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# Super-longs: an early response

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## Key points:

Simple basic vanilla conventional gilt, not a perpetual  
Maturing not before 2070; not after 2212  
Semi-strippable into an annuity and a talon  
As long as the investors can take

## Background

A super-long gilt (to use the DMO's terminology) was proposed by this author in [Please, only one more long](#), 21 December 2011. A few months later, before the Budget, the Chancellor discussed the possibility with journalists (FT, [Mr Osborne's plan for a super-long bond](#), 13 March). This author commented quickly in [The 100Y gilt: The Chancellor agrees](#), 14 March; the FT further responding in [A century of gilt](#) and [No forever debt please, we're British](#).

We now have a formal consultation, the UK DMO having published on 25 May [Super-long and Perpetual Gilts: A Consultation Document](#), to which this essay is part of the reply from Société Générale. It has been prepared by the Fixed Income Strategy Research Department of Société Générale.

The DMO has requested responses by close of business on Friday 17 August 2012, but has also indicated that early responses would be helpful. Société Générale encourages clients who buy ultra-long bonds, even if 50-year Switzerland or France or Austria or 40-year Japan, to send to the UK DMO any reasoning that might be helpful.

As our thinking on this matter is fairly well advanced, we are sending this early response. However, the subject will be much discussed by market participants, and that discussion might necessitate a further response. In practice, this is unlikely to be our last word on the subject!

This response divides into two parts. First we discuss the negatives, the don't-do-this, the prohibitions (not a perpetual, not shorter than 2075, not longer than two centuries).

Second we discuss what should be done, the positives. One of these is precise and detailed (semi-strippability), the other is non-specific, and relying on what the investors say (the maturity).

## Prohibition: no perpetuals

2½ Annuities was issued in 1853, presumably to fund the Crimean War.

That war remains in the national myth via a poem by Lord Tennyson, too mutely heralding July 1916, and also for Florence Nightingale. The lady with the lamp! The inventor of modern nursing! The only non-Royal woman to appear on the Series D £10 note. Not all patriots have forgotten her field hospital, those "magnificent huts", designed by Brunel and made in Gloucester of wood from the Forest of Dean; transported and assembled in the field.

Back then we were in the height of an industrial revolution, not yet fully copied by others. An industrial revolution by which Britannia ruled the waves, unthreatened from an as yet unmilitarised air, a food importer not yet fearing hunger from under the waves. Still safe.

Surely this is a tempting image for the seven Lords of the Treasury (who include the Prime Minister and the Chancellor of the Exchequer). Ahh, the healing romance of a perpetual. Austerity begone; there comes again Victoria's glory illuminated by a lamp!

There is much joy in romantic folly; indeed, the world would be better with more of it. But such joyful romance should be kept far from debt management. Policy makers should not allow sepia-toned images of a former Empire to be confused with competent modern post-pre-Black-and-Scholes debt management. Doing it right is technical and tiresome and tedious, not romantic.

A perpetual would not only be unwise, it would be so unwise as to be wrong. We believe that the DMO knows this, and we hope that the DMO will be able to convince its masters in the Treasury. Indeed, it is to help this persuasion that the romantic presentation has been so emphasised.

So, what's wrong with a perpetual?

① Equitable life offered its pensioners a minimum annuity rate. That option, given to investors in higher-yielding times, bankrupted the firm. Investors have learnt, and will not again cheaply concede such an option. And the risk of a call is very wrong-way: when equities and yields are falling, and investors have the greatest need of duration, exactly then is a long-duration instrument called, thereby becoming a very short-duration instrument. That is a terrible risk for investors.

Investors should therefore avoid a callable gilt, unless its yield is so large that it is compellingly cheap. Which would, from the DMO's viewpoint, be a pessimal reason.

So an investor can have a false appearance of being protected against some states of the world, in that falling equities and yields can offset. But that apparent safety would break when yields fall far enough for the perpetual's call to become relevant. Such a misleading appearance of safety is just the thing that should be of concern to a regulator, whose questions might deter ownership.

## Fixed Income &amp; Forex Research

② Many investors, perhaps even most non-leveraged investors, are benchmarked to an index. That is, the money manager's job is to do better than some target index. Such a manager's neutral portfolio is to own the index.

So it is very advantageous to an issuer for its bonds to be in the important indices. But J. P. Morgan's indices include only "bullet bond government securities": neither perpetuals nor callables.

Not being in the JPM indices could, of itself, add 10bp to the yield. Yes, this is the tail wagging the dog, but the tail is strong and important and should not be ignored.

So we very much approve of issuing a super-long —indeed, we suggested it—but we strongly disagree with issuing a perpetual. Please don't.

## Prohibition: not before 2070

In [Please, only one more long](#) we discussed, at length, that there is an upper limit to ideal bond density. Beyond thirty or forty years there is no good and some harm from having more than one bond per decade. There is a 2060 conventional gilt, so the new gilt should definitely be at least 2070, and we prefer to stretch this floor to 2075.

(Why the stretch to 2075? The linked essay explained that, in every currency, broker screens fully defining the swap curve have one price per decade beyond 30 or 40 years. That is sufficient to price and hedge any forward-starting non-par-coupon odd-dated swap. But there is less need to price this range of instruments with government bonds, and the adding of another bond splits liquidity. So relative to the equivalent in swaps, additional bonds bring less gain and higher cost: government bonds should be less dense than swaps. Hence a longer gilt should absolutely definitely be at least 2070; we prefer to stretch this floor to 2075; and it is entirely sensible to make it eighty years or more.)

But some might argue for a shorter super-long, claiming that there would be more turnover it could more reliably hedged with the 2060. As we then wrote:

*It is also worth distinguishing between turnover and liquidity. Imagine that there is a long bond, and another long bond with identical cash flows. There may well be much turnover, investors making tiny sums by switching the marginally dearer one into the marginally cheaper. Turnover could be massive. But the markets risk-absorption capacity to take the opposite side to an investor's immediate dealing need ('liquidity'), could be almost zero. It could be that no dealer is willing to go long or short, but that all are willing to trade the switch. Turnover is not the same as liquidity.*

So there could be lots of turnover in 4%60 versus 4%60A, but that turnover would have approximately zero DV01, zero curve risk, and only a tiny stock-specific risk. The existence of that turnover would not mean that the market could make a price in an outright deal, buying (or selling) a large quantity of one of these two.

We hope that the authorities recognise and ignore the low-liquidity high-turnover argument.

## Prohibition: not longer than 200Y

One of the advantages of a long bond, of a really long bond, is that it can be much larger. The 2¼ Mar 2014 is now £35bn, and we assume that the authorities regard that as the largest safe size. But that is £35bn in 2014 money. With long-term inflation at 2% and real economic growth a miserly ½%, the 4%60 can be over £100bn and still be a smaller proportion of GDP at maturity. For a Dec2111 this becomes £380bn. Even at 2% inflation and zero real growth—pity our descendants—the 2111 could be £236bn.

This safe concentration of liquidity, of price discovery, is one of the non-romantic joys of super-long bonds. They can be few, massive, and so very very liquid.

But there is little advantage in a single bond being larger than the whole national debt! Indeed, it is unlikely that the authorities or investors would want a single bond larger than 25% to 50% of the national debt. So this advantage fades beyond a century.

We also want the new gilt to be materially longer than existing gilts. So at what maturity does a bond become *de facto* perpetual?

Well, that depends. Assume that the new gilt is issued with a 3% coupon, but that the yield then falls to 2.50%. On a coupon date the Macaulay duration of a perpetual is a coupon period plus reciprocal yield =  $0.5 + 1 \div 0.025 = 40.5$  years. What maturity would the gilt need to have a duration within a coupon period of this? Answer: 197 years.

So we think that the authorities can impose a ceiling of two centuries.

## Semi-prohibition: long linkers

We have not yet found the reasoning by which to describe clearly, to ourselves as well as to the DMO, the reasoning about long linkers.

Self-evidently, if the UK could issue a zero-coupon perpetual, whether or not linked to inflation, that would be excellent funding. Even if that ideal proves unreachable, a near-miss still might seem attractive. And with the yield of the 2062 ILG flitting around zero  $\pm$  15bp, long low-coupon funding might be available.

But this is not riskless for a sovereign.

For myself, I assume that I won't be conscripted to do my bit in another enormous war. Yes, there will be wars, and lesser police actions, but on a modest scale. For these my contribution will be in taxes rather than heroic brawn. My planning assumes that as and when there is another huge war, I'll have pre-deceased it.

But the state, the United Kingdom, should make its plans as if it is much much long-lived than the author. The United Kingdom will have more wars to fight, eventually, even if

not today. The decisions and actions of the United Kingdom, should not needlessly make that war harder. Yes, there is the ever-present balance of guns and butter, but when deciding to buy one rather than the other, the consequences should be considered.

Linkers are terrible funding in a war. Conventional debt allows the conventional 'default' by inflation: the investor's coupon will buy less beer. Linkers deprive the government of this within-war flexibility.

However, linkers have historically been cheaper funding. So the natural balance is to have some borrowing in linkers, but not to allow ILGs to become too large, either individually or as a whole.

Too large? Assume a massive war reduces productive GDP by 30%; and that the within-war limit should be half the Maastricht limit. That suggests a limit of  $60\% \times \frac{1}{2} \times (1-30\%) = 21\%$  of 'pre-war' GDP. Uplifted outstanding is now about 18%.

And a definite feature of long-dated debt is that it is there for a long time. If the UK were to fund 25% in ILGs, and those were very long, there would be an ongoing increase the proportion of the stock of debt that is inflation-linked.

One old-fashioned solution would be to issue low coupon debt with a slightly indeterminate maturity date, the first call and final maturities being a apart by a large fraction of a decade. But such an instrument, of which many conventionals were once issued, has the previously mentioned problems of indices and options.

So very long linkers leave us a little uncomfortable, even if we have not found a clean expression of what would be best.

Anyway, that's enough prohibitions. Let's be positive.

## Definitely semi-strippable

The DMO has said that the "Government does not anticipate that super-long gilts would be made strippable". Quite right: if a 3% 2111 gilt had £100bn in issue, the penultimate coupon strip would have a maximum nominal size of £1.5bn. At a price of about £3 per £100 this is a maximum cash size of about £45m, which is too small by factor of at least a hundred.

But a new super-long could and should be 'semi-strippable', that is, exchangeable into just two pieces.

- A '2037 Annuity', comprising all the coupons until the end of end of 2037.
- A '2038 → 2111 Talon', comprising all the gilts cashflows  $\geq 2038$ .

If in issue today, the Talon would be about 40% of the value, about 75% of the DV01 ( $\approx 52.5$  years Macaulay-Weil duration), and about 92% of the Macaulay-Weil convexity (a little more than twice as convex as the bond).

So if an investor spent £100m cash on the Talon, the GEMM would strip about £257m value of the bond, so would be left with  $\approx £157m$  of the annuity, this having a duration of  $\approx 11$  years. This residual is of modest size, and easily hedged. Further, the annuity would have a trading life of its own, and so a home could be found in reasonable time.

As a generalisation, the Talon would be a natural investment for pensions of my generation, as it starts to pay at about the time of retirement, and the annuity would be a natural investment for the generation of my parents.

So semi-strippability retains the key advantage of strips (access to low-cash high-duration high-convexity instruments); without the disadvantage (dealer balance sheets laden with many small illiquid pieces).

## Risks: a good risk

Everything is a risk, a calculated risk. For the UK government issuing a century gilt would be a risk, but a risk with a payoff of more than five-to-one, and a chance of winning materially above 75%. There are few risks that good: HMT, meaning the DMO, should seize this one.

Say that, soon, the government issues a new century gilt. Over a few re-openings it is built to the minimum basic size of £25bn.

This new gilt might be cheap to the old 50-year, it might be dear. If it's cheap, stop. Sell no more. But if it is dear re-re-...re-re-open until it is much larger, perhaps most of the sizes mentioned above (£236bn or £380bn).

So the government might borrow £25bn slightly expensively; the government might borrow many times this slightly cheaply. That is a good payoff ratio.

What of the probability? The DMO itself has argued, rightly, that there is a persistent inversion in long gilts, making it likely that this will trade at lower yield. But put aside that advantage and instead assume that the cheap-dear probabilities are half-half. And say it happens to trade cheaply, high yielding, after £25bn has been issued. Then stop. Wait. And in a few years, glimpse at its yield. If it is then trading rich, its existence allows the authorities to know this, and to decide to resume selling. By this time it might be much shorter, say, 90 years or 80 years. That doesn't matter: re-open.

We can be confident that the yield of a gilt with maturity  $\geq 70$  years but  $\leq 100$  years would be very close to the yield of any other gilt in this maturity range. So the new century gilt would, for thirty years, act as a spy, revealing when this sector is in demand. That isn't thirty independent observations: each year would be correlated with the few immediately previous. But observations fifteen years apart would be *de facto* independent, giving a probability of much more than 75% that it is dear at least once.

A payout of more than five-to-one, with a  $>75\%$  chance of winning, is a splendid risk-return. Seize, with both hands!

## The big question: what maturity?

So what maturity conventional gilt should the DMO issue?

Answer: as long as the investors allow.

If a majority of the investors claim that their mandates or needs prohibit beyond  $x$  years, then issue at  $x-\epsilon$ . If the investors don't, stretch to at least a century.

If the DMO restricts itself to a conventional bullet non-callable no-funny-business gilt, it will be in all the 15+ indices, and so there will be buyers. It will have more convexity than the index, by a factor about 3.4x, giving a powerful reason to be overweight, and an equally powerful reason not to be underweight.

If most investors have a hard upper limit, or even a passionate anti-enthusiasm, respect that. Failing which, stretch to a century.

Our conversations with investors have been mixed. Some have little use for post-50Y cashflows. These investors would be compelled to buy via the affect on the indices, but would not buy more than that.

Others would willing buy a super-long, provided that the balance of yield and convexity were attractive relative to other long gilts. So a yield lower than that of the 2060 would still be acceptable, provided not too far through.

One investor has mentioned a tentative soft ceiling of a century, but this was soft and tentative.

## Solvency II

The [European Insurance and Occupational Pensions Authority](#) is privately consulting with insurance companies about the determination of the risk free interest rate term structure for Solvency II.

We are not an insurance company, so are not privy to all the details, but understand that the consultation is still ongoing, and the issue is also being addressed in discussions about the forthcoming Omnibus II Directive.

Our understanding is that Solvency II is proposing to use liquid instruments up to some point, in £ that being 50 years, beyond which a special extrapolation formula is to be used. That extrapolation formula is likely to give a higher yield than that of an actual super-long gilt.

The rules are not yet fixed, though it is plausible to expect insurers to prefer that the formula reference a higher-yielding extrapolation rule than a lower-yielding gilt.

This is good and bad. It means that insurers will provide a backstop bid. But it might lessen insurance demand for a 100Y gilt when it yields less than this backstop bid. As of end-2011, the best data we have suggests that this 'backstop Solvency II' bid might then have been about 4%60 + 6bp.

## The DMO's questions

Starting on page 11 of the consultation document, the DMO asked specific questions. Our thoughts on these are as follows.

1. **"sources and scale of demand ...?"**: the buyers of a new super-long will be the same investors who currently buy the existing ultra-longs. We can hope that overseas investors would want some of such a unique instrument—there aren't many 100-year triple-A assets out there—but such demand would be, at best, a small proportion of the whole. We will be writing a separate essay on pricing, but it is likely to trade through the 4%60 because of the value of the convexity.

2. **"more cost-effective financing...?"** Its lower yield, relative to existing ultra-longs, will be better funding for HMT. But there is a second benefit: it can be very large, and hence very liquid. And that liquidity would be more likely to be sustained when markets are stressed. That has a spill-over benefit to shorter maturities.

3. **"price relative to existing ultra-long gilts?"**: see separate essay, forthcoming.

4. **"To what extent would issuance of super-long and/or perpetual gilts displace demand for existing ultra-long gilts?"** A new vanilla gilt, non-perpetual, non-callable, would be in all the 15+ indices. So at least some of the displacement would come from sub-30-year gilts, as well as from 30s to 50s.

5. **"How sustainable would demand be...?"** As we argued above, it is useful to think of a super-long as a spy, reporting on the currently unobservable super-long yields. If 50s/100s were steep, that would be saying that it's enough for now. That message could be heard and heeded. Later, demand might re-appear, and the price would show that to the authorities.

So demand does not need to be "sustainable" to justify issuance: the bond will be there a long time, and could be re-opened in, say, thirty of the next sixty years. So sustainability of demand would be useful, but is not essential.

6. **"at which new maturities would there be most potential demand...?"** For the investors to answer. But the DMO should take the longest possible version of their answers.

7. **"issuance ...?"** We anticipate that initial issuance and the first few reopening will be by syndication, and subsequently by auction. There are other possibilities—a regular program of sale of 28-day at-the-money calls—but that is conceptually separate from whether to issue at all.

8. **"how much should it seek to supply per financial year?"** We anticipate that the pace of issuance would be similar as that for ultra-longs, but would continue for longer.

9. **"Should the yield curve be extended gradually...?"** Absolutely definitely unambiguously not. Issue one super-long conventional gilt, and only one. If it is a 100Y the next

thirty years of super-long issuance should be in the form of a reopening of this same gilt.

Please do not split liquidity for no gain. Just one super-long conventional gilt, and only one.

10. **“how much should it seek to issue and over what period of time?”** A new super-long could be about half of all long issuance, so about 10% to 15% of all issuance. It can be reopened at the same pace as an ultra-long, but for decades.

11. **“What would be the appropriate method(s) of issuance of super-long and perpetual gilts?”** We envisage that it would be created and re-opened in the same way as ultra-long gilts, as in question 7.

12. **“To what extent would issuance of super-long and/or perpetual gilts risk fragmenting long-dated or index-linked gilt supply or liquidity? What steps, if any, could the Government take to minimise this risk?”** Issuing a new instrument, not very similar to long-only portfolios of other gilts, would not obviously damage liquidity. And liquidity could be maximised, as already stated, by issuing only one.

13. **“Are there any other issues and risks that the Government should be aware of in launching super-long or perpetual gilts?”** Other than Solvency II, discussed above, we believe not.

14. **“Are there any changes that should be made to the design of conventional or index-linked super-long gilts relative to existing instruments?”** No. The one super-long should be a conventional semi-annual fixed-coupon single-maturity-date ordinary gilt, entirely vanilla, even if much hyphenated.

15. **“If the Government were to issue new perpetual gilts, how should they be structured?”** The authorities should not issue a perpetual.

16. **“lead time required ...?”** The authorities should give more notice than usual, at least four weeks, of the approximate maturity. But the precise date can be released in the usual pattern of syndication announcements.

17. **“should the roles and responsibilities of the GEMMs be identical to those for existing gilts?”** Yes, but the same market-making obligations should apply to the semi-stripped pieces, the annuity and the talon.

18. **“What should be the implications, if any, for existing undated gilts should the Government decide to launch a new perpetual gilt?”** The authorities are considering a super-long because of the low level of yields. Obviously, that cause might also lead to the calling of outstanding perpetuals. Other than that, no implications.

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