

---

## Issuance of ultra-long gilts

### Introduction

1. This<sup>1</sup> is the response of Julian D. A. Wiseman to the United Kingdom Debt Management Office consultation on the *Issuance of ultra-long gilt instruments*<sup>2</sup>, which was published on the 2<sup>nd</sup> of December 2004. This response is sent in my personal capacity, and does not necessarily reflect the opinion of my employer, an emerging-market hedge fund which typically has little or no exposure to sterling-denominated instruments.

### Summary

2. The United Kingdom should issue a new conventional gilt with a maturity of at least 50 years. The longer the better: 98- or 99-years have advantages over 50.
3. This should be a conventional gilt, paying identical semi-annual coupons, and the full principal at maturity. The UK should **not** issue any amortising structures.
4. Such a very-long dated conventional gilt should be large to promote liquidity: £50 billion would be good, and twice that would be better.
5. Issuance should be by auction.
6. Such a long-dated bond should be strippable in the usual sense of the term, though little of it would be stripped. The DMO should also allow it to be partially stripped into just two securities: a '2020 annuity', composed of the coupons up to the first in 2020; and a '2020 talon', composed of the coupons and principal after then.
7. Market-making responsibilities should be the same as for other conventional gilts.

### Why issue long?

8. This section (¶8 to ¶12) is based on *Some elementary thoughts on the maturity at which a government should borrow*<sup>3</sup>, J. D. A. Wiseman, January 2002.
9. Issuance of long-dated government debt helps stabilise the economy. If the economy were to fall into deflation, the government would wish to push money into the private sector, and having long-dated government debt outstanding would achieve this automatically. (The price of the debt goes up, supporting financial entities' regulatory ratios, and allowing entities to raise money by repoing the now-above-par debt to the central bank via its counterparties.) The government would not have to worry about its own solvency, as, *in extremis*, it could always order the money printed: the UK government has monetary sovereignty. (This assumes, as is believed by financial market participants and by most British and foreign politicians, that the UK is unlikely to join EMU.)
10. But equally, if inflation were to increase, there would be a transfer of wealth to the government from the private sector.
11. These effects, in a small way, stabilise the economy. This effect would be particularly large in the deflationary scenario, and Japan has shown that any help in avoiding or escaping deflation should be welcomed.

---

<sup>1</sup> Published at <http://www.jdawiseman.com/papers/finmkts/long-consultation.html> soon after being sent to the DMO.

<sup>2</sup> See <http://www.dmo.gov.uk/gilts/public/consdoc/cons021204.pdf>

<sup>3</sup> See <http://www.jdawiseman.com/papers/finmkts/debt-maturity.html>

12. Long-dated bonds also complete markets for private-sector issuers, who would otherwise pay a premium to issue beyond the end of the government curve.

### How long?

13. When issuing a new long-dated gilt, the DMO has typically extended the yield curve by 2 or 4 years.<sup>4</sup> Given that revealed preference, an extension of the curve to 50 years is probably the most radical step available. But the DMO should actually go longer still, to a 98- or 99-year maturity, falling shy of the 100-year boundary to avoid the confusion of having two bonds maturing a century apart.

14. The table on the right shows, for various maturities of 4½% par gilts, their Macaulay duration, in years, and difference between this duration and that of a gilt 1 year shorter, in days. It also shows the percentage difference between these durations and those of a 50-year, and the ratios of the changes in the durations to the 50-year.

Mat.	Dur'n	Rel. 50s	ΔDur'n	Ratio
30	16.74	-17.39%	99.4	0.41
50	20.27		40.8	
75	21.92	8.13%	13.4	3.04
99	22.44	10.75%	4.6	8.85

Table shows various statistics of par 4½% gilts. First column is maturity; second duration; and third the percentage difference between this maturity's duration and that of the 50-year. Fourth is the difference between the duration and that of a gilt 1 year shorter, measured in days: a rate of ageing. Final column is this ageing rate divided into that of the 50-year: a higher number means that the duration of the 50s shrinks faster.

15. Observe how similar are the durations of the 50- and 99-year gilts, the latter being a mere 10.75% longer. Hence choosing one rather than the other would not make a radical difference to the debt portfolio: the 99-year's duration is only slightly longer.

16. But there are two senses in which a 99-year is much longer than a 50-year. The first is that a 99-year ages much more slowly. At a yield of 4½% the duration of a 99-year shortens by 4.6 days per year, whereas a 50-year shortens 8.85 times faster, at 40.8 days per year. In 15 years time the proportionate duration gap between a then-84-year and a then-35-year (assuming 4½% yields) will have more than doubled from 10.75% to 23.7%. So, instead of issuing a 50-year now, and another in a decade, the DMO could keep reopening the now-99-year for decades, because it will barely age. This would concentrate liquidity, as discussed in ¶22.

17. The second difference is, trivially, that maturity will happen in 99 years rather than 50. Fifty years of 2% inflation reduces the value of money by a factor of 2.7, but over ninety-nine years this inflation would be worth a factor of 7.1. So a 99-year gilt, even if reopened many times over the next half-century, would not be a significant burden at maturity. Indeed, 98.75% of the current value would be paid before maturity (discounting at 4½% semi-annual rather than 2% annual).

18. These arguments might be thought to argue in favour of issuing perpetuals, but perpetuals have three disadvantages. First, most bond indices exclude perpetuals (a similar argument is made about amortisers in ¶27). Second, some investors' booking or accounting systems cannot cope with such non-standard structures (¶28). Third, eventually the transaction cost of making numerous small payments becomes significant relative to the payments themselves. This is, in some sense, an inflation-linked liability for which the government was not paid. So perpetuals would be better with a 'sunset clause', the easiest example of which is for them to mature — but only eventually, not soon.

<sup>4</sup> 6% Dec 2028 in Jan 1998; 4¼% June 2032 in May 2000; 4¼% March 2036 in Feb 2003; and 4¾% Dec 2038 in April 2004.

## Size: how large?

19. The longer a government bond is, the larger it can be, and the larger it should be.
20. Long gilts can be huge. Let's assume that HMT would not want to make a principal payment larger than £15bn in today's money. At 2% per year for 50 years that is just over £40bn; and for 99 years is £106bn. If HMT were willing to allow a principal payment of £15bn kept constant as a proportion of GDP, and were willing to assume annual nominal GDP growth of 2% inflation + 2½% real, these sizes would become £135bn and £1.17 trillion. Truly, ultra-long gilts can safely be far larger than the UK authorities currently appear willing to contemplate.

21. These sizes are also very far ahead of current practice. The table on the right shows the largest government bonds in existence (that had at least 20 years to maturity at issue). There are no such bonds with much more than £20bn nominal outstanding.

**Large long bonds**

Ticker	Cpn	Maturity	Size, bn	Size, bn
BTPS	6	May2031	€29.76	£20.98
BTPS	6½	Nov2027	€26.01	£18.34
UKT	8	Jun2021	£16.74	£16.74
BTPS	5¼	Nov2029	€23.29	£16.42
T	8	Nov2021	\$30.63	£15.94
DBR	4¾	Jul2034	€20.00	£14.10
UKT	4¾	Jun2032	£13.83	£13.83
FRTR	5¾	Oct2032	€18.74	£13.21
BTPS	5	Aug2034	€18.54	£13.07
UKT	5	Mar2025	£12.92	£12.92
UKT	4¾	Mar2036	£12.25	£12.25
UKT	4¾	Dec2038	£12.00	£12.00
DBR	5½	Jan2031	€17.00	£11.98
T	6¼	Aug2023	\$22.66	£11.79
UKT	6	Dec2028	£11.76	£11.76

22. Long gilts should be huge in order to promote liquidity. These assets tend to be owned by UK pension funds and insurers with GBP-denominated liabilities, and by funds tracking European or global bond indices. The UK funds buy anything in the FT15+ and JPM15+ indices, and particularly demand assets with longer durations. But those with smaller holdings of sterling fixed income tend to concentrate in fewer securities, particularly the more liquid ones. Indeed, funds tracking the JPM 1+ index might own little or nothing past 15 years. Each of these non-UK holdings is typically small, but there are many non-UK insurers and pension funds whose money HMT should want. A £25bn 50-year (let alone a ≥£50bn 99-year) would be materially different from the typical security in these investors' bond indices, and a significant fraction of their target DV01. So the vast majority of global-indexed funds would own it. Indeed, were gilt ownership to be more dispersed across regional financial entities in the Americas and Asia, the new gilt's existence might help drive a 24-hour gilt market (a development which would probably be opposed by the GEMMs). The longer and larger the new gilt is, the more the larger index weights will generate demand, and the more dispersed ownership would be.
23. There will also be plenty of demand for whatever long the DMO issues. Some £23bn-worth of the 8% June 2021 (£16.741bn nominal, valued as a 15-year with a yield of 4½% and so a price of 137.87) will drop from the 15+ indices in 2006, and between now and then holders of 15+ gilts will receive coupons of just over £6.5bn. So there will be almost £30bn of money to be reinvested in 15+ gilts between now and summer 2006. This is in addition to new funds to be put to work, and to any continued pension reallocation into fixed income. Even without making dramatic assumptions about the structure of UK pension allocations, this would be a solid base of demand for any new gilt issued into the 15+ indices.
24. Of course, having very large securities risks the average inflation or nominal GDP outturn being lower than assumed. But the government can later reduce the size of its maximum payment by switch-auctioning the gilt. In 2000 the DMO did this four times with the 8% December 2015; if necessary it could be done again.

25. In short: longer is better; larger is better; and longer allows larger. There will be buyers. The DMO should reopen a new century bond once a quarter for most of a decade.

### **Amortisation**

26. The DMO has suggested the possibility of issuing an amortising bond. Such amortisation is unnecessary, and substantially harmful to the government's cost of borrowing. The DMO is urged not to introduce this structure.

27. An amortising gilt would not be included in most government bond indices, which include only conventional non-perpetual securities. Exclusion of this gilt from the main bond indices would, in effect, introduce a substantial hurdle to purchase. As a guess, exclusion from the indices would be worth 10bp to 15bp of yield. (The government-guaranteed London Continental Railway 4½% Dec 2028 and 4½% Dec 2038 yield about 20bp more than the same-maturity gilts. An amortiser would be better, but not greatly so.)

28. But even if, by charm or otherwise, the DMO is able to arrange for an amortiser to be included in the indices, the problems do not end there. The GEMMs and large sterling-based investors may well go to the trouble of building systems to allow this bond to be priced, and to facilitate regulatory and tax accounting. But there are many other investors, not dedicated to sterling but nonetheless with sterling portfolios, or at least with gilts in their target indices. Why should they spend money and, worse, management, IT and accounting time, on a single gilt, for a sterling portfolio of only a few hundreds of millions? And if they don't make that up-front investment, prudent risk management says that they should not buy that gilt. Plenty of investors have a we-can't-cope policy of not buying certain securities, whether for systems, booking, accounting, or tax reasons, and HMT should not want a long gilt to be one of these. Indeed, ¶17 of the consultation document says "HM Government is therefore not inclined to issue instruments that are likely to appeal to a limited group of investors ... with a resulting loss of liquidity": this constraint applies to amortisers as well as LPI bonds.

29. Furthermore, investors have little need of long-dated amortisers, which can be simulated with an equivalent-duration-and-convexity portfolio of gilts. Investors with shorter liability streams, particularly sub-10-years, do have a use for amortisation, but they are not the target market of an ultra-long gilt.

30. The one possible advantage of such an amortiser to the government is the dispersion of its cashflows. But this can be done in two ways, both of which are less expensive. First, as discussed in ¶17, the DMO could shrink the real size of the principal payment by pushing it further into the future (and, the longer the maturity the more a conventional resembles an annuity). Second, the DMO has experience of switch-auctioning 15-year gilts into longer securities, and when the time comes, the same could be done again (¶24).

31. To repeat, the DMO is strongly urged not to issue amortising gilts, nor other non-standard securities.

### **Stripping**

32. At a yield of 4½%, the present value of the last coupon of a £10 billion 4½% 50-year is a mere £24.3 million. The market in coupon strips shorter than 50 years is utterly illiquid, and these will be no different. There is no harm in allowing stripping of the new ultra-long, but the facility will go almost unused.

33. However, there is something the DMO can do. It should also allow the new gilt to be partially stripable into, and reconstitutable from, two securities: a '2020 annuity', composed of the coupons up to the first coupon of 2020; and a '2020+ talon', composed of the coupons and

principal after that date. Each of these would have substantial present value, of about half the value of the whole gilt.

34. The talon would be an instrument with extremely long duration. As of 15 years before the annuity's last coupon, the Macaulay duration of the talon would be 15 years plus the duration of the par gilt forward to the that last coupon date. For a par gilt presumed to have 35 years life then remaining and yielding 4½%, this is 17.9 years, for a total duration of 32.9 years. Hence this instrument would have a duration longer than that of almost any other government security, within or without the UK, yet would have a maximum present value of many billions of pounds. This combination has a chance of generating demand and some liquidity.
35. The annuity would also have a large maximum amount outstanding, though less novel partial derivatives. At a yield of 4½% a 20-year annuity would have a Macaulay duration of about 8.8 years, similar to that of an 11-year par 4½% gilt, though with convexity about 23% larger. Especially if the talon trades at a premium, and hence the annuity at a discount, this should be of interest to insurers and to mature pension funds.
36. There are some relevant details. For UK tax purposes, both talons and annuities should be deemed to be holdings of their of their constituent strips. A talon, like a principal strip, should be identified with its source bond. Talons themselves should be strippable into, and reconstitutable from, the principal and coupons of which they are composed, and should merge with their underlying gilts on the ex-dividend date of the coupon before their first. An annuity, like a coupon strip, would not be identified with its source. If, in the future, other gilts were to become similarly partially strippable, annuities with the same cashflows (i.e., having the same start and end dates and the same first coupon) would be fungible. Annuities should also be strippable into, and reconstitutable from, their constituent coupons. A decision would also be needed on whether, after the ex-dividend date of an annuity's penultimate coupon, the now one-cashflow annuity should merge with the coupon strip of its last coupon. This merger would be unnecessary, though harmless.
37. In time, perhaps in most of a decade, the DMO might wish to allow the ultra-long gilt to be partially strippable also into an annuity with a later end date, perhaps 2030, and a talon with matching start date. Alternatively, perhaps the 2020+ talon could become partially strippable, into a forward annuity containing the coupons from 2020 to the first in 2030, and a 2030+ talon, comprised of the cashflows from then onwards. But the DMO need not do more now than leave these possibilities open for the future.

### **Index-Linked**

38. When inflation is large, and a government wishes to signal its determination to bring it down, the issuance of index-linked debt can help reduce inflation expectations, and thus inflation itself. But the UK is not in this position: inflation expectations, both in market prices and as revealed by surveys, are low and stable and near the target.
39. But the issuance of bonds indexed to inflation denies the government the wartime ability to default through devaluation. Happily, there is no war of that scale in sight, and none can be envisaged for many decades, so this 'option' appears irrelevant. But the maturity of a ≥fifty-year bond is further than one can reliably see.
40. Index-linked debt is held by a narrow community of UK investors, with almost no overseas participation. Indeed, one could argue that it breaches the already-quoted "instruments ... likely to appeal to a limited group of investors" constraint. Because of the narrowness of the investor base, ILGs are much less liquid than conventionals, and this would be just as true for an ultra-long ILG.

41. In theory one could counter this illiquidity with size. But ultra-long ILGs do not have the real shrinkage of principal exhibited by conventionals: large ILGs stay large. This should make a prudent debt manager unwilling to create giant index-linked gilts.

42. The ILG duration argument is also weaker than for conventionals. The table on the right shows the statistics equivalent to those near ¶14, but for par 1¾% ILGs. (With a nominal semi-annual discount rate of 4½%, and a par semi-annual coupon of 1¾%, this table is assuming that forward annual RPI is 2.7447%, compatible with the 2% HICP assumption used earlier.) Shown in the table are Macaulay duration, in years, and the difference between this duration and that of an ILG 1 year shorter, in days; also the percentage difference between the durations and those of a 50-year, and the ratios of the changes in the durations to the 50-year.

**Duration and ΔDuration, of par 1¾% ILGs, absolute and relative to 50s**

Mat.	Dur'n	Rel. 50s	ΔDur'n	Ratio	Conv.
30	23.47	-30.00%	219.4	0.71	0.41
50	33.52		154.9		
75	42.04	25.41%	100.2	1.55	3.04
99	47.37	41.32%	65.9	2.35	8.85

Table shows various statistics of par 1¾% ILGs with conventional yields at 4½%. First column is maturity; second duration; and third the percentage difference between this maturity's duration and that of the 50-year. Fourth is the difference between the duration and that of an ILG 1 year shorter, measured in days: a rate of ageing. Fifth column is this ageing rate divided into that of the 50-year: a higher number means that the duration of the 50-year shrinks faster. Final column shows this same ratio for conventionals, repeating the numbers in the table near ¶14.

43. Recall that a conventional 99-year is 10.75% longer than a 50-year; for ILGs this difference is 3.8 times larger at 41.32%, and much larger in absolute terms (ILGs 13.85 years, conventionals 2.18 years). Also observe that ILGs age much faster than conventionals of similar maturity, and that the ageing ratio between 99s and 50s is only 2.35, rather than 8.85 for conventionals. So long ILGs entail more duration risk for the issuer, and less benefit (faster ageing). Both of these properties derive from the back-loading of payments, particularly onto the principal, which increases the government's refunding risk.

44. For all these reasons, this author does not believe ultra-long-dated index-linked debt to be part of the optimal portfolio of a government with credible macro-economic policies. Shorter-dated ILGs, up to (say) twenty years, can be useful to policy setters wishing to observe forward inflation, but that benefit diminishes quickly beyond a couple of decades.

## Conclusion

45. The DMO should issue a very long conventional gilt, and reopen it repeatedly until it is very large. If the DMO can set aside its natural debt-manager caution, the new gilt should be a 98- or 99-year<sup>5</sup>, and reopened until it is at least £50bn, and perhaps as much as twice that.

*Julian D. A. Wiseman  
New York, January 2005  
www.jdawiseman.com*

<sup>5</sup> If the DMO wishes to avoid a weekend, the new gilt should mature on Friday 7<sup>th</sup> Dec 2103 or Friday 7<sup>th</sup> March 2104. There have been strippable gilts with weekend maturities (6½% Sunday 7<sup>th</sup> Dec 2003, 4% Saturday 7<sup>th</sup> March 2009, and 5% Sun 7<sup>th</sup> Sep 2014) but not yet a long. And there is no need for a weekend maturity in a new ultra-long: a 99-year and a 98-year have a duration only a few days apart (see ¶16), so the DMO can near-costlessly choose the one with a weekday maturity.