

# Any advance on £22.5 billion?

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Paul Klemperer tells **Karl Sabbagh** how academics made the government a lot of cash by devising a telecoms auction

**F**or me, economics has always seemed a bit like meteorology. When economists get it right, it is quite useful, but when they are wrong there are all sorts of post hoc reasons why they were still really right.

So when economist Paul Klemperer pointed out that earlier this year he and his fellow economist Ken Binmore, both specialists in the theory of auctions, had helped to make £20 billion for the government (and therefore for you and me) I had to admit that — if he was right — economics had made the equivalent of a correct meteorological forecast of the famous storms of 1987 (which, of course, the meteorologists got wrong).

Klemperer is professor of economics at Nuffield College, Oxford, and within moments of my arrival in his office, he had my head whirling with the “Bag of Coins Problem”, a simulation Klemperer uses in his classes to introduce the topic of auction theory. Waving a bag of 5p pieces in the air, he asked me how much I would bid for the bag, based on my guess of how much was in it. Feebly, I made a stab at £3.40 and was wrong by a factor of four, since there was £15 in the bag. We were off to a bad start.

At least I did not overestimate, since I might then have ended up paying more for the bag of money than there was in it. But the analogy was a useful introduction to the psychology and economics of auctions.

By bidding wildly low I had avoided “the winner’s curse” — a fate you suffer if you estimate too high a value for something you want. It is an important factor in auctions or takeover bids. If you want to buy something — a company, a franchise or whatever — you would normally work out what you think its value is and then offer, say, 80 per cent of that, so that you make a profit of 20 per cent. If you underestimate its value among a lot of other bidders, it is likely that you will not win — others will guess higher. If you overestimate, you might win, but then, if you have overestimated, you will not make the 20 per cent you thought you would. You might even make a loss. That is the winner’s curse.

So although I would not have acquired the bag of money in Klemperer’s informal auction, because someone was bound to have bid more, I would not have lost money either by paying, say, £25 for a £15 bag, which often happens in Klemperer’s classes.

Klemperer sees himself as a one-handed economist, from an old joke attributed to United States president Harry Truman. Truman apparently said: “I wish you could send me a one-handed economist. Every economist that comes to see me says, ‘On the one hand... but on the other hand.’”

“The profession as a whole — at least the macro-economics profession — acts like a two-handed economist,” says Klemperer, “and there’s no clear policy prescription. Micro-economics, the study of small situations like auctions, is much more the domain of one-handed economists.” By which he means that he and his micro-colleagues more often “get it right” when they make forecasts based on economic theory. And he offered the role of economists in devising the recent £22.47 billion telecom auction as a case in point.

At the auction, as Ken Binmore, professor of economics at University College London, explains on his website, the government sold five licences to use specific radio frequencies for the next generation of cellular phones. This was an example of how, with the help of economic theory, it is possible to achieve a major public policy success. “In this case

apparently abstract research was actually very relevant. It is good that people can see that economists can play this useful role. The most important thing was running the auction at all, rather than just selling licences as in the past. Last time the firms paid £40,000. This time they paid more than £4 billion for each licence, which revolutionises the government's finances." Game theory may be applied again in future transactions, for instance in the competition to gain the rights to broadcast Premiership football.

What then was the magic ingredient that transformed a potential £40,000 into £22 billion? Because if that is what economists can do for the country, let us give them all a peerage, a Porsche and a pad in Mayfair.

The auction was fairly similar to an ascending bid auction, as practised at Christie's and Sotheby's. But there were one or two extra rules. Companies were allowed to bid for only one licence at a time. After the first round, five out of 13 interested companies went forward to the second round, with their bids published.

The eight unsuccessful bidders now had the right to make a bid for any of the five licences. In fact, they had to if they wanted to stay in the auction. Those bids had to be at least 5 per cent above the figures on the table. After the second round, three of the five previously successful bidders were displaced by three of the eight unsuccessful ones. But the three displaced participants



**Money man: Klemperer helped the government raise £22bn**

and the remaining unsuccessful ones could stay in the auction if they wanted to, by making a yet higher bid for one of the five licences.

Obviously, as the amounts rise for each licence, some of the bidders will drop out, and the auction finishes when there are only five bidders left.

In a flurry of bidding by fax, each round constrained to a half-hour time-frame, the auction went to 150 rounds until the final five bidders were left — leaving the government reeling at the final figures. "The government's advisers — not me — thought that the auction was going to raise £3 billion to £4 billion in total," Klemperer told me, "and it actually raised £22.5 billion."

This showed the limitations of the government's knowledge of the true value of these franchises to the bidders. "There were individuals in the firms who knew they were going to bid £4 billion to £6 billion per licence, because that is what they did in the end. They must have known where they were going. But the government couldn't collect that information: the only way you can collect the information is by forcing people to put their money where their mouths are."

At the end of our discussion, having told me how much auction theory had made for the government, Klemperer pointed out rather wryly that funding of academic economics is actually being cut back: "I am the

**'It's good that people can see that economists can play this useful role'**

director of the MPhil programme, a two-year taught course that I regard as an extremely valuable programme. But the Economic and Social Research Council will not fund two-year taught programmes any more, which is completely contrary to the way the rest of the world is moving.

"If you went to America, any graduate programme would give you at least two years of teaching before you moved on to doing your thesis. It is therefore very unfortunate that the changing in the funding rules is going to cut off support to this programme. And it is important not just to those who want to become academic economists, but those who want to become professional economists working, for example for the Treasury, or the Bank of

England, or the government more broadly, or in the City, or for a business. And many people who come on the MPhil follow those routes."

If we were in a world where taxes raised by a road-fund licence would be spent on roads, for example — I suppose it could be argued that the profits of the UK spectrum auction would go to the economists who made that extra £18 billion. On the other hand...

For more details about auction theory see: <http://www.nuff.ox.ac.uk/economics/people/klemperer.htm>.

## Executive Summary

**This month we spoke to Professor Klemperer, the Oxford economist and principal theorist behind the third-generation (3G) mobile licence auction in the UK.**

The third-generation (3G) mobile licence auction raised £22.5 billion for the Exchequer, an amount some five times higher than analysts were predicting. Gordon Brown has prudently pledged to use this windfall to help pay off the national debt (£339.4bn in March 2000), thereby saving the UK economy some £1 billion a year in interest repayments. The size of the windfall is widely credited to the effective design of the auction, based on the insights of game theory.

As the Internet facilitates the use of auctions in new markets and drives down the costs of participation, auctions are likely to become increasingly pervasive. The question is, do auctions always get it right?

“Auctions are not a panacea”, says Professor Klemperer. “They have to be carefully designed with the specific conditions of the market in mind. The scope for companies to collude or deter entry has to be minimised. But with the correct mechanism auctions can result in big efficiency improvements”.

This is because, where there are information asymmetries, bidders know more about the value of an asset to their business than the seller does. In the case of the current auctions for telecoms licences, bidders are willing to pay an amount equal to the discounted future profits they expect to receive. Auctions can theoretically act as a 100% tax on supra-normal profits (hence their unpopularity with telcos!).

**He stresses the economic benefits of auctions, but warns against the potential pitfalls.**

Get it wrong, however, and the results can be disastrous. In America there have been instances of bidders using the final four numbers of their multi-million dollar bids as a collusive signal about which telephone code area they want to buy. In New Zealand tacit collusion allowed one bidder to pick up the rights to a tranche of the mobile phone spectrum for just NZ\$6.

As the Internet extends the use of auctions into new areas, businesses need to learn the lessons of auction theory. In business-to-business (B2B) markets, where prices are increasingly determined through real-time interaction with customers and suppliers, it is essential that companies design their auction mechanisms and strategies effectively.

Ultimately end-consumers will benefit from the increased efficiency of auctions, but innovative companies, game theorists and consultants also stand to gain as auctions begin to enter the mainstream of business thinking.

And finally, we asked Professor Klemperer if £22.5 billion is the largest amount of money ever made from an economic theory. His answer:

“I don't know, but Karl Marx certainly destroyed a lot more value with his.”

Further information on auction theory can be found at:  
<http://www.nuff.ox.ac.uk/economics/people/klemperer.htm>