Walczak. 2006. Auction Advisor: an agent-based online-auction decision support system. *Decision Support Systems* 41:2, 449-471. [[Crossref](#)]
420. Orly Sade, Charles Schnitzlein, Jaime F. Zender. 2006. Competition and Cooperation in Divisible Good Auctions: An Experimental Examination. *Review of Financial Studies* 19:1, 195-235. [[Crossref](#)]
421. M. Afergan. Using Repeated Games to Design Incentive-Based Routing Systems 1-13. [[Crossref](#)]
422. Sandra Rousseau, Ellen Moons. 2006. Auctioning Conservation Contracts: An Application to the Flemish Afforestation Policy. *SSRN Electronic Journal* . [[Crossref](#)]
423. David McAdams, Michael Schwarz. 2006. Credible Sales Mechanisms and Intermediaries. *SSRN Electronic Journal* . [[Crossref](#)]
424. David McAdams, Michael Schwarz. 2006. Who Pays When Auction Rules are Bent?. *SSRN Electronic Journal* . [[Crossref](#)]
425. Karla Hoffman. Choosing a Combinatorial Auction Design: An Illustrated Example 153-177. [[Crossref](#)]
426. Mukul G. Asher. 2005. Mobilizing non-conventional budgetary resources in Asia in the 21st century. *Journal of Asian Economics* 16:6, 947-955. [[Crossref](#)]
427. Per Andersson, Staffan Hultén, Pablo Valiente. 2005. Beauty contest licensing lessons from the 3G process in Sweden. *Telecommunications Policy* 29:8, 577-593. [[Crossref](#)]
428. Michel Mougeot, Florence Naegelen. 2005. DESIGNING A MARKET STRUCTURE WHEN FIRMS COMPETE FOR THE RIGHT TO SERVE THE MARKET*. *Journal of Industrial Economics* 53:3, 393-416. [[Crossref](#)]
429. Daniel W. Bromley. 2005. Purging the Frontier from our Mind: Crafting a New Fisheries Policy. *Reviews in Fish Biology and Fisheries* 15:3, 217-229. [[Crossref](#)]

430. Dan Levin, John H. Kagel. 2005. Almost common values auctions revisited. *European Economic Review* 49:5, 1125-1136. [[Crossref](#)]
431. Gary Stoneham, Nicola Lansdell, Anne Cole, Loris Strappazzon. 2005. Reforming resource rent policy: an information economics perspective. *Marine Policy* 29:4, 331-338. [[Crossref](#)]
432. Harald Gruber. The Economics of Mobile Telecommunications 71, . [[Crossref](#)]
433. Narjess Boubakri, Jean-Claude Cosset, Omrane Guedhami. 2005. Postprivatization corporate governance: The role of ownership structure and investor protection. *Journal of Financial Economics* 76:2, 369-399. [[Crossref](#)]
434. Axel Ockenfels, Reinhard Selten. 2005. Impulse balance equilibrium and feedback in first price auctions. *Games and Economic Behavior* 51:1, 155-170. [[Crossref](#)]
435. Klaus Abbink, Bernd Irlenbusch, Paul Pezanis-Christou, Bettina Rockenbach, Abdolkarim Sadrieh, Reinhard Selten. 2005. An experimental test of design alternatives for the British 3G/UMTS auction. *European Economic Review* 49:2, 505-530. [[Crossref](#)]
436. Atakelty Hailu, Steven Schilizzi. Learning in a "Basket of Crabs": An Agent-Based Computational Model of Repeated Conservation Auctions 27-39. [[Crossref](#)]
437. Svante Mandell. 2005. The choice of multiple or single auctions in emissions trading. *Climate Policy* 5:1, 97-107. [[Crossref](#)]
438. Miguel Andres Figliozzi, Hani S. Mahmassani, Patrick Jaillet. 2005. Impacts of Auction Settings on the Performance of Truckload Transportation Marketplaces. *Transportation Research Record: Journal of the Transportation Research Board* 1906:1, 89-96. [[Crossref](#)]
439. Orly Sade, Charles R. Schnitzlein, Jaime F. Zender. 2005. When Less (Potential Demand) is More (Revenue): Asymmetric Bidding Capacities in Divisible Good Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
440. Jan Boone, Jacob K. Goeree. 2005. Optimal Privatization using Qualifying Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
441. Elias Aravantinos. 2005. A New Pricing Model for Next Generation Spectrum Access. *SSRN Electronic Journal* . [[Crossref](#)]
442. Paul Klemperer. 2005. Bidding Markets. *SSRN Electronic Journal* 112. . [[Crossref](#)]
443. Atakelty Hailu, Steven Schilizzi. 2004. Are Auctions More Efficient Than Fixed Price Schemes When Bidders Learn?. *Australian Journal of Management* 29:2, 147-168. [[Crossref](#)]
444. Timothy N. Cason, Lata Gangadharan. 2004. Auction Design for Voluntary Conservation Programs. *American Journal of Agricultural Economics* 86:5, 1211-1217. [[Crossref](#)]
445. C-K Woo, I Horowitz, B Horii, R I Karimov. 2004. The efficient frontier for spot and forward purchases: an application to electricity. *Journal of the Operational Research Society* 55:11, 1130-1136. [[Crossref](#)]
446. Rafael Epstein, Lysette Henríquez, Jaime Catalán, Gabriel Y. Weintraub, Cristián Martínez, Francisco Espejo. 2004. A combinatorial auction improves school meals in Chile: a case of OR in developing countries. *International Transactions in Operational Research* 11:6, 593-612. [[Crossref](#)]
447. Ricardo D. Paredes, José Miguel Sánchez. 2004. Government Concession Contracts in Chile: The Role of Competition in the Bidding Process. *Economic Development and Cultural Change* 53:1, 215-234. [[Crossref](#)]
448. Harald Gruber. 2004. Is spectrum still a constraint for mobile telecommunications?. *info* 6:5, 289-297. [[Crossref](#)]
449. Yossi Sheffi. 2004. Combinatorial Auctions in the Procurement of Transportation Services. *Interfaces* 34:4, 245-252. [[Crossref](#)]

450. Joanne M. Tucker, Victor J. Massad. 2004. Effect of Buyer and Seller Experience on Buy It Now Pricing. *Journal of Internet Commerce* 3:2, 101-115. [[Crossref](#)]
451. Radosveta Ivanova-Stenzel, Timothy C. Salmon. 2004. Bidder Preferences among Auction Institutions. *Economic Inquiry* 42:2, 223-236. [[Crossref](#)]
452. Chi-Keung Woo, Rouslan I. Karimov, Ira Horowitz. 2004. Managing electricity procurement cost and risk by a local distribution company. *Energy Policy* 32:5, 635-645. [[Crossref](#)]
453. Ronald G. Cummings, Charles A. Holt, Susan K. Laury. 2004. Using laboratory experiments for policymaking: An example from the Georgia irrigation reduction auction. *Journal of Policy Analysis and Management* 23:2, 341-363. [[Crossref](#)]
454. Paul Milgrom. Putting Auction Theory to Work 92, . [[Crossref](#)]
455. C.K. Woo, D. Lloyd, M. Borden, R. Warrington, C. Baskette. 2004. A robust internet-based auction to procure electricity forwards. *Energy* 29:1, 1-11. [[Crossref](#)]
456. Tilman Börgers, Eric van Damme. Auction theory for auction design 19-63. [[Crossref](#)]
457. Timothy C. Salmon. Preventing collusion among firms in auctions 80-107. [[Crossref](#)]
458. Emiel Maasland, Yves Montangie, Roger van den Bergh. Levelling the playing field in auctions and the prohibition of state aid 108-129. [[Crossref](#)]
459. Maarten Janssen, Benny Moldovanu. Allocation mechanisms and post-allocation interaction 130-144. [[Crossref](#)]
460. Emiel Maasland, Benny Moldovanu. An analysis of the European 3G licensing process 177-196. [[Crossref](#)]
461. Jacob K. Goeree, Theo Offerman. 2004. Notes and Comments the Amsterdam Auction. *Econometrica* 72:1, 281-294. [[Crossref](#)]
462. Paul Klemperer. 2004. Auctions: Theory and Practice. *SSRN Electronic Journal* . [[Crossref](#)]
463. Maarten C. W. Janssen. 2004. Auctions as Coordination Devices. *SSRN Electronic Journal* . [[Crossref](#)]
464. Thomas W. Hazlett. 2004. Property Rights and Wireless License Values. *SSRN Electronic Journal* . [[Crossref](#)]
465. Richmond D. Mathews. 2004. Optimal Equity Stakes and Corporate Control. *SSRN Electronic Journal* . [[Crossref](#)]
466. Vragov. 2004. Why is eBay the King of Internet Auctions? An Institutional Analysis Perspective. *e-Service Journal* 3:3, 5. [[Crossref](#)]
467. Aurélie Coppe, Axel Gautier. 2004. Régulation et concurrence dans le transport collectif urbain. *Reflète et perspectives de la vie économique* XLIII:4, 65. [[Crossref](#)]
468. Johannes M. Bauer. Spectrum Management and Mobile Telephone Service Markets 247-265. [[Crossref](#)]
469. Flavio M. Menezes, Rohan Pitchford, Andrew Wait. 2003. Tendering and Bidding for Access: A Regulator's Guide to Auctions. *Australian Journal of Management* 28:3, 345-370. [[Crossref](#)]
470. Ravi Bapna. 2003. When snipers become predators. *Communications of the ACM* 46:12, 152-158. [[Crossref](#)]
471. Gary Stoneham, Vivek Chaudhri, Arthur Ha, Loris Strappazon. 2003. Auctions for conservation contracts: an empirical examination of Victoria's BushTender trial. *Australian Journal of Agricultural and Resource Economics* 47:4, 477-500. [[Crossref](#)]
472. Timothy N. Cason, Lata Gangadharan, Charlotte Duke. 2003. A laboratory study of auctions for reducing non-point source pollution. *Journal of Environmental Economics and Management* 46:3, 446-471. [[Crossref](#)]

473. Natalia Fabra. 2003. Tacit Collusion in Repeated Auctions: Uniform Versus Discriminatory. *The Journal of Industrial Economics* 51:3, 271-293. [[Crossref](#)]
474. Sven de Vries, Rakesh V. Vohra. 2003. Combinatorial Auctions: A Survey. *INFORMS Journal on Computing* 15:3, 284-309. [[Crossref](#)]
475. Darin Lee. 2003. Lessons from the Nigerian GSM auction. *Telecommunications Policy* 27:5-6, 407-416. [[Crossref](#)]
476. Johannes M Bauer. 2003. Impact of license fees on the prices of mobile voice service. *Telecommunications Policy* 27:5-6, 417-434. [[Crossref](#)]
477. Theodore C. Bergstrom. 2003. Vernon Smith's Insomnia and the Dawn of Economics as Experimental Science. *The Scandinavian Journal of Economics* 105:2, 181-205. [[Crossref](#)]
478. Paul Klemperer. 2003. Using and Abusing Economic Theory. *Journal of the European Economic Association* 1:2-3, 272-300. [[Crossref](#)]
479. T. Borgers, C. Dustmann. 2003. Awarding telecom licences: the recent European experience. *Economic Policy* 18:36, 215-268. [[Crossref](#)]
480. J Stern, R Turvey. 2003. Auctions of capacity in network industries. *Utilities Policy* 11:1, 1-8. [[Crossref](#)]
481. Dirk Neumann, Henner Gimpel, Carsten Holtmann, Christof Weinhardt. Agent-based Bidding in Electronic Markets 553-567. [[Crossref](#)]
482. A. Alexander Elbittar, M. Utku Ünver. On Determination of Optimal Reserve Price in Auctions with Common Knowledge about Ranking of Valuations 79-94. [[Crossref](#)]
483. Audra L. Boone, J. Harold Harold Mulherin. 2003. Corporate Restructuring and Corporate Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
484. Jon Stern, Ralph Turvey. 2003. Auctions of Capacity in Network Industries. *SSRN Electronic Journal* . [[Crossref](#)]
485. Paul Klemperer. 2003. Using and Abusing Auction Theory. *SSRN Electronic Journal* . [[Crossref](#)]
486. Maarten C.W. Janssen. 2003. Auctions as Collusion Devices. *SSRN Electronic Journal* . [[Crossref](#)]
487. Chris Ping-fai Chan, Patrick Laplagne, David Appels. 2003. The Role of Auctions in Allocating Public Resources. *SSRN Electronic Journal* . [[Crossref](#)]
488. Y. Stephen Chiu, Francis K. Cheung. 2003. Posted Price Clauses in Ascending Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
489. Richmond D. Mathews. 2003. Minority Stake Sales and Corporate Control. *SSRN Electronic Journal* . [[Crossref](#)]
490. Ronald C. Cummings, Charles A. Holt, Susan Laury. 2003. Using Laboratory Experiments for Policy Making: An Example from the Georgia Irrigation Reduction Auction. *SSRN Electronic Journal* . [[Crossref](#)]
491. John Cable, Andrew Henley, Kevin Holland. 2002. Pot of gold or winner's curse? An event study of the auctions of 3G mobile telephone licences in the UK. *Fiscal Studies* 23:4, 447-462. [[Crossref](#)]
492. Alvin E. Roth. 2002. The Economist as Engineer: Game Theory, Experimentation, and Computation as Tools for Design Economics. *Econometrica* 70:4, 1341-1378. [[Crossref](#)]
493. Paul Klemperer. 2002. How (not) to run auctions: The European 3G telecom auctions. *European Economic Review* 46:4-5, 829-845. [[Crossref](#)]
494. David J. Salant. Auctions of Last Resort in Telecom and Energy Regulatory Restructuring 143-160. [[Crossref](#)]
495. Paul Klemperer. 2002. Some Observations on the British and German 3G Telecom Auctions. *SSRN Electronic Journal* . [[Crossref](#)]
496. Productivity Commission. 2002. Radiocommunications. *SSRN Electronic Journal* . [[Crossref](#)]

497. Gary Stoneham, Vivek Chaudhri, Loris Strappazon, Arthur Ha. Auctioning biodiversity conservation contracts: an empirical analysis 387-416. [[Crossref](#)]
498. Per-Olof Bjuggren. The Swedish 3G Beauty Contest: A Beauty or a Beast? 277-291. [[Crossref](#)]
499. John Debenham. Information-Based Planning and Strategies 45-54. [[Crossref](#)]
500. Atul Saroop, Satish K. Sehgal, K. Ravikumar. A Multi-Attribute Auction Format for Procurement with Limited Disclosure of Buyer's Preference Structure 257-267. [[Crossref](#)]
501. . Auktionen 101-116. [[Crossref](#)]
502. D. Neumann, C. Weinhardt. Domain-independent enegotiation design: prospects, methods, and challenges 680-684. [[Crossref](#)]
503. R. Vragov. Implicit Consumer Collusion in Auctions on the Internet 174c-174c. [[Crossref](#)]