By Nina Mehta

Paul Klemperer is probably the best-known European auction theorist. From 1997 until 2000, he and economist Ken Binmore headed the team of analysts that advised the UK government about its sale of third-generation telecom licenses. The auction in spring 2000 raised more than five times the amount of money analysts had anticipated. Klemperer, an economics professor at Nuffield College, Oxford University, is the author of *Auctions: Theory and Practice* (Princeton University Press, 2004) and editor of *The Economic Theory of Auctions* (Edward Elgar, 2000). He is also a UK Competition Commissioner (comparable to a U.S. Federal Trade Commissioner; indeed he served as a consultant to the FTC in the late 1990s). Klemperer studied engineering at Cambridge University and received an MBA and, in 1986, a Ph.D. in economics from Stanford University. His research focuses on industrial organization and auction theory (for more information, see www.paulklemperer.org). In this interview, which was conducted in early July, he talks about telecom auctions, the Google IPO, and the future of auctions.

FEN: *In the spring of 2000 the British government raised 22.5 billion pounds sterling—2.5 percent of gross domestic product—in less than eight weeks by auctioning off five 3G telecom licenses. It was the most successful sale of telecom licenses ever. When the planning began for the sale in 1997, how radical a decision was it for the government to use auctions as a way to sell the licenses?*


Paul Klemperer

KLEMPERER: Actually, not very radical. The United States had started running spectrum auctions a few years earlier.

FEN: *From what I've read, the UK government's goals were basically to assign the licenses efficiently, to encourage competition, and to not get shafted by receiving too little money for the radio spectrum.*

KLEMPERER: That's right. The most important objective was to make sure the licenses went to those who would use them most efficiently. Subject to that, the government was keen to maintain a competitive industry and encourage new entry to the industry. And subject to those goals, the government wanted to raise revenues.

FEN: *One point you have repeatedly made is that a successful auction depends on its careful design. You caution that an auction should not be an off-the-rack affair. With the mobile phone licenses auction, how did you proceed?*

KLEMPERER: You're right that auction design is not one-size-fits-all. Our auction was even harder than usual because both government regulation and the technology were changing so rapidly that when we started thinking about this auction we didn't even know how many licenses it would be possible to auction. So we had to prepare for a number of different scenarios.

Otherwise the auction was much like any other. First of all, you have to use the mathematical tools of auction theory. Second, you have to think hard about the special features of the particular environment. You have to be very careful to stop any kind of cheating or collusion, or gaming of the rules. At the same time, you have to make the auction attractive to bidders. You'll never do well if you can't get people to show up to the auction. Indeed, many auctions have failed quite badly because designers did not recognize the basic need to get people to come and play the game. Finally, you've got to come up with something that's comprehensible and acceptable to the civil servants and politicians who must run the process, because they're the ones whose necks will be on the line if the process fails.

FEN: *Clearly you couldn't teach the politicians math. How did you explain such a complex process to them?*

KLEMPERER: It is important to use, wherever possible, analogies to processes they're familiar with. Another thing that's helpful is to simulate examples. For every auction design we proposed, we programmed the rules and had students or other experimental subjects play those auctions. Civil servants could watch what was happening, and that gave them a lot more comfort about how the auction would work.

FEN: *During the actual auction, what bidding strategies surprised you?*

KLEMPERER: We discovered that the way firms bid was less simple than expected, but not so far from expected that it interfered with the success of the auction. One bidder, for example, bid up the price on one license that it didn't intend to buy itself, probably in order to make somebody else pay a bit more. It might have done that to make the second company a less strong competitor in future auctions. Another reason might have been to make the management of the first company look relatively better by making it look like it got a better deal.

FEN: *In the kind of auction you ran, is it possible to raise too much money?*

KLEMPERER: No auction can raise more money than the thing is worth to bidders unless bidders do foolish things. In these kinds of auctions, it is implausible that the bidders would do unreasonably foolish things since such large sums of money are involved and they've all therefore hired auction experts themselves.

FEN: *What went wrong with some of the subsequent 3G auctions? They didn't attract enough entrants and bidding didn't go up as high?*

KLEMPERER: There were two main kinds of problems. One is that firms were able to coordinate their bidding, and the other is that firms didn't show up to the bidding. A clear example of the former problem was the Austrian auction where 12 blocks of spectrum were for sale and there were six bidders. Firms understood they would do well to simply divide the market so that they each won two blocks, and that they could do that at a low price. The rules of the auction didn't stop them from doing that, and in fact made it rather easy for them to do so.

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A good example of an auction where entry was put off was the one run by the Netherlands. There were five licenses for sale, but there were five strong incumbent bidders, so it was clear who the natural winners of the licenses were. The Dutch government rather foolishly chose to copy the UK, which had sold five licenses very successfully, by essentially an ascending auction. The Dutch failed to recognize that the UK context was quite different. In the UK we also sold five licenses but we had only four incumbent operators who were allowed to win only one license each, so there was good reason for new entrants to come in since one was guaranteed to win. Both the Austrian and the Netherlands auctions made less than one-third of what they should have made—those governments threw away billions of dollars by choosing the wrong auction design.

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FEN: *Let's move on to Google. The company decided to organize its IPO through an auction because it deemed an auction to be more fair and transparent. Other IPOs run by WR Hambrecht have taken place through auctions, but this is a very large offering and chances are that there will be a lot of retail participation. This interview will probably be published after the Google auction, but right now what risks does Google face?*

KLEMPERER: If Google's founders are serious in their statements that they want a fair process and they want to achieve a share price that reflects a fair-market valuation, and if they are concerned about maintaining good will and brand loyalty, then they should worry that the design they proposed in their initial filings may get people bidding too much and overpaying.

"AT THE VERY LEAST, GOOGLE NEEDS TO EDUCATE RETAIL INVESTORS MORE ABOUT THE RISKS THEY FACE."

Google is quite different from auctioning spectrum. My earlier answer that there wasn't a risk of raising too much money applied to the telecom context but not to the Google context, where there are hundreds of thousands or even millions of inexperienced potential bidders. The nature of an auction is that the winners are the most bullish and optimistic bidders. People who make the mistake of overbidding will be the winners—it's called the "winner's curse." Sophisticated bidders are aware of this and adjust their bids accordingly: they base their bids not on their initial estimate, but on a somewhat lower view which allows for the fact that winning estimates are often too high. Retail investors need to ask themselves, "If I'm a winner, is that because I've beaten the smart money? And if so, what does that mean?"

FEN: *The clearing price for the IPO will be the lowest winning price. If I'm bidding and I think Google is worth $40 a share, why not bid $45 or $50 in order to be sure I get some shares? I'd get it at a lower price than I was bidding.*

KLEMPERER: If you're comfortable that the person who sets that lowest price is someone who has done his homework and not overbid, that would be fine. If sufficiently many people were like you, it could be disastrous. If enough people bid $50, then the lowest winning price would be $50 and you will have paid more than you wish.

FEN: *I wasn't actually planning to bid, but I suppose now I have good reason to stay away. If the Google founders gave you a clean slate and asked you to redesign their auction, what would you do to avoid some of the risks posed by retail investors being unfamiliar with auctions?*

KLEMPERER: Ideally they'd run a different kind of auction that gave ordinary retail investors more information about how more-informed people valued the stock. That might mean running an auction for institutions and giving small investors the option of simply taking small allocations at the same price, or perhaps even running an ascending auction similar to the kind you'd see at Sotheby's or on eBay, in which you also allowed individual retail bidders to observe and, if they wished, to mimic the institutions. At the very least, Google needs to educate retail investors more about the risks they face. Their more-recent SEC filings have moved in that direction, perhaps in response to my and others' criticisms. I hope they'll do still more to educate and inform retail investors, and that by the time your readers see this, they'll have run a successful auction.

FEN: *I know you think auctions are the best choice in a great many pricing situations. But what wouldn't you auction?*

KLEMPERER: If I deliberately wanted to be a bit non-transparent, I might not use an auction. Or if I couldn't specify my own objectives clearly at the beginning of the process, I might not use an auction. For example, if you are deciding who should receive a franchise to run a TV station, you might care about the quality and style of programming. You might want people to put in bids which describe not just how much money they would pay for the franchise, but also what they would do with the franchise; and you may wish to choose a winner partly on the basis of that. If you couldn't specify in advance exactly how you would measure quality, you might want to just look at the proposals when they come in and then make a choice, and perhaps then go on to a phase of negotiation with the preferred bidder.

FEN: *What can be priced via auctions that isn't being priced that way right now?*

KLEMPERER: I'm sure the role of auctions will continue to grow in financial markets, not just in IPOs—whatever the outcome of Google's current offering—but in many other areas where trading processes are not as efficient as they could be. Securities lending would be one example.

Some other areas where auctions have a big future are the environment, energy and transport. In the environmental area we're already seeing auctions for pollution permits. The government fixes a total amount of pollution that's acceptable, and auctions off the right to produce that amount of pollution. It's a more efficient way of achieving a given amount of pollution—or, put in a more positive way, a given amount of clean air—than simply allocating permits in some other way, or setting standards which apply equally to everyone, however hard or easy each company finds it to reduce pollution.

Those kinds of auctions may become more important—not just for traditional pollutants, but for greenhouse gases. I recently helped the UK design and run the world's first greenhouse gas auction, and there will be more such auctions in the rest of Europe. If a Kyoto-like treaty ever comes into force, especially if it includes the US, there might one day be very substantial auctions for quotas of greenhouse gases.

FEN: *What about in transport?*

KLEMPERER: A transport example is airport landing slots. At the moment, they're allocated in a very murky way. They are usually owned by the incumbents, it's hard to trade them, and certainly there's no thought of auctioning them. Auctioning rights to those valuable assets would be appropriate and might be something we'll see in the European Union in the near future.

FEN: *What are some of the complications or perils associated with auctioning off those landing slots?*

KLEMPERER: A landing slot is no use without a takeoff slot that matches it, so there are important complementarities between slots. You need a sophisticated auction to manage that. Another thing to worry about is that you don't want firms to gain market power in the airline market through the auction. You'd have to make sure a single company is not allowed to buy up too many slots in one airport.

FEN: *You say in your new book that auction theory can also explain a lot of other economics, such as buying frenzies and crashes in the stock market.*

KLEMPERER: Yes. The tools of auction theory have turned out to be very useful in understanding many other kinds of contests, including patent races, takeover battles, and the way oligopolistic businesses compete. It's because auctions are such simple trading environments that their methods can be building blocks for modeling much more complex environments—such as stock markets. Auction theory is now being applied to questions in labor economics, macroeconomics and even political science.

FEN: *When you boil everything down, what's the real point of an auction?*

"AUCTION THEORY IS NOW BEING APPLIED TO QUESTIONS IN LABOR ECONOMICS, MACRO-ECONOMICS AND EVEN POLITICAL SCIENCE."

KLEMPERER: An auction allows us to collect information about what the right price is for something when none of us knows it, and often allocates resources more efficiently. Auctions also have an important role in helping us test the basis of economic behavior. The rules are clearly defined and everyone knows what's allowed and what isn't, in contrast with most ordinary economic environments in which people have all kinds of differing objectives and all kinds of different choices. Economists study auctions for the same reason that biologists study fruit flies. A lot of biology is done by studying the fruit fly because it's a very simple organism, and biologists hope they'll get insights that help them to understand more complex organisms such as humans. Auction theory is the economist's fruit fly.

[This interview was conducted six weeks before the Google IPO auction. For Paul Klemperer's comments on what actually happened, see http://www.paulklemperer.org/google]