Methods for Distributing Gilts: A Reply

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New York, December 2008

On 17th December 2008 the DMO published a wide-ranging consultation[2], asking whether there are other methods, or improved methods, by which the DMO could distribute gilts.

This paper describes an improvement to the auction mechanism, and also proposes that the DMO should also sell short-dated call options on long-dated gilts.

Summary

This paper describes three improvements to the distribution of gilts.

1. In ¶26 of the consultation is a remarkable admission:

   > *The additions to gilt issuance … were skewed towards short (and medium) maturity gilts. The increase in the skew of issuance towards short maturity conventional gilts was in accordance with the Government's debt management objective but also reflected the operational requirement to raise a significant amount of additional finance in a relatively short period of time …*

   The "reflected the operational requirement" is the tail wagging the dog, and strongly suggests that a better auction mechanism, one less risky for both seller and buyers, would have given the DMO more flexibility in its choice of maturity. And there is such a better auction mechanism, described in the section entitled *Auctionettes.*

2. Small auctions, or mini-tenders, or even the old Bank-of-England-style taps, decided at short notice, have the advantage of allowing the authorities to sell into a rising market, without exacerbating falling markets. But the fact that the DMO would need to take a decision—is the market rising?—makes this untransparent and introduces new uncertainties. So the DMO should not take the decision: instead the market should, via the DMO selling short-dated call options on long-dated gilts. In return for a little uncertainty about its pace of funding, gilts could be sold more quickly and for more money raised. The details are explained in the section entitled *Selling Call Options*.

3. Separating the sale of the duration from the sale of an instrument costing up-front cash would improve the all-in sale price of long-dated gilts. This argument is not repeated here as it was discussed in a recent paper[3], on which the DMO has commented[4].

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New York, December 2008

[1] This reply also published at and via www.jdawiseman.com/papers/finmkts/distributing_gilts.html.

[2] *Supplementary Methods For Distributing Gilts: A Consultation Document*, 17th December 2008, www.dmo.gov.uk/documentview.aspx?docName=/publications/giltsmarket/consultationpapers/cons171208.pdf.

[3] G*ilt Asset Swaps: DMO Should Profit*, October 2008, www.jdawiseman.com/papers/finmkts/dmo_asset_swap.html.

[4] *Gilt Asset Swaps: Stheeman's Reply*, 25th November 2008, www.jdawiseman.com/papers/finmkts/dmo_asset_swap_stheeman.html.

Auctionettes[5]

Auctions as currently constructed contain two risks.

- Timing risk. If bond markets fall after the deadline for bids but before the publication of results, a trader cannot know whether to hedge all, some, or none of the potential exposure. Over the years the DMO has worked on reducing the time taken to calculate and publish the result, but the risk remains.
- Auction risk—the risk that the auction itself will cause markets to move. If there are few bids at an auction it is likely that any given bid will be filled. The shortage of bids becomes apparent when the results are announced, and the market falls in response. So a bid is most likely to be filled if the market is about to fall, and least likely to be filled if the market is about to rally. Bidders are aware of and do fear this asymmetrical risk, and compensate by underbidding.

An auction mechanism that eliminates these two risks should increase the average sale price. Happily, there is such a mechanism, a mechanism that would also reduce the too-few-bids risk faced by the seller.

The auction mechanism

The DMO should not sell a single lump of £4 billion of gilts. For the market to absorb so much comfortably, each market participant needs more information about how much other market participants would be willing to pay. So instead such auctions should be split into smaller pieces.

Each auction should consist of forty 'auctionettes'. These auctionettes, conducted electronically, would be held one minute apart. The 39-minute duration of the auction would be short enough to have the undivided attention of investors, but each auctionette would still be small enough to be absorbed easily.

Minimum prices and quantities

Such a fast pace means that the seller's process must be entirely automated, so each auctionette must be subject to a minimum price. Before the auction the seller would choose a 'maximum rate of price decline', perhaps approximating the price value of 1bp of yield. The minimum price for the first auctionette would be the bid yield observed in the market five minutes before the start of the whole process, minus twice the maximum rate of price decline. Each auctionette after the first would have a minimum price of the clearing price of the previous auctionette, minus the maximum rate of price decline. Further, the minimum price for the auctionettes would not be allowed to increase from one auctionette to the next by more than that same maximum rate.[6]

The whole of each auctionette will be sold. Let the number of wholesale GEMMs be n, and the nominal size of each auctionette be x. Then each GEMM that bids for less than x/n would

[5] This section is based on *A Better Auction Mechanism, And Why Governments Should Sell Futures Rather Than Debt*, Economic Affairs, vol. 17 no. 4 (December 1997), pp48-52, ISSN 0265-0665, the text of which is available at www.jdawiseman.com/papers/finmkts/auctionette.html.

[6] The cap on the minimum price for an auctionette (at the previous auctionette minimum, plus that same maximum rate of change) is a small improvement on the original version of this auction methodology. Imagine that a GEMM wanted to cause a problem with the auction. It could bid extremely high for an auctionette. Under the old system that would cause the minimum price for the following auctionette to be very high—only 1bp cheaper, and all GEMMs would be paying this price at the subsequent uncovered auctionettes. This potential manipulation (or accident) can be prevented by not allowing the minimum price to move by more than a certain amount in either direction.

be deemed to bid for the shortfall, rounded up, at the minimum price for the auctionette. So if each auctionette is £100mn, bidding amounts in integer multiples of £100k, and there are fifteen GEMMs, then a GEMM not otherwise bidding at an auctionette would be deemed to bid for £6.7mn at that auctionette's minimum price. This is a very small risk for a GEMM, which might occasionally buy cheaply trivial quantities of extra gilts. Even in the theoretical worst case, in which nobody bid at any of the auctionettes, each GEMM would acquire one fifteenth of the whole auction at an average yield of about +21½bp over the bid yield five minutes before the auction started. Indeed, under the current auction system a GEMM bidding alone would have a far worse loss. However, the existence of these deemed bids guarantees to the seller that the whole of each auctionette will be sold, and hence so will the whole auction.

And from time to time there would indeed be a small number of auctionettes receiving too few or even no bids. This would be entirely ordinary, and not a cause for market instability, just a small fall in price and a resumption of bidding.

It might be that the DMO would also wish to impose a minimum price on the whole auction. This could easily be arranged, merely by specifying that the minimum price for each auctionette not be below the whole-auction minimum.

Squeezes

Most countries currently have a rule to prevent squeezes[7], that prohibits any one bidder from taking more than a certain proportion of any auction. However, a sequence of auctionettes would ensure that any attempted squeeze would become apparent to the other bidders as the auction proceeded and before the auction ended; they could counter this by bidding more aggressively to acquire paper. Thus this kind of rule would be unnecessary.

Nonetheless, it might be that the DMO still insists on imposing an upper limit on the quantity of paper acquired by any one dealer. Such a requirement could be accommodated by forbidding GEMMs from bidding for more than a specified share of the auction on their own account. Immediately after the auction any dealer winning more than the official maximum share of the auction would be obliged to provide the DMO with a report detailing how much had been on-sold to whom.

Information to publish

What information should be revealed after each auctionette? It is important that this not damage the position of successful bidders, so certain pieces of information should not be revealed. For example, revealing the total quantity of bids received in that auctionette would punish a bidder who was one of few bidders, and thus can reintroduce some of the auction risk. It suffices to reveal:

- the amount sold in that auctionette;
- the (uniform) price at which it was sold;
- the proportion of the lowest accepted bids that were filled (the "scaledown");
- the amount for sale in the next auctionette;

[7] Such rules are an attempt to patch a poor auction mechanism. Imagine that a new bond is being sold, and that it has a price of 100. Dealers sell this bond to investors, and then bid at the auction. But if dealers were permitted to, and one dealer did, bid for the whole auction at a price of 100+ε, that dealer would own become a monopoly owner, and could sell to the other dealers (who are short) at a highly profitable price. This possibility of such behaviour would deter dealers from selling in advance to investors, thus, over the long term, diminishing the government's achieved sale price.

- the minimum price of the next auctionette; and perhaps
- the total amount remaining for sale in this auction.

More information about the number, distribution and size of accepted (or even all) bids should not be revealed. If just the above were supplied, then a trader who had bid for the whole auctionette would know that other traders would receive information that is, except for the price, maximally bullish. This means that a trader who bids for the whole auctionette is reassured that the pattern of other dealers' bidding or not bidding could not cause a fall in the price of the newly acquired debt, so a bidder's risk is further reduced. Indeed, in order to minimise the information released about the distribution of the bids, auctionettes should be uniform-price rather than bid-price; after a uniform-price auctionette it is sufficient to reveal only the lowest accepted price, but after a bid-price auctionette it is necessary to reveal both the lowest and the average accepted prices.

Non-competitive bids

Currently the DMO allows GEMMs to make a non-competitive bid, which is filled at the auction's average price. Under the new mechanism this would be redundant, as a GEMM wanting to buy £40 million at the average price could just bid significantly above market for £1 million at each auctionette. Hence the GEMMs' non-competitive facility should be scrapped.

The DMO also allows private investors to buy at the average price. As this is convenient to private investors, who have no cheap way of replicating it, this facility should continue. Though it is unlikely that there would be significant market sensitivity to the size of such sales, there is no advantage in needless auction risk. Hence the size of such sales should be revealed before the start of the auction, rather than at the end. The size of the last auctionette would be adjusted appropriately.

Auctionettes—conclusion

Thus splitting an auction into auctionettes would reduce the risks faced by both GEMMs and by the DMO. The average sale price would be slightly higher, and the DMO could be more confident of selling the whole auction.

Further, during an auction, the quality of price discovery would be very high, improving liquidity to and reducing the dealing cost of end-investors.

Selling Call Options

The DMO should have a program of frequent small auctions of short-dated call options on long-dated gilts. Such a program would have several advantages.

- Automatically, the DMO would sell into a rising market, and not sell when prices are falling—this was in part the motivation for the BoE's former habit of taps.
- Banks owning options are likely to do at least some delta hedging. That is, when the market is rising they will sell; when falling they will buy. This would provide some stabilisation of the market.
- Buying £100 of debt costs about £100. Buying a short-dated call option costs, depending on various parameters, a few pounds. This represents a huge reduction in balance-sheet

usage for intermediaries—and, as the DMO suggests, the crisis has created "difficulties" for GEMMs because of tighter "balance sheet constraints". Reduced balance sheet usage might facilitate higher demand.

- Implied volatility is currently very high, and the high level of risk aversion across financial markets suggests that the price paid might exceed some measure of fair value. Of course the DMO is not, and should not be, in the business of short-term profit-driven trading. Nonetheless, this provides some reassurance that the taxpayer would receive full value for the instruments sold.
- Currently some of the pension-fund demand for sterling fixed income is expressed by purchases of long-dated swaptions. It might be that the existence of a gilt option market, even if only with short-dated expiries, would facilitate some of this duration demand being expressed in the form of long-dated gilt calls.

The options the DMO would sell have several parameters, which need choosing.

The underlying

It is envisaged that the call options would have as their underlying the 'current' long gilt, that is, the conventional gilt with over thirty years to maturity that the DMO has most recently reopened. At time of writing this is the 4¼% Dec 2049. Once a new ≥30-year has a size exceeding £5bn, it could become the underlying for options subsequently sold.

There could also be a set of options with an underlying of a long index-linked gilt.

Time to expiry

If the DMO were to sell long-dated options, say six months, there would be a very long lag between the sale of the options and the Treasury knowing whether these options had resulted in funding. It seems unlikely that the authorities would be comfortable with that amount of uncertainty.

As the sale of the options will tend to stabilise the market, it seems natural to want there to be several sets outstanding at any one time. So, several times over the life of an option, the DMO should sell more options.

So one-day options would require the DMO to be holding auctions several times a day. That is impractical. And six-month options would mean that the Treasury had too little certainty about how much funding remains to be done. That is undesirable.

As a compromise between these competing *desiderata*, it seems reasonable to choose an expiry of 28 days, with auctions conducted once a week.

Strikes

The purpose of selling options is to sell the optionality, so strikes cannot be too far from the money. Indeed, the DMO might just sell at-the-money options.

But having a little spread of strikes helps maintain the market-stabilisation effect over a wider range of market prices. Further, selling a wider range of strikes will lower the standard deviation of the amount exercised, increasing the predictability of the pace of funding.

One possibility would be to sell three strikes, at-the-money, 25% delta (that is, with a strike about 0.67 standard deviations above the current price), and 75% delta (strike about 0.67 standard deviations below the current price). Selling equal amounts of these strikes would reduce the standard deviation of the quantity sold, relative to selling only at-the-money calls, by a factor of about 0.74.

For convenience and tidiness, the strikes should be rounded, perhaps to the nearest £¼.

Scale

What quantity of options should be sold? Imagine that once a week £500mn of each of three strikes is sold. What would be the consequences?

- Typically there would be four expiries outstanding, with a total nominal size of £6bn, representing an expected funding of £3bn with a standard deviation of ±£2.2bn.
- Over an entire year of 52 weeks the total sales would be 52×£1½bn = £78bn nominal of options. The premium raised would depend on various factors including the choice of underlying and the implied volatility, but might be of the order of £2bn to £3bn.
- The exercise of options would raise an expected 50% of the nominal amount sold, being £39bn per year. Of course, actual funding might be higher or lower than this, but as the fiscal year progresses the DMO would know whether the achieved funding was ahead or behind this expectation, and could appropriately adjust the volume of sales to compensate.

These numbers seem proportionate to the task at hand.

Structure

There are three obvious legal structures for these options.

- Each option could be a private over-the-counter transaction, that is, an agreement between the DMO and the GEMM. As private contracts, such options would be non-transferable, though a GEMM could sell a similar option to others, with itself as the counterparty. The option would be paid in full up front, so the DMO would not have any on-going credit exposure to the GEMM.
- Each option could be a special security, even a gilt, with its own ISIN and SEDOL. This has advantages and disadvantages. It gains transferability—a hedge fund could own an option issued by the DMO, without being compelled to take the credit risk of a GEMM. But at expiry, if exercised, the DMO could be settling with any arbitrary entity of any nationality, an entity that might even be the receiver of a bankrupt something. Also, the small size of these options would mean that there would not be a repo market in these securities, limiting liquidity.
- Alternatively, these options could be derivative instruments listed on a futures exchange, ideally as options marked to market rather than paid up front. This has several advantages, but one disadvantage. They would be fully transferable—a pension fund could own just the same instrument as a GEMM. There would also be no problem with liquidity—investors could buy or sell without needing repo. And at expiry the DMO's only counterparty would be the clearing house. However, there would be cash mark-to-market, often involving the DMO paying money before receiving it. Imagine, for example, that the DMO has sold a 102 call at a price of £1, and that the underlying gilt then rises in price such that the option is priced at £1.50. The DMO would need to pay £0.50 to the clearing house, though over later dates would receive £103.50+accrued = £1 + £0.50 + £102+accrued. However, margin payments by the DMO would occur only if the price of gilts rose, so cannot imperil the UK's creditworthiness.

Overall, the small margin payments seem a worthwhile price for the transferability and not dealing with strangers. The sale of options would therefore require the co-operation of a

futures exchange—I am confident that several of them would compete fiercely for the privilege of so assisting the DMO.

Selling calls—summary

So an option sale would work as follows.

At the appointed hour the DMO would observe the price of the underlying, and observe or estimate implied volatility. Strikes would be computed, rounded to the nearest 25 pence, and published.

An auction would be conducted, perhaps using rules similar to those described in the previous section, perhaps—given the small size of each auction—using simpler rules.

Whilst the options are outstanding there would be daily margin payments.

Whilst the options are outstanding their owners' delta hedging would slightly lower the delivered volatility of the underlying.

At expiry, either the options would expire worthless, or they would be exercised. If exercised the DMO would deliver gilts to the clearing house, receiving cash in return.

Other Distribution Methods

The DMO's consultation paper mentioned a number of other possible distribution methods.

Mini-tenders

Mini-tenders are a form of short-notice opportunistic issuance that can be done more transparently, more reliably, and in larger size, by the sale of call options.

Syndication

Syndication has a purpose, and this is not it.

If an entity wishes to issue debt, and that debt would have no natural comparator outstanding, a potential investor would have to do a lot of work to assess fair value. For an investment of only a few million or tens of millions, that may well be uneconomic for the investment manager. It is a rating agency's job to assess credit risk, but not to assess a fair price. Instead a syndicate of investment banks are paid to do this, and to give to the investors an imprimatur that the debt is fairly priced, at least relative to general market conditions. That does not absolve the investment manager of due diligence, but if there is a long-standing relationship with a bank that has proved trustworthy in the past, and the investment is of modest size, that imprimatur can save much labour.

None of which applies to the DMO reopening an existing gilt, or creating another. Indeed, my reply to the consultation[8] that resulted in the 1¼% 2055 index-linked said "Issuance should be by auction".

Direct placement with investors

If an investor has a sudden lumpy need to buy a large quantity of a particular gilt, that might indeed move the price.

[8] *Issuance of ultra-long gilts*, January 2005, www.jdawiseman.com/papers/finmkts/long-consultation.html#para05.

However, given the likely frequency of gilt sales over the next few years, the investor does have the simple solution of waiting for the next auction—one will be along soon.

But the better solution would be to improve the liquidity of the market, which is needlessly hampered by gilts being unnecessarily small—see previous writings[9] on this subject. For example, the 4¼% Dec 2055 is now £17.4bn. Assuming 2% inflation, at maturity this would buy the same quantity of bread and beer as £6.9bn today; and assuming nominal growth in the tax take of 4%, would be the same proportion of the government's revenues as a mere £2.7bn today. Whilst far larger than a year ago, these numbers are still miniscule relative to the £24.4bn outstanding of the 5% Mar 2012.

Rather than concocting ways around the illiquidity of the market, it would be better to improve liquidity by enlarging gilts. Happily, the DMO has recently said that "the DMO is prepared to re-open individual gilts to larger sizes than has been the practice to date"[10]. Please, no more new gilts between 12 years and 2055 until the 4¼% 2055 is at least £100bn.

[9] *Bonds: too many; too small*, September 2006, www.jdawiseman.com/papers/finmkts/reopenings.html and *US Treasury Bonds: fewer and larger*, August 2007, www.jdawiseman.com/papers/finmkts/us_treasuries_fewer_longer.html.

[10] *Pre-Budget Report 2008: Revisions to the DMO Remit 2008-09*, 24th November 2008, www.dmo.gov.uk/documentview.aspx?docName=/remit/sa241108a.pdf.