SOCIETE GENERALE
Cross Asset Research

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Fixed Income

Special report

Please, only one more long

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How large should long bonds be? How numerous should they be? How should a sovereign debt manager strike a balance between the two?

We justify that there are more than enough gilts between 15 years and 2060. And if the UK DMO is to issue a new long, it should be ≥2070, and ideally a new 100-year

How many conventional bonds should there be?

How many conventional bonds should there be? There are three obvious constraints.

1. Issuers don't want to be making very large payments; issuers prefer smaller more numerous payments.
2. Investors want enough variety of bonds to hedge their liabilities.
3. Investors want the liquidity that comes with size.

Let us take these in turn.

Advice, Not a Forecast

This essay advises that, for the next decade or so, there should be no new gilts between 15Y and 2069. This is advice, not a forecast.

Indeed, we forecast that this advice will not be heeded, at least not yet, and that late in 2012 or early in 2013 the DMO will issue a new 2044.

❶ Issuers don't want to be making very large payments

Imagine that a gilt, about to mature, is £250bn. Yikes! No government would want to rely on being able to re-borrow that all at once. Even if it weren't dangerous (the money is paid into the banking system, which has to put it somewhere), the perception of danger could itself be dangerous.

However, that does not prevent there being large **long** bonds. Before such a bond becomes short, the authorities would have a chance to review whether it was still large and, if necessary, could take remedial action. A large bond could be split by one of several means. The issuer could start a sequence of reverse auctions. If buying 4% of the bond each quarter, then after six years it would be almost all gone. Or if the bond still has some while to maturity, it could be switch-auctioned longer, or into a variety of shorter bonds, or both. (Recall that from 1999 to 2001 the UK DMO conducted seven switch auctions, four of them shrinking the 8% Dec 2015[†].) Neither of these would be expensive: the large size of the bond would mean that investors have plenty to offer. Or perhaps nominal tax revenues will have grown sufficiently, whether by real growth or inflation, to shrink the bond's effective size to ordinary from large.

For example, the 5½% 2008-12 (first call 2008, final maturity 2012) was issued in 1960 and quickly enlarged to £1bn, then almost 4% of annual GDP and of the debt. The earliest and last maturities were so far away that the gilt's nickname was "never-nevers". Of course, by the time it was a sub-10Y that size had become non-scarily small. And if it hadn't been small, the DMO would have had plenty of time to notice and to take action.

So an issuer should dislike large short-dated bonds, but large long-dated bonds should be acceptable.

Even though the effective size of a long conventional bond is shrunk by nominal growth in the tax take, governments wouldn't want them to be too large. How large is that? For the UK, the 2¼ Mar 2014 is £34,863m, of which the DMO owns £755m, so the DMO will have to repay £34.1bn. Let's assume that to be the ceiling. But that is a ceiling in 2014 money. Also assume that long-term nominal growth will resemble the last five years—a miserable standard—so 2.6% p.a. (longer-term it has been 5.5%). Over the 45⅞ years between the maturities of the 2Q14 and the 4%60, that 2.6% compounds to a factor of 3.27. So the 4%60 could be £111bn, and at maturity be the 'same size' as the 2Q14.

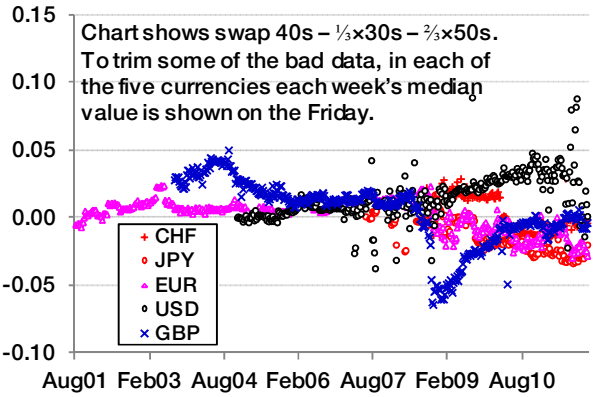
[†] On 21 October 1999 £1bn 8%03 → 5%04 (announcement, result); on 9 Feb 2000 £1½bn 8%15 → 6%28 (announcement, result); on 22 June 2000 £1½bn 8%15 → 4Q32 (announcement, result); on 27 September 2000 £1½bn 8%15 → 4Q32 (announcement, result); on 6 December 2000 £2bn 8%15 → 4Q32 (announcement, result); on 21 June 2001 £1.4bn 8½07 → 5%12 (announcement, result); and on 10 July 2001 £500mn ILG 2% 2006 → ILG 2½ 2016 (announcement, result). The switch auction is a well practised mechanism.

Of course, if the assumptions should be flawed, then reverse-auctions or switch-auctions could be used. And the same argument for a new century gilt maturing 7th December 2111 (on which more later) gives a factor of 12.5, so an implied safe size of £427bn! (Indeed, assuming nominal growth of 4% gives a safe size much larger than the current national debt.) Even if, as an extra margin of safety, the cautious '2.6% sizes' were shrunk by a factor of two in addition to the ability to take later action, they're still much larger than current sizes.

❷ Investors want enough variety of bonds to hedge their liabilities

Some investors have liabilities, and would prefer assets that can be used to hedge those liabilities. So imagine that there is a market in which investors have nominal liabilities of 30+ years, but the longest conventional government bond is five years. If the government were then to issue a small quantity of a 30-year bond, one would expect that investors would be willing to overpay for that asset, at least relatively.

The chart on the right shows that a 40Y liability can be well hedged with a fixed combination of 30s and 50s. In each of the five currencies in which it is possible to trade 50Y swaps (£ $ € ¥ CHF), there is plotted 40Y – ⅓×30Y – ⅔×50Y. To trim some of the bad data, within each week the median point is shown.



And almost all the data is within ±5bp of zero, and prior to the crisis in an even narrower range. Forties really can be well-approximated with thirties and fifties.

And investors do not even have 40Y liabilities. Investors have actuarial approximations to liabilities, the error in longevity giving much larger errors than the 30s40s50s barbell.

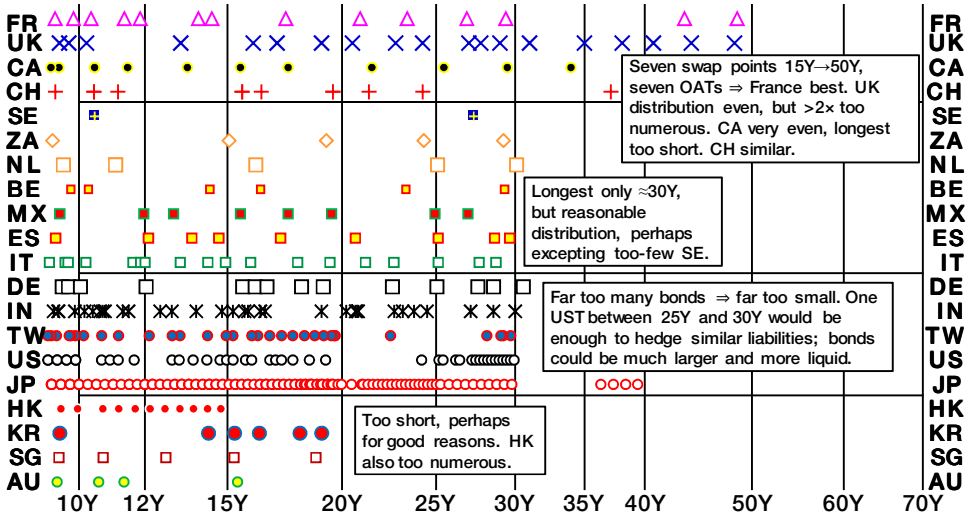
Separately, the private sector has settled on an answer to how many points are needed to define (and hence to hedge) a yield curve. Swap brokers publish swap prices which are then used to value and trade mis-shapen sets of cash flows: forward-starting, odd dates, non-par coupons, etc. In £ these quoted rates are annual from 2Y to 10Y, beyond which at 12Y, 15Y, 20Y, 25Y, 30Y, 35Y, 40Y, 50Y, 60Y and 70Y (some brokers omitting 35Y, some omitting the longest maturities).

In all other currencies, except EUR, the same post-2Y maturities are quoted, truncated at some maturity shorter than 70Y, and sometimes without 35Y. Only € has a denser set of maturities: annual to 29Y, then as £.

One should expect that this 'swap standard' would be denser than that which would be efficient for government bonds, for two reasons. First, swaps often trade forward: e.g., the 30Y-forward 20Y rate. Government bonds, being spot instruments, do not need this information. Second, making more swap points is nearly costless as there is no splitting of liquidity. But, even though nearly costless, in every currency the ≥40Y swap curves are defined with only one point per decade.

So very few long-dated bonds are needed to hedge liabilities. The swap markets have settled on a set of points that completely define spot and forward rates, and henceforth we take this 'swap standard' as being more than enough.

Next, let us compare the distribution of bonds in some of the main debt markets with the swap standard (shown as vertical lines).



The horizontal lines separate the markets into four types.

FR UK CA CH: there are seven swap points from 15Y to 50Y, and seven OATs in this maturity range, reasonably well-distributed. The longest could be longer, but nonetheless, France is nearest the optimum. Gilts are yet more evenly distributed, but there are fifteen in the same maturity range, more than twice what is necessary. Canada and Switzerland are also commendable, though the longest is too short, and the Swiss long is too small (though the chart does not show sizes).

IT ES MX BE NL ZA SE: these seven countries have bonds up to only ≈30Y, up to which about as dense as the swap standard. Perhaps Sweden has too few. The author likes longer bonds, but for a 50Y most of these markets are too emerging or too small or insufficiently creditworthy.

JP US TW IN DE: these five countries have divided long liquidity between far too many bonds. There are seventeen USTs from Feb 2036 to Nov 2041. Any end-investor liability that could be hedged with the 4¼ May 2039 could be hedged just as well with a combination of the 3½ Feb 2039 and the 4½ Aug 2039. Most of these seventeen securities just diminish liquidity for no gain in investor flexibility. Japan is even more extreme: from Mar 2031 to Sep 2041 there are thirty-seven JGBs. Indeed, there are three JGBs maturing on 20 Mar 2031, with coupons 1.9%, 2%, and 2.2%.

HK KR SG AU: these countries entirely lack long bonds, as do some others that didn't have any bonds long enough to justify a row on the chart (NO, NZ, CL, IL).

❸ Size and liquidity

Liquidity begats liquidity.

If a bond is twice as large, it is twice as likely that a seller or buyer of duration will be trading in that bond. So a dealer would have to wait half as long before quoting a price in this bond to another client. If trading direction is, from the dealer's viewpoint, something like random, that halving of time reduces the dealer's risk by a factor of about $\sqrt{2}$.

If there is competition between dealers (there are twenty-one GEMMs), that should reduce the client's dealing cost by about $(1-\sqrt{½}) \approx 30\%$.

We will also need an estimate of investors' turnover. This must be an estimate. It may well be that vanilla turnover numbers (not the same as liquidity) are dominated by micro relative-value switches such as 4Q39 ↔ 4Q40. It may well be that if there

were fewer gilts they would be more efficiently priced, and so there would be less such turnover. But economically meaningful turnover (changes of duration and big changes of location of DV01) might total, per year, about 20% of a portfolio.

In ordinary times the current bid-ask in a long gilt is less than 1bp, say about £0.15. Investors would pay this cost every five years (∵ 20% turnover), or 3p per year. Reducing this by about 30% should therefore lower gilt yields — lower the taxpayer's cost of funding — by about 1bp.

But when markets are stressed the liquidity gradient becomes steeper. The slightly illiquid become worse, the very few really liquid assets become more so. The authorities should strive to ensure that gilts remain tradable even when other markets aren't working.

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.

Non-consensus things

A number of non-consensus things have been said, and it might help to re-state them more concisely.

☆ There should be enough long-dated government bonds to be able to hedge liabilities, but no more than that.

☆ The swap market shows many points are needed to completely define a curve, and hence to hedge it. Beyond 10Y it suffices to have 12Y, 15Y, 20Y, 25Y, 30Y, 35Y, 40Y, 50Y, 60Y, and 70Y. Even this contains redundancy, so should be seen as an upper limit to ideal bond density.

☆ So enough long bonds is enough. Having more reduces issue sizes, widens bid-ask spreads, lessens liquidity, increases yields, and reduces robustness to market stress.

☆ An excess of long bonds increases turnover but reduces liquidity.

Recommendation for the UK DMO

So what should the UK authorities do?

✪ There are enough long conventional gilts between 15 years and 2069. For the next decade there need be no new gilts in that range.

✪ Gilts in that range can be much larger. Assuming nominal growth of 2.6%, and that the 2Q14 is acceptable, the third column shows the equivalent size. They could be enlarged by a total of £789bn nominal (even more cash as the gilts are above par). Even if the 2Q14-equivalent sizes are halved, out of an abundance of caution, that is still another £262bn.

✪ Between 40Y and 70Y the swap standard has points 10 years apart. So if there is to be a new gilt, it should mature ≥2070. But the UK could go further. Gilt investors are already accustomed to something like a perpetual. Though 3½% War Loan is callable (and we think soon to

Gilt	Non-DMO size, £m	'2Q14 2.6%' size
4Q27	23,642	48,202
6%28	13,446	49,045
4T30	20,872	51,965
4Q32	21,578	54,153
4H34	19,142	57,329
4Q36	17,469	59,670
4T38	18,493	63,914
4Q39	18,612	65,326
4Q40	23,454	67,473
4H42	14,997	70,969
4Q46	16,163	78,802
4Q49	17,311	85,162
3T52	4,500	91,370
4Q55	18,469	99,462
4%60	16,498	110,799
Total	**264,646**	**1,053,642**

be called), for much of its life this callability has been ignored. And when investors are asked "is there an upper limit to gilt maturities, such that you would not buy longer", the answer is typically "no". Some investors were comfortable with suggestions of multi-century gilts (Q: "250 years?" A: "Sure.") The shortest maximum heard was 100 years.

Hence, if in the next decade there is to be another long conventional gilt, we hope that the authorities choose a maturity of Monday 7th December 2111. Alternate auctions of longs could be of this gilt, for the next decade or two, eventually taking its size to £250bn to £300bn. It could become the most easily traded DV01: even Asian investors in Asian time using it as the benchmark non-Asia duration, or at least as one of the few such benchmarks.

Semi-Strippability

A very large very liquid very long bond is new territory for government issuers, and it admits of another novelty.

In most markets, including gilts, strips don't trade. Indeed, if the yield curve is flat at 3%, the last coupon of a 3% semi-annual 50Y is worth about 34p, or one part in 295 of the whole. Selling an investor £1m worth of that coupon increases the dealer's balance sheet by £294m. That doesn't work.

However, there is something that can be done. It should be possible to split the new 100Y gilt into two securities: a '2036 annuity', composed of the coupons up to those of 2036; and a '2037+ talon', composed of the coupons and principal after that date. The 100Y gilt should be 'semi-strippable'. The talon would be just under half of the present value of the bond, but a little over 80% of the DV01: it would have a duration of about 55 years. It would also hold about 95% of the convexity of the whole gilt.

There are some minor details. The gilt would be reconstitutable from the talon and annuity. The talon would merge into the gilt when the remaining cash flows become the same (in late 2036). And, probably uselessly, the talon and the annuity could themselves be stripped into, and reconstitutable from, their constituent cash flows.

Later, perhaps in a decade or so, the authorities might allow the gilt or the talon to be semi-strippable into a longer-lasting annuity and a later-starting talon. In other words, eventually a new post-2036 separation date would also be needed. But those decisions would be for later; for now it would suffice to leave these possibilities open for the future.

Strips give investors access to non-derivative low-cash high-DV01 very-convex instruments. Strips also use lots of dealer balance sheet, impeding liquidity. Semi-strippability keeps the baby but not the bathwater.

But a 100Y gilt would probably be enough novelty for one day. So the DMO might not start semi-strippability until the new gilt is no longer tiny: say, ≥£25bn.

Conclusion

★ There are enough conventional gilts between 15 years and 2060. For at least the next decade, in this maturity range, the DMO should restrict itself to re-openings.

★ The maturity date of any new long conventional gilt should be at least 2070, and ideally 7th December 2111.

★ Such a new 2111 should be re-opened repeatedly until it is at least £200bn. This would take some years to reach.

★ The new century gilt should become semi-strippable, eventually. The DMO might initiate consultation on this at about the time the gilt is launched, but semi-strippability need not start immediately.

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