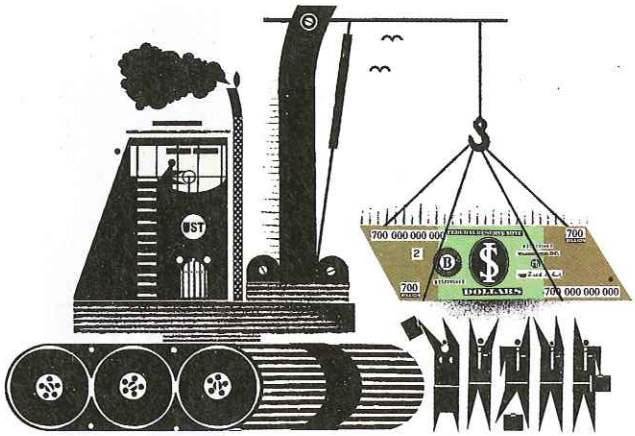
The Undercover Economist

My advice to the US Treasury? Go back to Plan A



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IMAGINE AN AUCTION IN A LOOKING-GLASS WORLD, WITH THE AUCTIONEER OFFERING CASH TO THE HIGHEST BIDDER and the participants frantically outbidding each other with a jumble of assorted assets. Should a million dollars be sold to the man in the front row for his bundle of 2006-vintage toxic mortgage securities? Or the lady behind him, for her 2005-vintage offering?

That was the auction the US Treasury was hoping to hold until it abruptly changed its plans in November. It was going to spend up to $700bn – the "Tarp" (toxic asset relief programme) fund – buying a variety of toxic assets from banks. The idea made sense: by establishing a market price for these dubious assets, the auction would have improved transparency and helped solvent banks to prove that they really were solvent.

The Tarp fund was then cannibalised to recapitalise banks (probably a good idea) and then dole out suitcases of cash to all-comers (a less good idea). But the original auction concept should be resurrected, because it solves a problem that has not gone away.

And yet – how could the looking-glass auction work without the US Treasury overpaying for junk? Holding a single auction with a single price would be a disaster: only the most worthless assets would have been offered for sale. To do the job properly and establish realistic prices, the auction needs to distinguish between different assets: some good, some bad and some ugly.

But simply holding many different auctions is not much better. Once finished, a bank might be surprised by the prices, wishing it had sold more of one kind of asset at a generous price, and fewer of its others. Not only would the banks have acted differently with hindsight, but the Treasury would want them to, in the interests of higher revenue and more price transparency.

So two economists from the University of Maryland, Larry Ausubel and Peter Cramton, proposed a dynamic design that would have allowed banks to adjust their bids as the auction proceeded, shifting their emphasis to compete more aggressively wherever prices seemed tempting. The auction was tested to destruction by graduate students and seemed to work well. But there is a flaw: each auction would take a day, with the auction prices affecting financial markets and the markets affecting the auction prices.

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However, a solution was already being developed to answer a similar problem for the Bank of England. Paul Klemperer, one of the economists behind the 3G mobile spectrum auctions in the UK, has published a paper explaining how the Bank might auction off loans secured against different qualities of collateral.

He suggests having banks simultaneously submit combinations of bids. Each bank would be considering different scenarios – one in which loan rates were high and it preferred to borrow the absolute minimum; another in which rates were low and it happily offloaded collateral to the Bank of England.

The same approach could work for a Tarp auction, too; Klemperer and three economists from Stanford have been working out the details. A computer would compile bids from both sides, with both the banks and the US Treasury saying in advance what they would be willing to buy or sell at different possible prices. The computer would calculate the result. Because each bidder submitted bids to cover each eventuality, the auction should be efficient and nobody would regret having told the computer the truth.

Whether the US Treasury will relent and return to an auction remains to be seen. The Tarp auction is a fiendishly difficult design problem, but it looks solvable. At the time of writing, it seems that the Treasury prefers to spend the cash ad hoc. Shame.

Tim Harford is author of "The Logic of Life".

Central bank liquidity and “toxic asset” auctions

Paul Klemperer
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The crisis set policymakers scrambling for appropriate mechanisms to respond to financial turmoil. This column proposes a new auction design that can be used for toxic asset purchases and central bank liquidity auctions in a credit crunch.

The crisis began in early August 2007, and a bank run led to Northern Rock’s collapse in mid-September. The Bank of England wanted urgently to supply liquidity to banks and was therefore willing to accept a wider-than-usual range of collateral, but it wanted a correspondingly higher interest rate against any weaker collateral it took.

A similar problem faced the US Treasury during its autumn 2008 Troubled Asset Relief Program where it planned to spend up to $700 billion on “toxic assets” with a face value well in excess of $1 trillion (Pagano 2008). There were on the order of 25,000 closely related but distinct securities and perhaps 300 likely sellers, but the largest ten sellers held something like two-thirds of the toxic assets.

Complicating matters in both cases, the pace of financial markets required any auction to take place at a single instant, thus ruling out many of the multistage auction techniques used in other areas. The problem with multi-stage auctions in the financial world is that bidders who entered the highest bids in early stages might change their minds about wanting to be winners before the auction closed. Moreover, financial markets themselves might be influenced by the evolution of the auction creating opportunities for manipulation.

How to proceed: A new auction design

How should goods that both seller(s) and buyers view as imperfect substitutes be sold, especially when multi-round auctions are impractical? This column outlines a new solution to all these problems – the “Product-Mix Auction” (so-called because it solves the general problem of a firm that can offer multiple product varieties to customers with different preferences, subject to capacity and other constraints).

My design is straightforward in concept – each bidder can make one or more bids, and *each* bid contains a *set* of mutually exclusive offers. Each offer specifies a price (or, in the Bank of England’s auction, an interest rate) for a quantity of a specific "variety". The auctioneer looks at all the bids and then selects a price for each "variety". From each set of offers in each bid, the auctioneer accepts the one that gives the bidder the greatest surplus evaluated at the selected prices or no offer if all the offers would give the bidder negative surplus. All accepted offers for a variety pay the same (uniform) price for that variety.

The idea is that the menu of mutually exclusive bids allows each bidder to approximate a demand function, so bidders can, in effect, decide how much of each variety to buy *after* seeing the prices chosen. Meanwhile the auctioneer can look at demand *before* choosing the prices. (Allowing the auctioneer to choose the prices *ex post* creates no problem here because it allocates to each bidder precisely what that bidder would have chosen given those prices in the environments for which the auction is proposed.) Importantly, offers for each variety provide a competitive discipline on the offers for the other varieties, because they are all being auctioned simultaneously.

Comparing a product-mix auction with existing approaches

Compare this with the three "standard" approaches:

The first traditional approach is to run a separate auction for each different “variety”. In this case, outcomes

are erratic and inefficient, because the auctioneer has to choose how much of each variety to offer before learning bidders' preferences, while bidders have to guess how much to bid in each auction without knowing what the price differences between varieties will turn out to be. The wrong bidders may win, and those who do win may be inefficiently allocated across varieties.

Furthermore, each individual auction is much more sensitive to market power, manipulation, and informational asymmetries than if all offers compete directly with each other in a single auction. The auctioneer's revenues are correspondingly generally lower. Thus, for example, if the US Treasury had simply predetermined the amount of each type of security to purchase, ignoring the information about demand for the large number of closely related securities, competition would have been inadequate because of the highly concentrated ownership of the assets. All these problems also reduce the auctions' value as a source of information. They may also reduce participation, which can create "second-round" feedback effects further magnifying problems.

A second common approach is to set fixed price supplements for "superior" varieties and then auction all units as if they are otherwise homogenous. This can sometimes work well, but such an auction cannot take any account of the auctioneer's preferences about the proportions of different varieties transacted. In any case, a central bank might not want to disclose its view of appropriate price-differentials for different collaterals to the market in advance of the auction. Furthermore, the auctioneer suffers from adverse selection. If, for example, the US Treasury had simply developed a "reference price" for each asset, the bidders would have sold it large quantities of the assets whose reference prices were set too high – and mistakes would have been inevitable, since the government had much less information than the sellers.

The final approach that is sometimes used is the simultaneous multiple round auction – the multi-stage auction in which bidders take turns bidding on multiple assets until no one wants to bid again on any asset. My product-mix auction yields similar outcomes but is more robust against collusion and other abuses of market-power. Furthermore a simultaneous multiple round auction is often infeasible – especially in financial markets – because of transaction costs, the time required to run it, or because its complexity is too off-putting to bidders.

In Klemperer (2009), I show how my new approach – the product-mix auction – can be implemented, and that it is simple, robust, and easy for bidders to understand, so that they are happy to participate.
The product-mix auction yields better "matching" between suppliers and demanders, reduced market power, greater volume and liquidity, and therefore also improved efficiency, revenue, and quality of information than feasible alternatives. Its potential applications therefore extend well beyond the financial context.

References

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Pagano, Marco (2008). "What is a reverse auction?", VoxEU.org, 21 October.

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