

5. Funding issues and debt management

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Summary

- Much more government debt is likely to be issued over the next five years than over the last five. But demand from insurance and pension funds should be strong, while issuance by the UK is likely to remain well below that of the largest Euro area countries. So this is unlikely to require a significant rise in bond yields.
- The Debt Management Office has pursued a simple, predictable and transparent funding strategy, issuing debt across the maturity spectrum to achieve a relatively smooth redemption profile. Targeting debt issuance better on the needs of life insurance companies and pension funds might save the government money.
- There is a strong argument for the government to issue more long-dated and index-linked debt. The relative shortage of this sort of debt may be keeping long rates unusually low. But the Debt Management Office is now planning to issue ultra-long 50-year gilts.
- The government might also find it attractive to provide greater liquidity to the options market, to encourage the issuance of bonds linked to life expectancy and to make Private Finance Initiative and mortgage-backed bonds more attractive to institutional investors. This could help both borrowers and the wider economy.

5.1 Introduction

In this chapter, we focus on the scale of public sector borrowing and analyse how the government's funding requirements can best be met. We consider the links between optimal debt management and the demands of financial institutions for certain types of debt instruments. The form in which government debt is issued will have a significant impact on the overall supply of certain sorts of instruments. That in turn will affect asset prices and the ability of financial institutions – most notably pension funds and life insurance companies – to manage their liabilities. All this raises important issues about the optimal way to finance the national debt and whether there is scope for new instruments to make debt management more effective.

Overall, we expect that the supply of gilts will be substantially higher over the next five years than it has been over the past five years. There are good reasons why a higher proportion of the new supply should be in long-dated instruments and in index-linked form. This should help alleviate some of the pressures that have arisen at the longer end of the yield curve and which have driven nominal and real yields down to unusually low levels. Optimal debt management would naturally help in providing relatively more of those forms of debt where demand has increased most.

The chapter proceeds as follows. Section 5.2 looks at the likely scale of debt issuance implied by the forecasts for spending and tax revenue described in Chapter 4. Section 5.3 describes the Debt Management Office's current funding strategy and assesses the arguments for a more 'opportunistic' approach. Section 5.4 looks at the demand for fixed-income assets from life insurance companies and pension funds. Section 5.5 asks how the current funding strategy has affected the demand/supply imbalance and prices in the gilts and options markets. Section 5.6 looks at specific areas of potential government action: issuing more long-dated gilts, providing liquidity to the options market, facilitating issuance of longevity debt and encouraging institutional investors to consider new asset classes.

5.2 The outlook for the scale of debt issuance

Table 5.1 summarises forecasts for the overall net borrowing requirement of the public sector and Table 5.2 shows projections for the stock of net debt relative to GDP, all under different assumptions about how the UK economy evolves. We should stress here that these projections are based on the assumption that there are no new policy changes – policy on tax rates and on spending evolves in a way consistent with the plans outlined in the December 2004 Pre-Budget Report (PBR). This means that future governments do not take actions to offset deviations in borrowing from the current official projections, which means that the deviations shown in the tables are likely to be exaggerated.

Table 5.1. Public sector net borrowing

£ billion	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
PBR	34.8	34.2	33.4	29	28	24	22
Base case	34.8	34.4	36.7	40.9	40.9	39.2	37.4
MS central case	34.8	34.4	39.6	42.9	41.1	39.7	38.1
MS worse case	34.8	34.4	49.2	65.0	73.6	80.7	88.5

Sources: IFS; Morgan Stanley Research; HM Treasury.

Table 5.2. Public sector net debt

% of GDP	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
PBR	32.9	34.3	35.4	36.2	36.8	37.0	37.1
Base case	32.9	34.3	35.7	37.4	38.9	40.1	41.0
MS central case	32.9	34.3	35.9	37.8	39.3	40.6	41.7
MS worse case	32.9	34.3	36.7	40.4	44.3	48.4	54.5

Sources: IFS; Morgan Stanley Research; HM Treasury.

We show four scenarios:

- the Treasury's PBR forecast for net borrowing;
- the 'base case', which uses the Treasury PBR forecast for the UK economy and the projections for borrowing based on that forecast generated by the detailed IFS forecasting model;
- a projection based on the Morgan Stanley central case forecasts for the UK economy (see Chapter 3, Section 3.4);
- a projection based on the Morgan Stanley 'worse' case scenario, with very much weaker consumer spending in the near term (see Chapter 3, Section 3.4).

The scale of bond issuance generated by a government's deficit depends upon borrowing by local authorities, sales of national savings, changes in the stock of Treasury bills and fluctuations in the public sector's short-term cash position. Gross sales of government bonds also depend upon redemptions. Table 5.3 shows how the Debt Management Office (DMO) projects that the overall financing requirement will evolve based on the December 2004 PBR forecasts for the public finances. The final line in this table is an estimate of gross gilt sales where we make an assumption that from 2005–06 onwards, changes in the public sector cash position and in the stock of Treasury bills have no net impact on the requirement to issue gilts (we assume here £2 billion a year of national savings).

Table 5.3. Gilt issuance: the DMO's Pre-Budget Report projections

£ billion	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Central government net cash requirement	40	36	31	28	25	28
Redemptions	15	15	30	29	15	16
Financing requirement	54	50	61	57	40	44
<i>Illustrative gross gilt sales</i>	50	48	59	55	38	42

Notes: 2004–05 estimate of gross gilt sales is from the PBR; other projections assume national savings and investments run at £2 billion a year and that other factors (for example, changes in the public sector net cash position and changes in the stock of Treasury bills) have zero net impact.

Sources: DMO; Morgan Stanley Research.

Table 5.4 uses the different forecasts for the scale of public sector net borrowing (from Table 5.1) to generate projections for gross gilt sales. We assume here that from 2005–06, the scale of gross gilt sales differs from the projections based on the PBR forecasts by the difference in the size of the net borrowing requirement. In other words, we assume that gilt sales will be higher than in the final row of Table 5.3 – which we show again as the first row in Table 5.4 – by an amount equal to the difference between the forecast for the net borrowing requirement and the PBR forecast. (Any extra net cash requirement in 2004–05 beyond that forecast in the December 2004 PBR is assumed to add to gilt issuance in 2005–06.)

Table 5.4. Outlook for gross gilt issuance

£ billion	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
DMO/PBR	50	48	59	55	38	42
illustrative gilt sales						
Base case	50	52	71	68	53	57
Morgan Stanley central case	50	54	73	68	54	58
Morgan Stanley worse case	50	64	95	101	95	109

Sources: HM Treasury; IFS; Morgan Stanley Research.

Table 5.4 suggests that the scale of gross gilt issuance over the next few years will be very substantially higher than in the recent past, even using the PBR forecast for borrowing. Gross gilt sales are likely to exceed £50 billion a year for the next five years – perhaps by a very significant margin. If they do, sales will be higher than at any time since 1993. Figure 5.1 shows how net and gross gilt sales, relative to GDP, will evolve based on alternative forecasts.

It is useful to place the scale of debt issues in the context of the size of the balance sheets of the main holders of gilts (UK pension funds and life insurance companies) and also to see them against the backdrop of issues of bonds by the governments of other large economies.

UK insurance companies and pension funds hold gilts with a market value of around £220 billion – almost two-thirds of all outstanding gilts issued by the UK government. These bonds make up around 14% of all the financial assets held by pension funds and insurance companies (which are worth around £1.6 trillion). On the basis of the projections in Table 5.4, net new issues of gilts over the next few years will average somewhere around £40 billion a year. This would be about 2.5% of the gross financial assets of UK insurance companies and pension funds.

If there were to be no growth at all in the overall assets of insurance companies and pension funds and if such institutions were to buy *all* net new gilt issues – both extreme assumptions – their holdings of gilts would rise from around 14% of all their assets today to between 19% and 21% by 2007–08.

How prices of gilts evolve as supply rises will depend on how demand moves. It would not be surprising if the desired holdings of gilts in overall portfolios of pension funds and life insurance companies were indeed to rise over the next few years. Relevant factors here are the increasing maturity of many pension schemes and the fact that many with-profits funds are closed to new business. These factors are likely to increase further the desire to hedge debt-like obligations with long-maturity fixed-income assets.

Figure 5.1. Projections for net and gross debt issuance



Sources: IFS; Morgan Stanley Research; DMO.

So, despite the substantial rise in issuance that is likely over the next few years, it does not follow that a substantial increase in the overall levels of bond yields is necessary to bring forth the extra demand. Where demand comes from, and whether life insurance and pension funds will want to substantially increase holdings by buying the lion's share of new issuance, will depend, however, on the types of gilts issued by the Debt Management Office. Those are

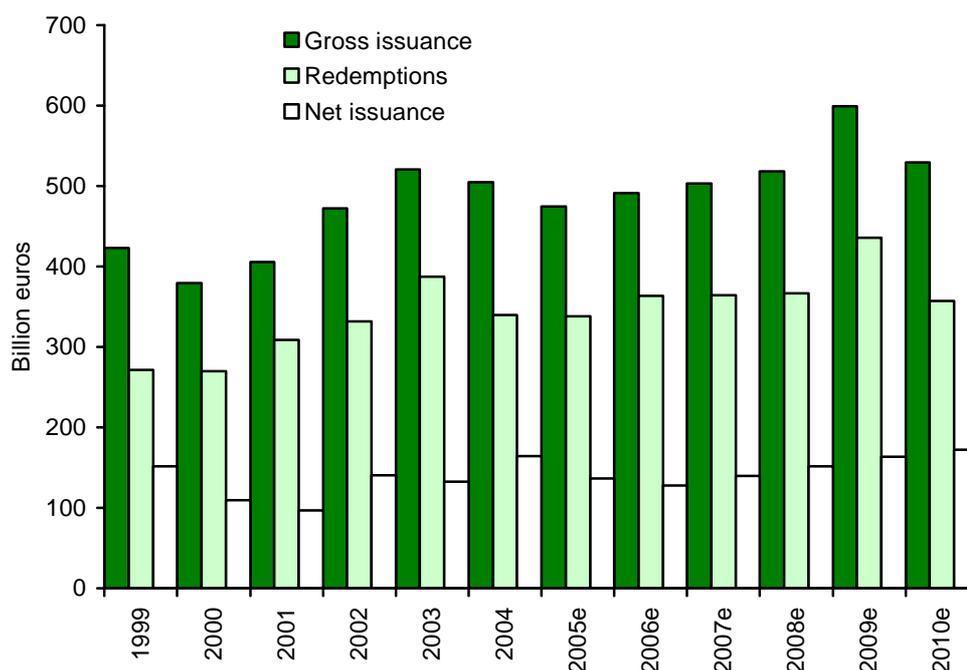
issues we address in detail in the next section. Shifts in the pattern of debt issuance (issuing more of a particular type of debt) do have the scope to change the shape of the yield curve. The scale of debt issued by government in other developed countries, particularly within Europe, is also relevant.

Scale of debt issues by other governments

Morgan Stanley research¹ suggests that the largest issuers of government bonds in the world – the US, Japan and the major EMU countries (excluding the UK) – all seem to be approaching a phase of stable or slightly declining borrowing needs. The upward trend in issuance observed over the past few years is likely coming to a halt.

Figure 5.2 shows projections for the scale of net and gross debt issuance by the governments of the four largest Euro area economies (Germany, France, Italy and Spain – the EMU4). Table 5.5 shows a projected breakdown by type of debt. Gross issues from the EMU4 are forecast to fall from around €500 billion in 2004 (£350 billion at current exchange rates) to €475 billion (£330 billion) in 2005. Supply will likely be on the rise again in 2006, but only modestly. Net issuance is projected to grow gently from a level of around €130 billion (£91 billion) for 2006 – a level rather significantly lower than in 2004.

Figure 5.2. EMU4 government bond issuance



e = Morgan Stanley Research.

Sources: National Treasuries; Morgan Stanley Research.

¹ V. Guzzo, T. Sato and T. Wieseman, *Government Funding Watch, Global Issuance Is Peaking*, Morgan Stanley, 12 November 2004.

Table 5.5. EMU4 government bond issuance

	1999	2000	2001	2002	2003	2004	2005e	2006e	2007e	2008e	2009e	2010e
Across countries												
Germany	100	101	97	142	154	154	157	166	177	194	196	192
France	81	90	90	101	118	122	111	132	110	123	144	114
Italy	205	157	183	194	214	190	168	166	193	177	222	191
Spain	38	32	35	35	34	38	38	28	24	25	37	32
Along the curve												
2–3 years	142	124	148	151	154	144	138	137	146	148	171	153
5–7 years	114	104	117	143	147	135	122	126	130	133	155	136
10 years	128	112	92	126	132	125	113	117	118	125	142	126
15 years	3	2	14	21	30	27	23	24	24	24	30	25
30 years	31	36	28	22	30	36	27	29	29	30	35	31
Index-linked bonds	5	3	6	9	26	37	51	58	57	58	66	58
Total												
Gross issuance	423	380	405	472	520	504	475	492	503	518	599	529
Redemptions	271	270	309	332	388	340	338	363	364	367	436	357
Net issuance	152	110	97	140	133	165	137	128	139	151	164	172

e = Morgan Stanley Research.

Sources: National Treasuries; Morgan Stanley Research.

So net and gross issues of UK government debt are likely to be rising in an environment where issues of euro-denominated government debt are not rising much at all and could be lower than the 2004 levels for some years. Issues of bonds by the US and Japanese governments are far larger than those from any European country, but they are not likely to be such close substitutes for UK gilts.

Conclusion

There is likely to be much more government debt issuance in the UK over the next five years. But the scale of UK issuance in the next few years is likely to remain well below that from the largest Euro area countries – Germany issued the equivalent of just over £100 billion of bonds in each of 2003 and 2004; Italy issued around £140 billion each year and France about £85 billion (at today's exchange rate). Table 5.4 suggests a level of issuance of gilts at very much lower levels, even on the most pessimistic assumptions about the public finances. Rising government deficits within the Euro area since 2001, and substantial increases in the supply of euro-denominated government bonds, have come against a background of falling euro bond yields. This does not prove that extra supply of UK government bonds will have no significant negative impact on price (and positive effect on market clearing yields). There are so many influences on bond yields that identifying the price impact of extra supply per se has proved remarkably hard to do in a reliable way.

5.3 How should government finance its cash needs?

The scale of likely debt issuance by the government over the next few years is, in itself, not likely to pose any policy problems – the days of ‘gilts strikes’ are well behind us and fundamental factors linked to ageing, risk management and regulatory change mean that the demand for low-risk, sterling-denominated, fixed-income assets is likely to grow. But there are crucial policy issues in debt management. These revolve around the question of which types of debt to issue. That, of course, cannot be seen in isolation from the type of instruments that major investors wish to hold. In this and the following sections we focus on those issues, looking at the current policy of the Debt Management Office, the demands from investors and the scope to manage the national debt more effectively by issuing new types of instruments, including derivatives.

The DMO’s current strategy

At present, the remit from the government to the Debt Management Office (DMO) is that it should seek ‘To minimise over the long term the costs of meeting the Government’s financing needs, taking into account risk, whilst ensuring that debt management policy is consistent with the aims of monetary policy’.² To meet this remit, the DMO has pursued a relatively simple, predictable and transparent funding strategy that has not explicitly involved targeting issuance at types of debt where there appears to be strongest demand. Gilts have been issued across the maturity spectrum and with an aim that there is a relatively smooth redemption profile.³ There has been little use of derivatives.

Table 5.6 shows the nature of the outstanding stock of gilts. Gilts issuance in recent years has been fairly evenly spread across the maturity spectrum and less than 25% of debt has been issued in index-linked form. In 2004–05, substantially more short-dated conventional debt will be issued than medium- or long-dated debt; only around 16% will be index-linked. While there has been a significant increase in the average life of outstanding gilts in recent years (Figure 5.3), this has not been achieved by focusing new issuance primarily on very long gilts.

² Annual DMO Review, July 2004.

³ Which means that the maturity profile of new issuance depends on decisions made many years ago about the maturity of new issues.

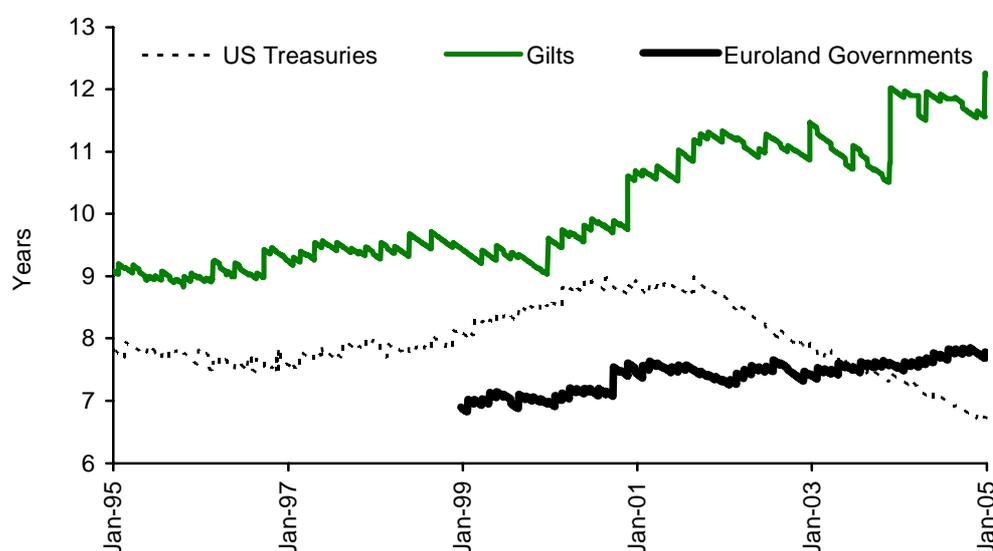
Table 5.6. Composition of outstanding gilts

%	At end-March:					
	1999	2000	2001	2002	2003	2004
Conventional						
0–3 years	16	17	17	18	16	16
3–7 years	22	22	22	18	19	19
7–15 years	24	19	16	17	18	19
Over 15 years	15	16	17	20	19	21
Total	76	75	73	73	73	74
Index-linked ^a	21	23	25	26	27	25
Undated	1	1	1	1	1	1
Floating rate	1	1	1	0	0	0

^a Including index-linked uplift.

Source: DMO.

Figure 5.3. Average lives of stocks of government debt



Source: Thomson Financial

In principle, there is no necessary conflict between the DMO's current remit and a more 'opportunistic' strategy in which the DMO provided relatively more of the assets most suited to the demands of the major institutions (most obviously life insurance companies and pension funds). Assets most in demand would tend to have the lowest yields; so there is self-evidently no tension between reducing the cost of funding the national debt and providing those gilts most in demand. We shall see in the next section that the shape of the yield curve in recent years is consistent with the idea that issuing more long-term debt – and a high proportion in index-linked form – would allow the government to lock in low funding costs. Such a strategy would also fit in with the government's aim of encouraging long-term saving for retirement. However, this would require a somewhat different philosophy and arguably an extension of the DMO remit to include the need for consistency with the government's objectives for long-term saving. A strong signal that a change in strategy is imminent is that the Debt Management Office is consulting on the desirability of issuing ultra-long debt – either in

conventional or in index-linked form, and either as a standard coupon-paying instrument or as an annuity (flat payment schedule).

Economic arguments for changing the funding strategy

There are two strong arguments why a shift in funding strategy towards issuing more longer-dated bonds, and more index-linked bonds, is desirable.

First, fixing the real cost of servicing the national debt – as is done by issuing index-linked debt – removes a source of uncertainty in the government's real funding costs; since revenues are linked to a real magnitude (real GDP), it is also a natural strategy on risk grounds. Since the government requires funding for the long term, it is also helpful to fix real costs of servicing debt for a long horizon as a means to reduce the risk that debt needs to be rolled over when real interest rates are, perhaps temporarily, high.

In theory, it *could* be the case that long-dated conventional debt would help smooth the overall burden on taxpayers better than debt with a fixed real cost. This would be true if there were a positive correlation between unanticipated inflation and the pressure on the public finances (since unanticipated inflation would then reduce the cost of funding existing conventional debt at a time when deterioration in the fiscal position made a reduction in real funding costs particularly welcome). But in practice it is not obvious whether unanticipated inflation will be positively or negatively correlated with pressure on the public finances. One could argue that unanticipated inflation is more likely to occur when demand and output in the economy are higher than expected and when, as a result, pressure on the public finances is lower than had been anticipated. If that were true, then long-dated nominal debt would not be a particularly good form of debt on risk grounds and would be inferior to index-linked debt.

These intuitive and somewhat sketchy arguments that the government should favour long-dated (and largely index-linked) debt can be made rigorous. Barro (1995) develops a theoretical argument as to why long-dated index-linked debt should be the dominant means of financing government deficits.⁴

The second reason why the government might wish to issue more long-dated, and largely index-linked, debt is that this is where demand has been strongest and where yields have been driven down most. The Barro arguments are all about issuing more long-dated debt to reduce risk – it would be fortunate if that policy *also* meant that the cheapest form of debt is being issued. Whether that might be the case, and why it has come about, is the focus of the next section, where we analyse the demand for long-maturity debt in the UK and what that has done to the shape of the yield curve. Issues connected with the supply of assets that match pension liabilities are central to this.

⁴ R. J. Barro, 'Optimal debt management', NBER Working Paper no. 5327, October 1995.

5.4 The demand for fixed income assets: pension funds and life insurance companies

Several factors account for a switch in actual and desired portfolio allocations of pension schemes and life insurance company portfolios towards long-duration and index-linked bonds:

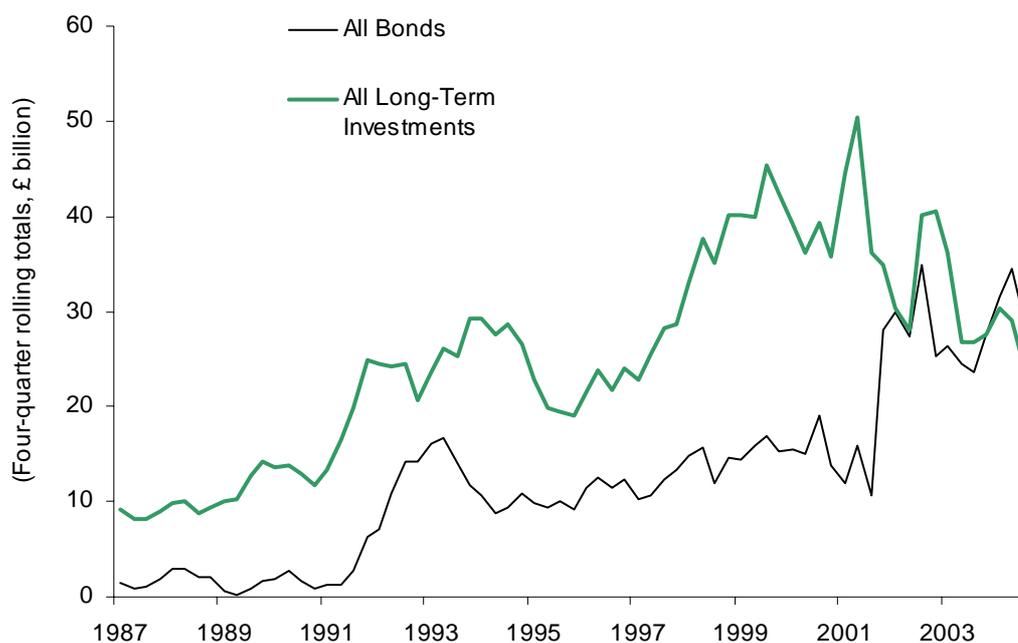
- The combination of falling stock prices and falling bond yields in the years after the stock market peak of early 2000 increased sharply the value of liabilities relative to assets in company pension schemes. This revealed what had always been the case: that holding assets with equity-like returns to fund liabilities that are bond-like is inherently highly risky. Despite this – and bar a few bold headline-catching moves – the shift in asset allocation towards bonds has been slow for defined benefit schemes in aggregate. Nevertheless, it was a mild influence favouring the acquisition of long bonds, soon to be augmented by the changes to the accounting valuation of pensions under Financial Reporting Standard 17 (FRS17).
- Increasing numbers of actuaries are coming to share the scepticism of financial economists that holding higher-risk and higher-returns assets (equities) could somehow reduce the cost of offering company pensions.⁵
- More realistic accounting for the liabilities of life assurance companies, and new rules on their capital requirements, have made it less attractive for many of them to hold equities and more attractive to hold long-duration bonds.
- Many life and pension policy providers have taken the decision to hedge out the duration of the guaranteed annuity rate options (GARs) inherent in their outstanding policies. Recognition of the optionality of these policies has also led to a significant supply/demand imbalance in the sterling interest rate options market.⁶

The supply of assets that more naturally match defined benefit pension scheme liabilities – assets that are also a natural part of the portfolios of risk-averse households saving through defined contribution schemes – is, to a significant extent, dependent upon the government. The supply/demand balance has been such that, over an extended period, the price of such assets has been driven up and the yields down. This has, arguably, increased the cost of long-term pension provision, at a time when rising life expectancy was already putting pension schemes under pressure.

⁵ Historically, defined benefit pension schemes held a high proportion of their assets in the form of equities, while that part of the portfolio invested in bonds was held largely in nominal bonds of a duration very much shorter than that of the liabilities. Increasingly, such portfolio allocations are seen as inappropriate.

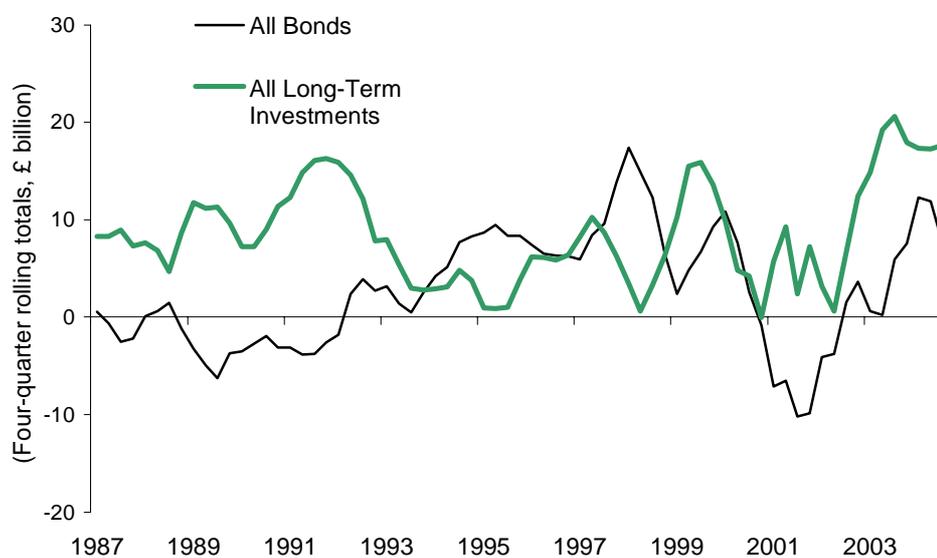
⁶ In 1998, the market began to debate (and understand) the nature of obligations faced by the life assurance industry as a result of guaranteed annuity options attached to personal pension business written in the 1970s and 1980s. The twin forces of much lower yields and increased longevity had pushed what were believed to be worthless, distantly out-of-the-money options close to and into the money, requiring the acquisition of large amounts of very long-dated sterling bonds in order to hedge the duration (if not the optionality) of the business.

Figure 5.4. Life company bond and total investments



Sources: ONS; Morgan Stanley Research.

Figure 5.5. Pension fund bond and total investments



Sources: ONS; Morgan Stanley Research.

Figures 5.4 and 5.5 show four-quarter rolling totals for the value of financial assets acquired by life and pension funds, respectively, together with the amount of bonds they purchased. They show that for life companies, nearly all net new assets acquired have been bonds for the last few years, driven by a reduced capacity for equity risk, as a result of the stock market collapse, and a tougher regulatory regime. Recently, pension funds, enjoying a much lighter regulatory touch, have done no more than re-acquire bonds that they had formerly sold in 2000 and 2001.

With deferred pensions and pensions-in-payment linked to inflation for defined benefit schemes (which still represent the lion's share of pension liabilities by value), migrating portfolios to much higher inflation-linked bond weightings would seem to be an imperative from a risk-management viewpoint. The reluctance to make a more meaningful shift thus far almost certainly reflects the fact that funds are still able to calibrate scheme contributions on the basis of higher expected returns from variable assets (equities, property, etc.), and the average final salary scheme has a significant deficit to plug on either an FRS17 or solvency (liability buyout) basis. The evolution of pensions legislation in the next parliament, particularly the details of the Scheme Specific Funding Standard to replace the Minimum Funding Requirement and the workings of the new pensions insurance system, will have a significant bearing on asset allocation. However, we regard the shift to bonds as inexorable, given the nature and maturity of the liabilities. Within the bond mix, the inflation-linked proportion will probably also need to rise dramatically.

5.5 The supply/demand imbalance

The impact on gilts prices

As a result of the factors outlined above, there has been a combination of high demand for long-term fixed and inflation-linked returns and a relative shortage of suitable long-dated assets. We noted above that around 25% of government bond issues outstanding are in index-linked form – but in recent years, the proportion of new issuance in index-linked form has been significantly less than that.

To a large extent, this situation has existed for several years in the UK and its manifestations – in terms of the shape of the yield curve and a comparison of yields on UK government bonds relative to those issued by other governments – have been present for some time. The supply/demand position for longer-duration bonds has created several features, some of which might even be called distortions:

- UK 30-year yields are currently at unusually low levels – perhaps artificially so – and have been since 1998 creating an inversion of the UK yield curve.
- Real yields at the longer end of the index-linked yield curve are now well below the likely long-run rate of growth of the UK economy – which the Treasury estimates at around 2½%. There is no necessary reason why real yields should be above the likely growth rate of the economy, though one reading of the economic theory of dynamically efficient economies would make that a condition of efficient investment levels for the whole economy. But simple estimates of real yields on government debt over the course of many decades do come out above the average rate of growth of the UK economy. Yet at current long-dated index-linked yields, that situation does not exist.
- The long end of the index-linked yield curve is around 1.5%.⁷ This is an unusual situation. Since the government first issued index-linked bonds over 20 years ago, the

⁷ Using the RPI as the price index in terms of which real rates of return are measured. If the CPI were to be used, real rates would be higher, but that would also have been true in the past, so comparisons with past real returns are not affected in an obvious way.

yield at the longer end has averaged about 3%. This is roughly the nominal yield on UK government bonds over the second half of the nineteenth century and the early part of the twentieth century – a period when inflation was, on average, zero and when expectations of inflation were also likely to have been close to zero. If 3% is a reasonable estimate of the long-run average real rate on UK government debt, it is about double the current real yield on long-run index-linked debt.

Table 5.7. Real yields on 20-year UK government index-linked bonds

1986	3.95	1991	4.49	1996	3.62	2001	2.31
1987	4.16	1992	3.85	1997	3.05	2002	2.13
1988	3.97	1993	3.01	1998	2.05	2003	2.01
1989	3.80	1994	3.87	1999	1.86	2004	1.50
1990	4.38	1995	3.56	2000	1.89		

Source: Bank of England estimated real spot yield curve (end-year levels of yield).

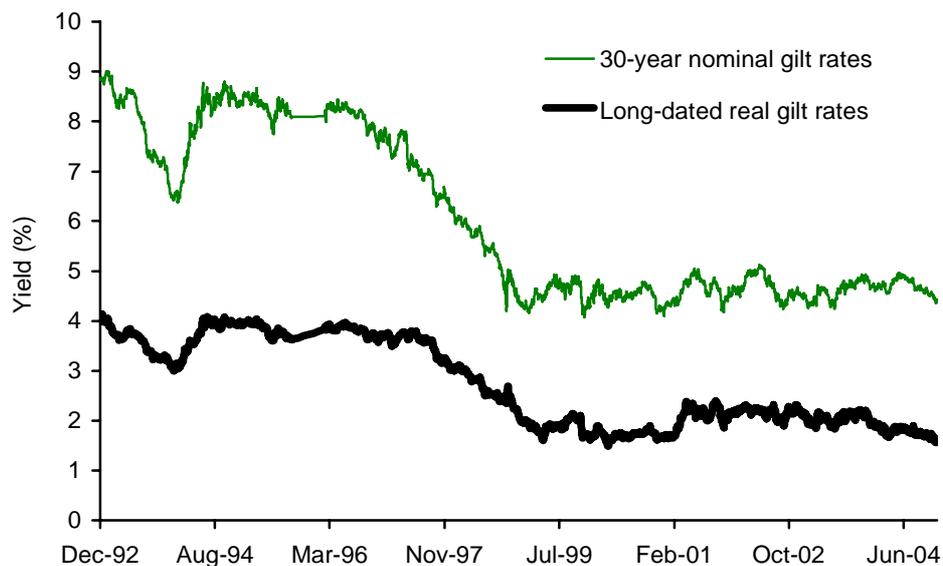
One indication of the distortions at the longer end of the nominal yield curve for sterling bonds is that implied short-term forward rates fall increasingly below implied forward rates on euro-denominated bonds for forward rates beyond about 10 years ahead (Figure 5.7). It is possible, though not entirely plausible, that investors in longer-dated sterling bonds really take the view that by 2030 or 2040, short-term nominal interest rates in the UK will be nearly 1% below short rates in the Euro area.⁸ But this pricing may also reflect the fact that yields on longer-dated sterling debt have been bid down to very low levels because of unusually high demand for long-maturity sterling fixed-income assets.

Long-term forward rates provide the most persuasive case that the long end of the curve remains distorted. The 15y15y GBP swap rate – that is, the implied rate for borrowing for 15 years but starting 15 years from now – has fallen back close to all-time low levels (Figure 5.8). Having said that, the equivalent Euro area forward rate is itself at a new all-time low, and the US 15y15y rate is only ½% above its lowest past level. Nevertheless, the 15y15y sterling rate is ½% below the EUR rate, and 1½% below the USD rate, suggesting that the long end of the sterling curve is ‘expensive’ in an international context.

The fact that UK long-term forward rates are near their lows, and forward rates beyond 30 years in the swap market are extremely low (the 20-year rate starting in 30 years’ time is currently around 3.65%), will, we believe, rightly encourage the government to go ahead with its plans to issue ultra-long nominal (and index-linked) gilts. The larger financing need, and the greater average duration supplied in meeting that need through longer gilt issuance, will serve to ‘normalise’ the curve over time, we expect.

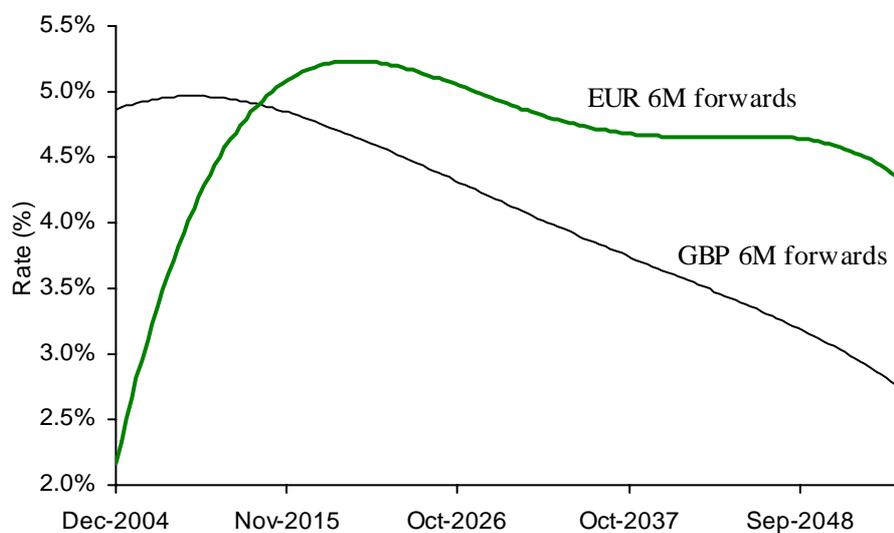
⁸ Inflation risk premiums may also differ due to differences in the credibility of monetary policy.

Figure 5.6. Long-dated real and nominal yields



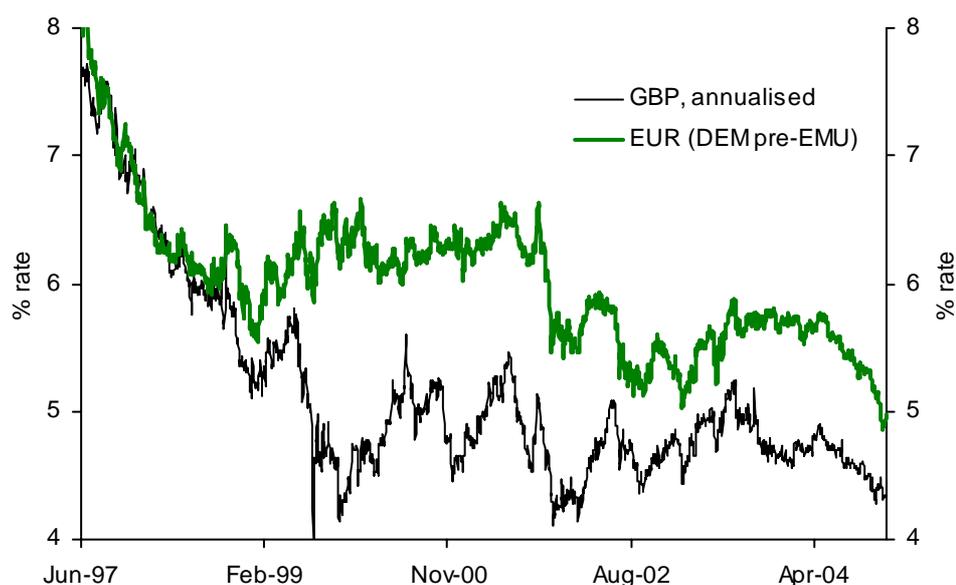
Source: FinCad/Reuters.

Figure 5.7. Forward rate on euro and sterling government bonds: December 2004



Source: FinCad/Reuters.

Figure 5.8. GBP and EUR 15-year ahead 15-year forward rates



Source: Morgan Stanley Research.

We would expect this normalisation of the forward rates to begin in earnest early in 2005, assuming plans to go ahead with ultra-long (50-year) issuance are confirmed. If the fiscal out-turn for the 2004–05 financial year is worse than was expected by the Treasury in the Pre-Budget Report, this could require a ‘carry-over’ of additional gilt sales in 2005–06. We see long gilt yields as more sensitive to unanticipated increases in supply than shorter maturity issues. So this would likely be a force for steepening the curve and lifting distant forward yields.

The impact on option markets

Imbalances between demand and supply are also relevant to the options market. The pension and life sectors look to the option market to provide insurance against an outright reduction in interest rates.

The pension sector is exposed if rates fall because they have typically funded pension obligations that are long-dated (15+ yr) through a combination of equities and shorter-maturity (5+ yr) bonds. Long-dated Calls on Gilts or Receiver Swap Options (instruments that give the holder the right, but not the obligation, to receive a flow of fixed payments in exchange for paying a variable interest rate, starting at some point in the future) are therefore useful to pension funds because they provide insurance against a fall in rates.

Recent activity by the firms in the sector to hedge their guaranteed annuity rate (GAR) exposure through the purchase of over-the-counter options in the interest rate swap market suggests that there is a lack of supply.

5.6 Scope for government action

Greater issuance of long-dated debt

Currently, the Debt Management Office follows a policy of issuing gilts in a balanced way across the maturity spectrum and with a benchmark of about 25% of issuance in index-linked form. The DMO has not issued derivatives on underlying fixed-income securities.

In 2003–04, and probably also 2004–05, more short-dated conventional gilts will be issued than long-dated conventionals and far more than are issued in index-linked form.

If it is true that longer-dated government bonds – both conventional and real – and long-dated options on swaps have been driven to expensive levels, then under a more active, or ‘opportunistic’, approach the DMO could:

- issue more long-dated index-linked and nominal gilts and potentially consider the issuance of annuities;
- provide liquidity to the long dated option market.

Index-linked bonds are, to the government, an unusually – by historical standards – cheap source of real financing at current yields. The arguments developed by Barro and others on the optimal structure of national debt suggest that long-dated, index-linked debt should make up the largest part of the stock of government bonds. Barro concludes:

... a key result is the recommendation for public debt to be indexed to the price level and long term. This structure is desirable because it insulates future government budget constraints – and, hence, future tax rates – from changes in real interest rates. Nominal debt is intrinsically inferior because it allows random fluctuations in inflation to influence the government’s future budget constraints and, hence, tax rates. These departures from tax-rate smoothing impose unnecessary distortions on the economy. A full program of optimal taxation also calls for debt payments to be contingent on the tax base ... and the level of government spending. However, other considerations – notably moral hazard problems associated with the determination of public outlays – may make these contingencies unattractive.⁹

The Barro argument is based on the ideas that optimal debt management involves issuing debt that at least does not create variability in the real cost of financing and that, ideally, debt should have a real cost that is *negatively* correlated with shocks to the economy that worsen the balance between government spending and tax revenues. This principle means that issuing long-dated nominal debt might not be optimal, purely on risk grounds, since it is far from clear that the correlations between inflation and shocks to government finances are of a type that then creates a negative correlation with the real cost of funding. It is helpful to keep that principle in mind in considering whether other instruments might be part of optimal debt management. We consider two such instruments in the following sections: derivatives on fixed-income instruments and bonds whose returns might be linked to longevity.

⁹ R. J. Barro, ‘Optimal debt management’, NBER Working Paper no. 5327, October 1995.

Provision of liquidity to the options market

If it were able to provide liquidity to the long-dated options market by issuing calls or swaptions (an option to enter into a swap transaction), the government could also be smoothing the costs of its own funding. A call, or a swaption that gives the holder the right to receive a flow of fixed-rate payments at some point in the future, is an instrument whose value to the holder rises the lower are interest rates on bonds. The issuer of such options receives a premium and then only faces a future cost if bond yields fall below some given level in the future. If the government issues such options, it would be issuing securities whose net profits are positively linked to the cost of its own future debt issuance, which is likely to be a risk-reducing strategy. Selling options would also provide securities in demand from life insurance and pension funds seeking to hedge risks that rates fall, which makes meeting obligations to pay fixed flows of income more expensive. Mortgage providers who offer fixed-rate mortgages that give borrowers options to prepay debt seek to hedge prepayment risk using options. The cost of buying such options for long maturities is one factor that will affect the interest rates charged on longer-term fixed-rate mortgages. (In the Pre-Budget Report, it was announced that as part of their response to the Miles Review of the UK mortgage market, the Treasury and DMO are to consider the desirability of using derivatives as a tool of debt management.)

The government could provide liquidity to the long-dated options market by selling gilt options. This has the advantage of providing the pension and life sectors with an appropriate option product ('an implied volatility hedge') while generating an immediate premium to HM Treasury. But there are no natural buyers since hedging programmes focus on the use of swaptions. Gilt options would be only as a proxy hedge to GAR liabilities or as an indirect way to hedge mortgage market activity. This lack of a natural demand would translate into poor relative value.

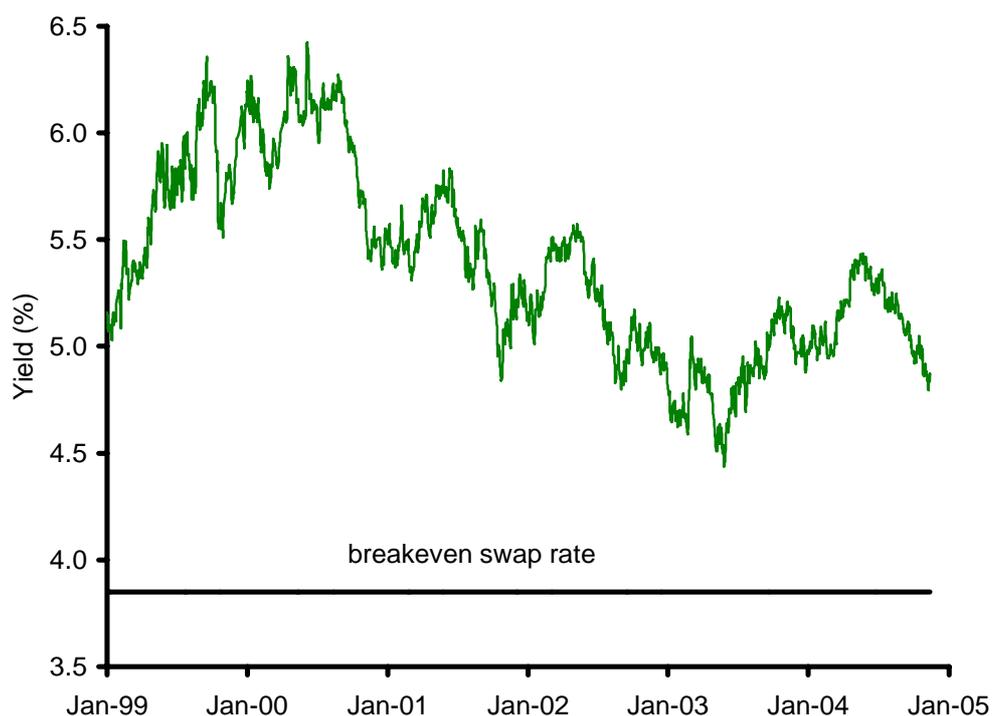
Table 5.8. Sample contract terms: indicative 10yr – 20yr swaption terms

Option buyer:	Counterparty
Option seller:	HM Treasury
Trade date:	11 Jan 2005
Option maturity	11 Jan 2015
Swap maturity	11 Jan 2035
Strike	At the money (4.475%)
Notional	£1,000,000,000
Option type	European Receiver
Upfront premium:	£55,340,000
Current forward starting swap rate (10yr – 20yr)	4.475%
Breakeven swap rate	3.85%

i.e. as long as the 20-year swap rate in 10 years time remains at or above 3.85%, HM Treasury will not face any net all-in expense.

Source: Morgan Stanley Research.

Figure 5.9. 20-year historical GBP swap rate



Source: FinCad/Reuters.

Providing liquidity in the Swaption market provides a better offset to the current activity and therefore has the advantages of significantly improved relative value and offering greater scope for active management of a disrupted market.

Table 5.8 shows how a swaption contract might be structured and priced in the current market conditions. The table illustrates that the government would benefit financially from selling swaptions giving the holder the right to enter into a 20-year swap 10 years from now so long as 20-year nominal swap rates were not under about 3.8% in 10 years' time (which means that gilt yields at the longer end of the curve would need to be at about 3.6% or above). Based on Figure 5.9, which shows the past history of the 20-year swap rate in a period of low inflation, it is unlikely that nominal yields will fall that low. In those circumstances where the government made a loss on issuing swaptions, it would find that the cost of issuing new longer-dated gilts was unexpectedly low; this is why the government's issuing options, rather than being a risk-increasing strategy, is probably a hedging strategy.

Helping the private sector hedge longevity risk

Unexpected changes in longevity have a major impact upon the cost of providing pensions. If individuals are not able to hedge these, they are exposed to the risk that their resources in retirement may be much smaller, relative to their needs, than they had expected. If individuals are to hedge those risks – by buying annuities or by having pensions that guarantee annual payments independently of how long a person lives – then providers of pensions and annuities need to be able to hedge the risk or else have resources to be able to take the risks. The more

difficult it is to hedge those risks, the lower will resources for the retired be. The scale of the risk to providers of annuities and of private pensions is already substantial.

- Pension assets held by self-administered pension funds and life companies total approximately £1.3 trillion, accrued state pension rights total £1.1 trillion and unfunded public sector pension rights approximately £0.5 trillion
- A relatively small increase in the life expectancy of the underlying population can cause these liabilities to increase significantly. For example, one major life insurance company has approximately £10 billion of pension liabilities. A decrease in annual mortality rates for pensioners of 10% would increase this liability by £500 million

There are a very limited number of ways to manage or hedge this risk. Companies have to reserve significant capital and ratings are under pressure as rating agencies wake up to this risk.

Through issuance of bonds whose value is positively linked to movements in life expectancy (longevity bonds), the government could help the private sector hedge this risk. But whether the government is the natural supplier of such instruments and whether longevity bonds naturally would be part of optimal debt management is not so clear. Nor is it clear whether the private sector is at a significant disadvantage in providing such instruments. In this section, we analyse the issues.

Issuing longevity bonds

Willetts (2004)¹⁰ and King (2004)¹¹ have argued that there is likely to be a role for the government in providing longevity bonds. King notes that members of a particular cohort cannot insure themselves against the risk of an unexpected rise in the overall level of life expectancy for that cohort. He then argues that sharing that risk across as many generations as is possible is desirable. But only the government can spread risk across future generations – no financial company can sell instruments to the unborn, but the government can run up debts to be paid by future tax payers. King sets out the key questions clearly:

Collective risks raise additional problems. Longevity risk to a particular cohort can be shared only across generations. Those generations who are alive today can pool risks through financial markets. But sharing across all generations, including the unborn, requires collective or public insurance through variations in the national debt ... How close private markets can get to providing the optimal amount of risk sharing is hard to say. Private annuity markets which could pool individual longevity risk are small. For collective longevity risks, the burden of unexpectedly high longevity for a particular cohort should be spread over as many generations as possible. In theory, this provides a potential role for government to share risks across generations ... What has happened in Britain over the past few years has been that the impossibility of obtaining longevity risk insurance has been a contributory factor to the sharp decline in private sector provision of defined benefit pensions. ... There is something to be said for the view that longevity risk is more efficiently shared collectively, leaving the

¹⁰ D. Willetts, 'The pensions crisis: what it means and what to do about it', mimeo, 2004.

¹¹ M. King, 'What fates impose: facing up to uncertainty', Eighth British Academy Annual Lecture, 1 December 2004 (<http://www.bankofengland.co.uk/speeches/speech234.pdf>).

private sector to provide insurance against individual mortality. The question of who should issue and who would buy longevity bonds merits further study.

Two issues are central to the question of the relative roles of the public and private sectors in more effectively allowing longevity risk to be handled:

- First, is the government already substantially exposed to longevity risk so that if life expectancy rises in an unanticipated way, its fiscal position worsens because pressure on spending rises relative to tax revenues? This is an issue that the tax-smoothing arguments of Barro suggest is crucial to the desirability of the government taking on more longevity risk by issuing longevity bonds.
- Second, is the scope to spread longevity risk across different cohorts alive at the same time (something that private financial markets can do) so limited that the greater part of risks have to be handled by government if they are to be spread much more evenly?

Both questions require serious and detailed analysis. We offer some preliminary thoughts:

- First, the issue of whether an unexpected rise in longevity puts more or less pressure on the balance between government spending and tax receipts depends very much on the structure of taxes and the type of spending government undertakes. The UK government relies much more on taxes on labour income than on taxes on capital income¹² and spends a substantial amount on healthcare;¹³ it also has very substantial obligations to pay public sector pensions. All this suggests some vulnerability to unanticipated increase in life expectancy if that raises the proportion of time people spend out of paid employment and raises the demands upon the health system.
- Second, while the ability of financial markets to spread longevity risk across the population is limited to those alive, this still presents scope to spread risk much more widely than it now is. Currently, much longevity risk is concentrated in particular places – most notably with life insurance companies.
- Third, it is not right to think that all people alive are affected in the same way by an unanticipated rise in longevity. A rise in life expectancy conditional on reaching 65 affects a 63-year-old and a 33-year-old very differently. A 63-year-old, who may have already stopped working or be about to, is heavily exposed to the risk that their assets will now provide less annual retirement income than before. A 33-year-old finds that the length of their healthy expected life has risen and that average future incomes relative to life expectancy may be higher as a result. Risk sharing between the relatively old and the relatively young is potentially highly advantageous. In principle, it can be achieved through trading in financial markets. But that depends on whether suitable instruments can be created and marketed. How that might be achieved is considered next.

¹² About 70% of Inland Revenue taxes and duties received in 2003–04 were in the form of PAYE receipts, i.e. almost exclusively taxes on labour income. National Insurance contributions and VAT receipts make up most of the rest of overall government revenues. Corporation tax and that part of Inland Revenue taxes and duties that is not PAYE is much smaller.

¹³ Expected to be about £82 billion in 2004–05, some 17% of total managed expenditure.

Facilitating market solutions

There are several factors that currently impede the development of a market in which private sector longevity-linked instruments could be traded. There is currently no regulatory capital relief available for any institution that does hedge its longevity exposures by holding an instrument with returns that hedge some of that risk. The regulatory framework is not currently set up to recognise anything other than a full risk transfer. This makes a market that allows significant, but inevitably less than perfect, risk reduction less attractive than it could otherwise be.

There are a number of areas where the government could potentially provide assistance:

- The Office for National Statistics could officially publish an index (say of life expectancy conditional on reaching a given age). This would create a public demonstration of government backing. At the moment, there are estimates from the Government Actuary's Department (GAD) on life expectancy, but these are updated relatively infrequently. They have also in the past severely underestimated longevity.
- The Financial Services Authority could implement a policy allowing for regulatory capital relief. This would make the product even more appealing to issuers allowing yields to be higher.
- Pension Protection Fund relief could be provided for funds that hedged their mortality risk.

Encouraging new asset classes

The issues of hedging longevity risk and the relative shortage of long-dated fixed-income assets are important to the future of private pension provision in the UK.

Government has a direct role to play in its debt management operations in handling some of the issues. It may also have a role to play in facilitating the greater use of alternative assets. The Taskforce on pensions, chaired by Peter Davis, whose report was published in December 2004, highlights the use of Private Finance Initiative (PFI) assets and the scope for securities linked to underlying mortgages to back claims by those providing pensions:

In addition to greater issuance of longer term conventional and index-linked gilts, more focus needs to be placed on finding alternative assets that can provide the necessary hedges. We urge the Government to work with the markets to identify such alternative assets with long dated profiles to help match these liabilities and facilitate their applicability. An interesting recent example has been the issuance of index-linked Private Finance Initiative (PFI) loans. Another option for long-dated index-linked assets might be to engage in inflation swaps with utilities. Alternatively, one could look at mortgages or other PFI assets. If the shortage of long-dated bonds (both fixed and index-linked) continues, the alternatives are maturity mismatches which result in reinvestment risk, or looking overseas for suitable bonds, which can lead to foreign exchange risk. It is also worth noting that, as more major economies seek to build up their private pension schemes, international demand for long-term assets will increase, putting greater strain on already limited capacity and putting further upward pressure on the price. If there is no increase in supply, this can only feed through into poorer annuity rates for individuals.

So what can the government do to encourage the development and take-up of new asset classes that are ideally suited to pension funds looking for long-duration, preferably index-linked, assets?

PFI-backed assets

PFI-backed assets have a number of characteristics that should make them attractive to pension funds:

- typically of up to 30-year duration;
- generate average rates of return now around 14–15% a year for new PFI projects or around 10% for schemes post-construction;
- often have index-linked payment streams;
- might have a low covariance with equities and bonds.

But pension fund interest in PFI assets is currently very patchy. Some of the bigger UK and overseas players are actively investing in PFI, typically through specialist PFI funds. Others argue that the assets cannot be classified as equities, bonds or private equity, and unless and until the investment consultants give them a clearer steer on how to treat them, they will stay away. Some, largely public sector, trustees do not like PFI assets as a matter of principle. There is a view that PFI projects are a form of privatisation. This neglects the fact that PFI assets invariably revert to the public sector at the end of the contract period. The assets are held in leasehold-type arrangements, but the freehold is owned by the public sector. So the government might have a role in better explaining the nature of PFI contracts and the ownership of the underlying assets.

The potential asset class can certainly no longer be considered too small to be worth understanding. Approximately £40 billion of PFI contracts have been undertaken. The future sums likely to be required to modernise UK and European infrastructure over the next decade are potentially enormous.

Mortgage-backed assets

The Davis Taskforce also highlighted the scope for mortgage assets to back claims held by those providing pensions. But currently these are overwhelmingly variable-rate and thus unattractive. Yet assets backed – either directly or indirectly – by property are a potentially ideal asset class.

- Property, both commercial and retail, provides a source of long-dated and index-linked assets.
- Overwhelmingly, mortgages on residential property in the UK currently have interest rates that are linked to short-term interest rates. But a significant move to new origination of either long-dated fixed-rate or index-linked mortgages could provide a significant supply of high-quality assets that would have a good match with pension liabilities.

The creation of these assets would also have some desirable features for both the economy as a whole and borrowers in particular.¹⁴

¹⁴ The arguments were set out in detail in the Miles Report, presented at the 2004 Budget, where a range of recommendations to facilitate the development of a bigger market in fixed-rate mortgages were made ([http://www.hm-treasury.gov.uk/media/BF8/30/miles04_470\[1\].pdf](http://www.hm-treasury.gov.uk/media/BF8/30/miles04_470[1].pdf)).