Creating confidence in cash

A new auction mechanism devised at Oxford is strengthening the financial system, as *Anthea Milnes* discovers

'A world first in central banking...potentially a major step forward in practical policies to support financial stability'

Paul Fisher, Executive Director of the Bank of England

The Bank of England has started using a new auction designed by Paul Klemperer, the University's Edgeworth Professor of Economics, which should help make the financial system more robust.

Professor Klemperer has been helping the Bank *pro bono* since he was approached by Mervyn King, Governor of the Bank of England, at the onset of the credit crunch in 2007. Following the run on Northern Rock, King urgently needed to be able to pump large amounts of cash into the commercial banks and building societies in order to prevent the collapse of the financial system. The Bank's own auctions – in which the banks and building societies make bids to borrow money in return for interest payments – had failed to get funds to where they were most desperately needed.

'Successful auction design involves mathematical modelling, data analysis and a good understanding of both the bidders' and the auctioneer's objectives,' Klemperer explains. 'The rules that govern an auction will affect whether bidders participate, how they bid, and whether they will try to manipulate or undermine the auction.' The process of designing the auction therefore involved specifying what kinds of bids were possible, how the winners would be determined, what the winners would get, and what they would pay.

The Bank of England's situation was particularly challenging because different bidders were asking for loans of funds on different terms, specifically offering different collateral as security for these loans, and the Bank wanted to be able to charge winners different interest rates accordingly. (Charging the same interest rates for risky loans as for safe ones would encourage borrowers to undertake riskier activities.) Making things even harder, the Bank wanted the amount of funds linked to each different type of collateral to depend on the bidding, because the Bank neither had enough information to specify these amounts in advance, nor did it want to publicly reveal its own view of the severity of the crisis. Furthermore, bidders might want to make 'either/or' bids, for example, a bidder might like to win A or B but not both, or would be willing to pay £*x* more to receive A than to receive B.

Klemperer had developed auctions designed to generate multiple prices for multiple goods previously, including the 3G mobile phone licence auction, which sold five licences of three different sizes, famously netting the British government £22.5bn in 2000 – five times the predicted amount. However, that auction, and others like it, required many rounds of bidding: the 3G auction took 150 rounds which took place over seven weeks. Since financial markets move fast, the Bank of England's auction had to run instantaneously, so new techniques were required. Permitting the amounts of funds loaned to vary in response to the bidding was also an innovation.

Klemperer came up with a solution he christened the Product-Mix Auction, a single auction for multiple types of funds that would allow borrowers to simultaneously submit combinations of bids, and would also allow the Bank to avoid specifying the proportions of different types of funds it allocates until after the bidding. 'And crucially,' Klemperer explains, 'it is much quicker and simpler to use and less vulnerable to collusion than existing multi-price auctions.'

Paul Fisher, Executive Director of the Bank of England, commented: 'The Bank's Indexed Long-Term Repo [auctions] represent a world first in central banking...This is potentially a major step forward in practical policies to support financial stability.'

Now that Klemperer's design has been successfully used by the Bank of England, other Central Banks are considering implementing it. A similar approach could also have important applications elsewhere, such as the purchase of electricity generated in different locations. It might also be used as a mechanism for trading biodiversity, for example, by allowing developers to trade off development in one place against greater conservation elsewhere. Klemperer is working with doctoral students Elizabeth Baldwin and Daniel Marszalec on improving his design further.

'Many people think auctions are just about raising lots of money,' Klemperer says. 'It's nice to demonstrate that well-designed auctions can also help with more important problems, such as making the financial system safer, and conserving the environment.'