6. Funding issues and debt management

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Summary

- Public sector net debt is likely to continue rising as a share of national income over the next few years, but empirical evidence suggests that this is unlikely in itself to trigger higher real interest rates – although we do believe that long-term interest rates are much more likely to rise significantly than to fall or remain at current levels.
- Demand for long-dated assets by defined-benefit pension schemes is set to continue, but does not guarantee long-term real interest rates will stay low. A cost-effective strategy would be for the corporate sector to buy back equity, issue more debt and so increase the supply of bonds available to its pension funds.
- The likelihood that long-term real interest rates will rise suggests that the Debt Management Office would benefit from locking in low real rates of interest now. Higher issuance of long-dated index-linked debt could also support cost-effective wider pension provision.
- The proportion of debt outstanding in index-linked gilts has been broadly constant in recent years. But the DMO seems prepared to take a more flexible approach going forward.

6.1 Introduction

This chapter begins by assessing how the scale of gilt issuance anticipated over the next few years could affect the cost of UK government debt. We analyse the ways in which the supply of bonds of different types will interact with demand to determine bond yields. The nature of the demand for different types of bonds, and the way in which the cost of servicing that debt moves with economic developments, should determine the optimal way in which the government finances its borrowing. Developments in the structure of pension provision may have a significant effect here and we consider the implications of that for debt management.

6.2 How does gilt issuance affect yields?

Over the past six years, gross issuance in the gilt market has risen more than fivefold – from £10 billion in the funding year 2000–01 to an estimated £52.3 billion in 2005–06. Issuance net of redemptions has increased even further, from a net redemption of £8.6 billion to an estimated net issuance of £37.7 billion. Tables 6.1 to 6.4 summarise how we expect net borrowing, debt relative to national income (GDP) and gilt issuance to evolve over the next five years.

Table 6.1. Public sector net borrowing

£ billion	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11
PBR	38.8	37	34	31	26	23	22
Base case	38.8	36.8	36.7	36.7	31.5	28.8	25.0
MS central case	38.8	36.0	37.0	37.2	33.6	31.3	27.8
MS worse case	38.8	35.8	36.4	38.5	37.0	34.7	30.6

Sources: IFS; Morgan Stanley Research; HM Treasury.

Table 6.2. Public sector net debt

% of GDP	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11
PBR	34.7	36.5	37.4	37.9	38.2	38.2	38.2
Base case	34.7	36.5	37.6	38.6	39.2	39.5	39.6
MS central case	34.7	36.4	37.6	38.6	39.4	39.8	40.1
MS worse case	34.7	36.4	37.6	38.6	39.7	40.3	40.8

Sources: IFS; Morgan Stanley Research; HM Treasury.

Table 6.3. Gilt issuance: the DMO's Pre-Budget Report projections

£ billion	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11
Central government net cash requirement	43	40	37	31	33	29
Redemptions	15	30	29	18	16	20
Financing requirement	55	70	66	49	49	49
Illustrative gross gilt sales	*52*	*68*	*64*	*47*	*47*	*47*

Notes: 2005–06 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: Debt Management Office; Morgan Stanley Research.

Table 6.4. Outlook for gross gilt issuance

£ billion	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11
DMO/PBR illustrative gilt sales	52	68	64	47	47	47
Base case	52	71	70	53	53	50
MS central case	51	71	70	55	56	53
MS worse case	51	70	72	58	59	56

Notes: The alternative projections in Table 6.4 to the PBR/DMO illustrations are not really forecasts of what gilt sales would be, since they are based on an assumption of unchanged spending plans and tax rates. If the alternative scenarios turned out to be accurate projections for the UK economy and for the subsequent path of the public finances, the government might well change policy so that borrowing does not increase as much. This is more likely in the medium term than in the short term. In particular, the £56 billion for 2010–11 under the 'worse case' scenario for the economy might not occur since the Chancellor would very likely have cut spending and/or increased taxes if things turned out this way.
Sources: IFS; Morgan Stanley Research; Debt Management Office.

Over the next five years, gross gilt issuance is likely to be running at very much higher levels than, on average, over the past five years. Net issuance is likely to rise by rather less, and it is net issuance that is probably more relevant in determining how the balance between demand and supply will affect interest rates on government debt. Our central forecast is for the net debt to GDP ratio to rise to be close to 40% by 2009. If that were to happen, the net debt to GDP ratio would have risen by close to 10% of GDP in the period between 2000 and 2010.

During the period between 2000 and the end of 2005, when net issuance increased strongly and the net debt to GDP ratio increased by about 6.5 percentage points, yields on medium- to long-dated gilts fell, in both real and nominal terms. Over that period, yields on medium- to long-dated bonds, both conventional and real (index-linked) were highest in 2001–02, when the amount of gross issuance was only £13.6 billion and when overall net issuance was negative (Table 6.5). With issuance nearly four times higher in 2005–06, yields are now lower than they have been in the last six years. Indeed, real yields on inflation-proof bonds are now at their lowest levels since the inception of the index-linked gilt market in 1981.

Table 6.5. Gilt issuance and yields

	Gross (net) issuance, £ billion	15-year nominal yield	15-year real yield
2000–01	10 (–9)	4.66%	2.06%
2001–02	14 (–4)	4.86%	2.37%
2002–03	26 (9)	4.71%	2.21%
2003–04	50 (29)	4.70%	2.04%
2004–05	50 (35)	4.74%	1.85%
2005–06	52 (38)	4.30%	1.53%

Note: 15-year real and nominal yields are funding-year averages of Bank of England estimated spot yields.
Sources: Bank of England; Debt Management Office.

So as the government has needed to raise more cash through the gilt market, and as the stock of outstanding debt relative to national income has moved up substantially, it has been able to borrow at a lower real cost. This appears to be at odds with the conventional historical view that increases in supply mean higher yields and lower bond prices. Given that conventional market view, it has been surprising that in a period such as the past five years, when the government has consistently borrowed more each year than it had forecast,[1] there has been little adverse reaction in the bond market – on the whole, bond prices have kept on rising and yields have kept on falling.

The global context

Part of the explanation as to why greater net issuance in the UK has not been accompanied by a rise in yields may lie in the fact that overseas holdings of gilts have increased over the past five years, from £53 billion in 2000Q2 to £106 billion in 2005Q3. In the context of the global bond market, issuance in the UK is still relatively small. But it has been growing in recent years – since 2003, net issuance in the UK has risen by 31%. This compares with a rise in net

[1] Since the funding year 2001–02, the Pre-Budget Report has consistently revised upwards required gilt sales relative to April budget projections.

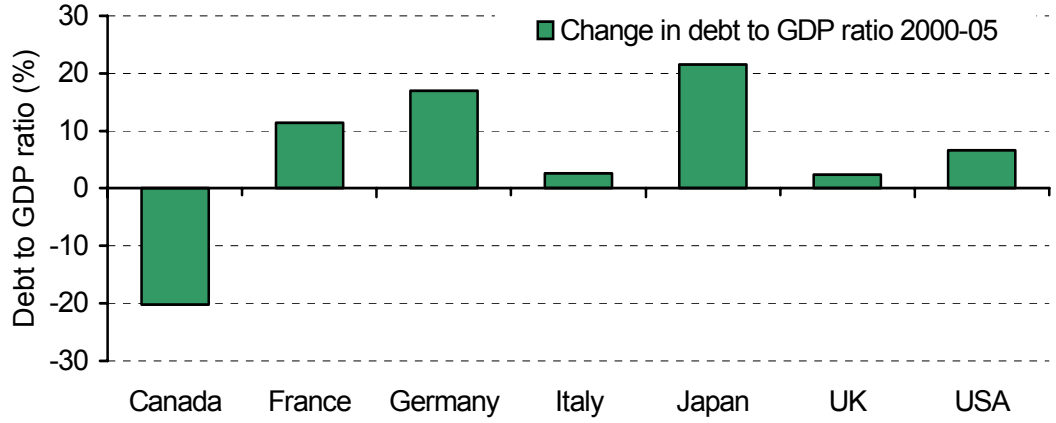
issuance by the four largest economies of the euro area (EMU4) of 13% and a *fall* in net issuance of US government bonds of 8% (see Table 6.6). This could explain why more cash has been allocated to gilts by overseas investors, particularly those managing a global portfolio, which could have helped provide the support for gilt prices that we have seen over the last few years.

Table 6.6. Net government bond issuance in the UK, USA and EMU4

	UK (£ bn / $ bn)	USA ($ bn)	EMU4 (€ bn / $ bn)
2003	29 (*49*)	286	133 (*151*)
2004	35 (*65*)	336	180 (*224*)
2005	38 (*68*)	263	150 (*187*)
2006[a]	42 (*72*)	264	151 (*178*)

[a] Morgan Stanley estimates for 2006. Funding year for the UK runs from April to March, so that the 2006 figure is a forecast for funding from April 2006 to March 2007. Funding year for the USA runs from October to September, so that 2006 figure is a forecast for funding from October 2005 to September 2006.
Note: Figures in parentheses for the UK and EMU convert net issuance figures into $ terms using the average exchange rate over the relevant funding year and the end-2005 exchange rate for 2006 forecasts.
Sources: Morgan Stanley; Bloomberg.

Figure 6.1. Change in debt to GDP ratios for G7 countries, 2000 to 2005

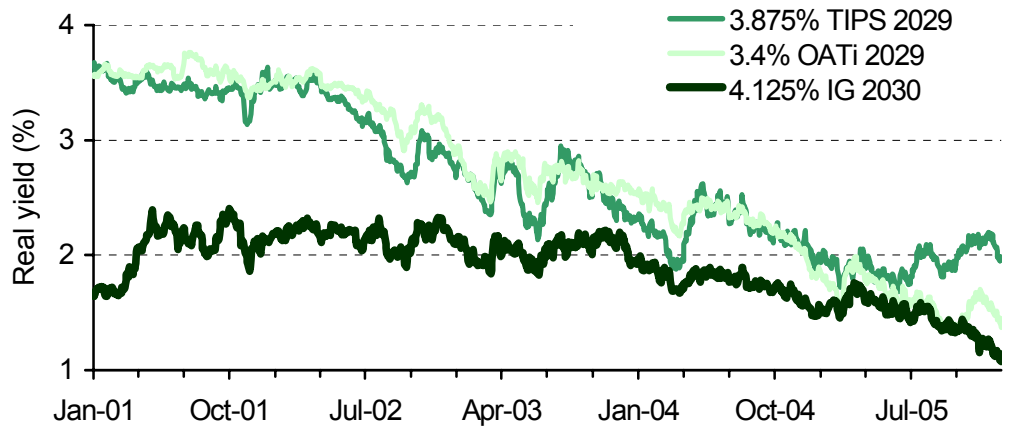


Note: Data are OECD figures for general government net financial liabilities; this differs from HM Treasury's measure of public sector net debt.
Source: OECD.

But this explanation ignores the fact that the fall in real rates on government debt has been a global phenomenon, as has been the rise in debt to GDP ratios. Figure 6.1 shows that only one of the G7 industrialised countries – Canada – has not seen its debt to GDP ratio rise over the period since 2000. But real rates of interest on government debt have fallen globally (see Figure 6.2). In fact, over the period shown, as the debt to GDP ratios of countries such as the USA and France have risen more than that in the UK, the real yields on index-linked bonds in those countries have fallen further.

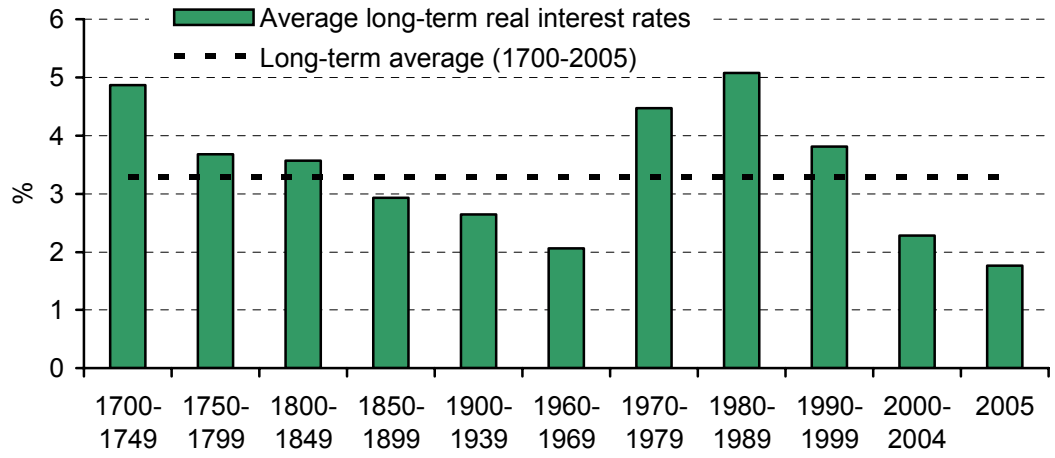
In absolute terms, however, real yields on index-linked gilts are considerably lower than their international counterparts, having been at relatively low levels for a longer period of time. To

Figure 6.2. International real yields on inflation-proof bonds



Source: Bloomberg.

Figure 6.3. Long-term real interest rates on UK conventional debt



Note: Nominal 2.5% consol rate less long-term inflation expectations.
Source: Morgan Stanley Research.

see just how dramatic the fall in UK real yields has been in a longer context, consider Figure 6.3. This shows our estimates of the real interest rate (yield) on long-dated UK government bonds at various times in the past 300 years. Based on our estimates, it appears that the level of real interest rates on long-dated UK government bonds is now close to 300-year lows.

Real interest rates and the stock of debt

Explanations for the fall in global real interest rates, and for the particularly low rates seen in the UK in particular, will be examined in the next section, where we consider their sustainability. This issue of sustainability is distinct from the question of whether greater bond issuance will in itself push rates higher. In fact, while the statistical evidence from the history of UK long-term government bond yields is for a degree of mean reversion – implying that real yields will tend to rise from today's levels – the evidence for a significant and

sustained link between the scale of government borrowing and the level of real interest rates is much weaker.

Figure 6.4 shows the estimated levels of real interest rates on long-term government bonds issued by the UK government since 1700. It also shows an estimate of the level of debt outstanding relative to GDP. The correlation between the two series is actually negative. A simple time-series regression of the level of long rates on the debt to GDP ratio (and inflation and growth in GDP) suggests there is no tendency for real rates to be higher when the stock of government debt relative to GDP is higher. (For details, see Box 6.1.)

Box 6.1. Real interest rates and the stock of debt

We used data from 1700 on the stock of UK government debt and real long-term interest rates on that debt to assess whether there has been a relationship between them. The real interest rate series was constructed by adjusting the nominal long-term government bond yield by expected inflation. The debt data were kindly made available by Professor Andrew Scott of the London Business School.

Figure 6.4 shows that there have been several periods since 1700 when real interest rates and the government debt to GDP ratio have moved in opposite directions. Periods when the debt stock is high relative to GDP do not obviously correspond to periods of above-average real interest rates. The simple partial correlation between the market value of government debt, relative to GDP, and the real long-term interest rate is negative for the 1700–2004 period, and remains negative, though is somewhat smaller, in more recent years (the correlation is about –32% for the 1980–2004 period, compared with –50% for the whole sample). The stock of debt as a share of GDP is a highly persistent (or sluggish) process, meaning it has a very weak tendency to revert to its longer-term mean; real interest rates show more of a tendency to revert to mean.

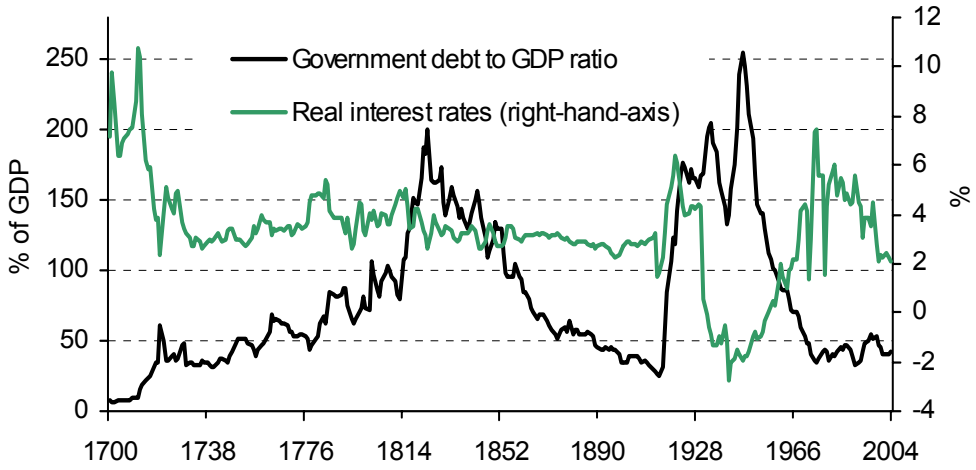
Simple regression analysis suggests that when we control for other factors, such as past GDP growth (Δgdp), past inflation (*infl*) and previous movements in the ratio between debt and GDP ($\Delta(Debt/gdp)$), the negative relationship between real interest rates (*rr*) and the stock of debt as a share of GDP is preserved, although the magnitude of this negative effect is small. The simple OLS regression we estimated, based on data for the 1700–2004 period, is as follows:

$$rr_t = \underset{(26)}{4.846} - \underset{(-1.43)}{0.057}\Delta gdp_{t-1} - \underset{(-8.81)}{0.0199}(Debt/gdp)_{t-3} + \underset{(3.6)}{0.0256}\Delta(Debt/gdp)_{t-4} + \underset{(1.4)}{0.0194}infl_{t-2}$$

The equation suggests that real long-term interest rates have tended to be lower when the total market value of government debt as a share of GDP is higher, whereas increases in the debt ratio have been associated with small increases in real interest rates. Past inflation and GDP growth are not found to be statistically significant influences on real interest rates over the whole 1700–2004 sample, though past inflation becomes a significant variable when we estimate this equation with more recent data.

Source: For more details, see D. Miles, M. Baker and V. Pillonca, 'What should long-term interest rates be today? A 300-year view', Morgan Stanley, 9 March 2005.

Figure 6.4. Government debt and real interest rates



Sources: Morgan Stanley Research; ONS; OECD; Global Financial Data.

Viewed in that light, the recent experience in the UK, and indeed in many other developed economies, of rising debt to GDP ratios and low and falling real interest rates is not so puzzling. (Indeed, more puzzling may be the view that had, until recently, been the conventional wisdom: that higher government borrowing meant higher real interest rates on debt – a view for which the historical evidence is far from compelling.) Obviously, it does not follow from this that if debt to GDP ratios rise further, real interest rates will stay at low levels. But it does suggest that rising levels of government debt may not be the trigger for a reversion to higher real interest rates.

6.3 The sustainability of low interest rates

So we have been through an unusual period in world history – with real yields on government debt having fallen to exceptionally low levels. Whether this proves sustainable, and whether the real cost to the UK government of issuing debt stays at today's very low levels, is an important issue for debt management. If today's low levels of real interest rates on government debt are here to stay, then it is not so clear that locking in borrowing costs by issuing long-dated bonds is necessarily the best strategy from the point of achieving the lowest cost of funding government borrowing. But if in 3 or 5 or even 10 years' time the real cost of the government issuing debt is likely to be significantly higher than today, then a strategy of issuing long-dated bonds now is the best way to minimise the cost of funding the national debt.

This issue of the sustainability of low real interest rates is one we now explore in some detail, drawing upon several recent, detailed studies from Morgan Stanley.[2] There are several arguments as to why low long-term real interest rates might persist. Since the issue of the sustainability of low long-term real interest rates is central to questions of optimal debt

[2] D. Miles, M. Baker and V. Pillonca, 'Where should long-term interest rates be today? A 300-year view', Morgan Stanley, 9 March 2005; D. Miles and M. Baker, 'Real yields, pensions and shifts in demand for bonds', Morgan Stanley, 4 July 2005; D. Miles, V. Pillonca and M. Baker, 'What should equities and bonds be worth in a risky world?', Morgan Stanley, 12 September 2005.

management, we briefly consider those arguments and assess their plausibility. We focus on three arguments for permanently low real rates: (a) a global savings glut; (b) a rise in risk aversion and a fall in expected growth; and (c) pension fund rebalancing.

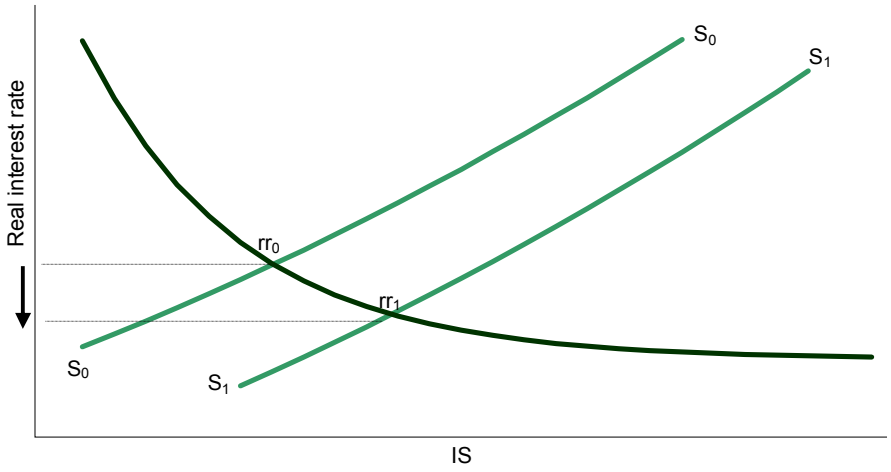
Global savings glut?

The hypothesis that an increase in desired savings for the world as a whole has driven down real interest rates is worth taking seriously. The mechanics of the argument are illustrated in Figure 6.5. We assume that total savings are higher the greater is the return on savings, but that the demand for savings to invest falls as the cost of savings (the real rate) increases. Real interest rates are on the vertical axis; saving and investment are measured on the horizontal axis. The diagram shows that, if there were to be an increase in the scale of desired global savings (a move in the schedule from S_0-S_0 to S_1-S_1), with an unchanged global demand for investible funds, we would expect to see:

- a decline in the real rate of interest;
- an increase in the level of savings (and investment, which must equal savings when we focus on the world as a whole).

Of course, the model illustrated is hugely simplified; it draws no distinction between a rate of return on some global debt instrument ('the' real interest rate) and a return on corporate capital funded by equity. It also abstracts from risk differences between different financial instruments and equates the required rate of return on corporate capital (or the cost of capital) with a real interest rate. Despite this, it still makes sense to ask if there is any evidence of a shift in savings large enough to generate the sort of movements in real rates we have seen, driven by a mechanism of the kind illustrated in Figure 6.5.

Figure 6.5. Simple supply and demand of savings model

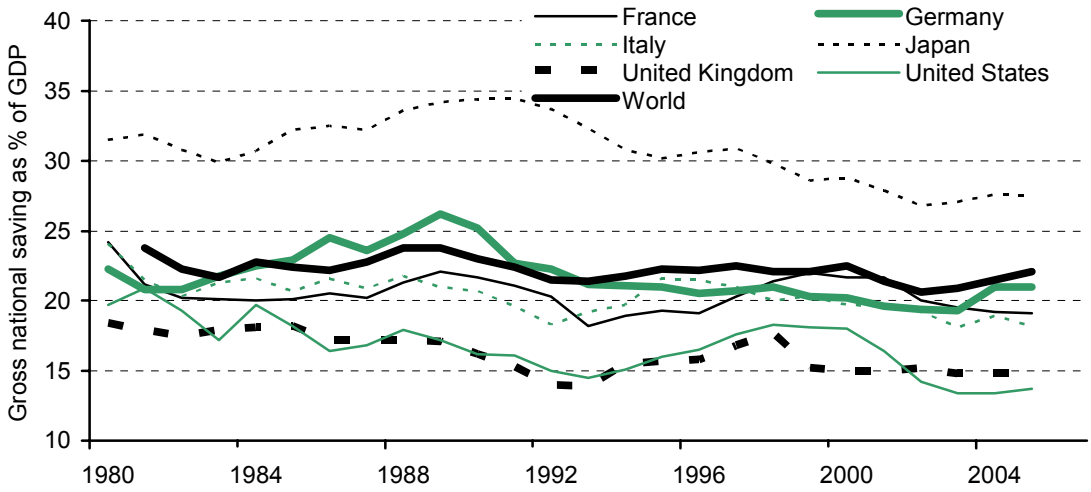


Source: Morgan Stanley Research.

Global savings have edged up …

Figure 6.6 shows IMF estimates of gross savings for the world as a whole, and for various areas and countries, in the period since 1980. There has been a fall in saving rates in many areas over the past few years – most notably in the USA, but also in the UK. For advanced economies as a whole, saving rates have gently declined since the end of the 1990s. But for the *world* as a whole, the estimated total level of gross savings has edged up in the last few years, from around 21% of global national income in 2001–02 to just over 22% of global national income by 2005. The scale of the change is clearly small, but could it nonetheless be large enough to drive down real rates by a significant amount?

Figure 6.6. Gross national savings (% of GDP)



Note: Figures for 2005 are IMF forecasts.
Source: IMF World Economic Outlook database, September 2005.

… but not nearly enough

It is implausible that such a small increase in the flow of gross saving can, other things equal, generate a fall in the level of real interest rates that is as substantial as is implied by the decrease in the level of yields on long-dated inflation-proof bonds. For example, the fall in the level of yields on long-dated inflation-proof bonds since 2001–02 in the USA and France has been from a level of around 3.5% to under 2%. The fall in the yield on long-dated UK inflation-proof debt over this period has been substantial: from around 2.3% to under 1%.

To generate a fall in the global real rate of interest of over 1 percentage point would probably require a much more substantial rise in the saving rate than that suggested by the IMF data. The back-of-the-envelope calculation described in Box 6.2 shows why.

Rise in risk aversion / lower GDP growth?

The level of real interest rates is likely to depend on the anticipated level of growth of real GDP. And the real return on a safe asset – an inflation-proof government bond issued by a government with only a small chance of default – is likely to be lower the more averse to

Box 6.2. Real interest rates and the saving rate

A production function – linking the level of output to inputs of capital and labour – suggests that there should be a link between the stock of capital and the amount of labour used in production and the rate of return on capital. If we assume the (common) Cobb-Douglas production function, which has the appealing feature that it predicts that the share of capital and of labour in total output is constant, the real rate becomes

$$rr = \beta(Y/K) - \delta$$

where rr is the real rate of return, K is aggregate capital employed, Y is aggregate output, δ is the depreciation rate on capital and β is the share of profits in GDP.

Let us take some ballpark figures for the key numbers:

$\beta = 0.30$;
$K/Y = 3$;
$\delta = 5\%$.

This would generate

$rr = 0.30 \times (1/3) - 5\% = 5\%$.

What would it take to reduce the rate of return by one full percentage point? To drive the rate of return down from 5% to 4%, we need the ratio of capital to income (or GDP) to increase from 3.0 to 3.33. This is an increase in the capital stock of about 11%, which is worth close to 33% of annual GDP at a plausible capital to output ratio of around 3. To achieve that rate of increase in capital over five years (the period over which real interest rates have fallen by about 1 percentage point) would require the saving rate to be higher by close to 7% of GDP each year. This is clearly far in excess of the actual increase in the global gross saving rate since 2001–02, which is about 1% of global national income.

taking risk investors are. So a combination of rising risk aversion and greater pessimism about the growth of future real incomes could mean that real interest rates on government bonds fall and, if persistent, mean that they stay low. Might these factors explain low real yields on government bonds? An analysis based on a framework developed by Robert Barro makes us sceptical.[3]

Using the Barro framework for valuing safe bonds and equities, we estimate that if lower expected real growth in GDP were to be the main factor behind the fall in real yields on longer-dated government bonds, then future growth in living standards would be expected to be about one-half the levels of recent decades (about 1.25% versus an historic average nearer 2.5%). And if the main factor behind lower real yields were to be more risk aversion, then we estimate that the current level of risk aversion would need to be substantially higher than survey evidence based on very large samples of US and German households suggests is

[3] See R. J. Barro, 'Rare events and the equity premium', NBER Working Paper no. 11310, May 2005, and D. Miles, V. Pillonca and M. Baker, 'What should equities and bonds be worth in a risky world?', Morgan Stanley, 12 September 2005.

likely. Nor is the hypothesis that perceptions of higher risk about real economic performance in the future are the main factor behind lower bond yields very plausible. Given that the last hundred years include two world wars and the great depression of the 1930s, the notion that the next decades are likely to be more risky than the past century is not particularly compelling.

We conclude that a theoretically based asset pricing model depending on fundamental features of the economy – the scale of volatility of real growth, the degree of risk aversion of investors, the average rate of technical progress – cannot easily account for today's very low real interest rates on long-dated bonds.

Pension fund rebalancing?

Probably the most convincing explanation for the exceptionally low level of real yields on longer-dated UK government bonds is that past, current and anticipated rebalancing of portfolios of UK pension funds and life insurance companies towards more fixed income assets may have driven yields down. The rationale is that these institutional investors provide a large source of demand for gilts as they aim to match their liabilities in response to regulatory innovations and in an effort to improve their risk management profiles.

Table 6.7. 10-year real and nominal forward rates 10 years ahead

Funding year	10-year nominal forward rate 10 years ahead	10-year real forward rate 10 years ahead
2000–01	3.86%	1.60%
2001–02	4.63%	2.00%
2002–03	4.63%	2.10%
2003–04	4.75%	2.18%
2004–05	4.50%	1.59%
2005–06	4.26%	1.30%

Note: Forward rates calculated from spot nominal and real yields as estimated by the Bank of England.
Sources: Bank of England; Morgan Stanley.

This source of demand has been present in the gilt market for a number of years, as regulatory and accounting changes in the UK have tended to stay ahead of international policy. But it does appear to have had a marked impact on the gilt curve more recently. Table 6.7 shows the average 10-year real and nominal forward rates 10 years ahead over the past six years. Given that these are forward rates, they should be largely unaffected by developments at the short end of the yield curve. A fall in these rates points instead to a preference on the behalf of investors for longer-dated assets.

The sample period can be broadly split into two. From 2000–01 to 2003–04, both real and nominal forward rates rose. The low rates seen in 2000–01 were most likely related to the Minimum Funding Requirement (MFR) for corporate pension schemes. Introduced in 1996, this regulatory requirement had given pension funds a strong incentive to pay a premium for long-dated gilts. But in 2001, the government announced its decision to reassess the MFR, thereby relieving pressure on long-dated gilt prices and allowing both real and nominal forward rates to rise. Since 2003–04, however, we have seen further regulatory initiatives, including changes to accounting standards (FRS17) and plans to replace the MFR with a

scheme-based regime. This has coincided with falling long-dated forward rates, particularly in the index-linked gilt market. It is unclear, however, quite how strong institutional demand for long-dated government bonds will be in the future. Two important factors will be the evolution of pensions regulation and the pace with which defined-benefit (DB) schemes close.

Ongoing demand for long bonds is likely …

In October 2005, the Pensions Regulator published a consultation document entitled *How the Pensions Regulator Will Regulate the Funding of Defined Benefits*. This set out how the Pensions Regulator intends to regulate private sector defined-benefit pension schemes, effective from April 2006. The new guidelines replace the much-criticised MFR with a more individual scheme-based approach aimed at ensuring that defined-benefit funds are able to meet their future liabilities.

The basic outline of the approach is that individual schemes will be charged with assessing their own funding shortfall (as measured by FRS17) and putting in place a recovery plan in order to eliminate it. Every scheme will undergo a regular funding valuation to take place at least every three years.

The new regulations do not include specific guidance as to which assets pension funds should be invested in. It is, however, likely that DB pension funds will increase their holdings of long-dated government bonds. Long bonds are a better match for debt-like liabilities (whose value under accounting standard FRS17 depends on corporate bond yields) than most other asset classes. While they are not effective in hedging longevity risk, they can protect against duration (that is, interest rate) risk and, in the case of index-linked gilts, against inflation risk. By holding a substantial proportion of assets in long bonds, pension funds can minimise the risk that, because of interest rate movements, deficits reappear or widen in the future. This may be achieved either by switching out of equities or by using new cash injected by companies predominantly into bonds.

The Pensions Regulator made it clear that it would require pension schemes to have a recovery plan in place that would eliminate deficits as soon as possible, subject to not putting undue strain on the strength of the underlying company. Ten years is suggested as a maximum length of time over which the recovery plan should be implemented. It is clear, however, that where the Pensions Regulator believes the deficit can reasonably be plugged within a much shorter time, it will require companies to do so.

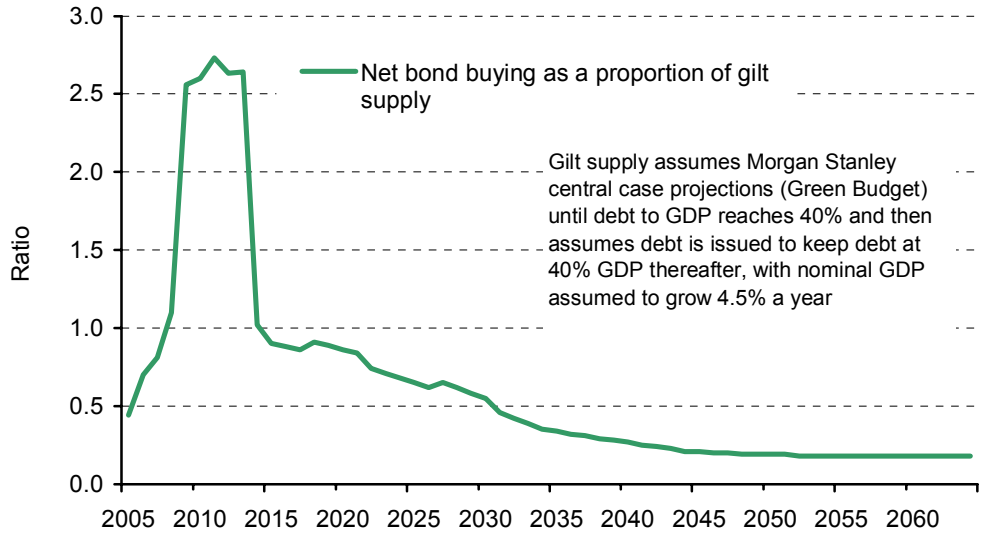
A related development is the establishment in 2005 of a Pension Protection Fund (PPF), a statutory fund set up to compensate members of defined-benefit schemes in the event of insolvency of the sponsoring company. For the year 2006–07, levies to finance the PPF will not be related to the asset allocation of individual pension schemes. But, with a consultation exercise planned in 2006, there remains the possibility that – in the following year or two – pension funds may find that levies become linked to portfolio allocations and that funds with low bond holdings face higher levies. Again, this *may* well provide a bid to the long end of the gilt market over the next year or two, keeping yields low.

… but the impact could be muted

While the direction of many of these forces is clear, the scale of the effects is harder to judge. Whether they are powerful enough to keep yields on longer-dated gilts at exceptionally low

levels is not clear. Indeed, a number of factors act against such an outcome. First, it is important to recognise that the majority of private sector defined-benefit schemes are already closed to new members; and over the next few years, many may also stop existing members from accruing additional rights. Based on detailed modelling of how demographic change and closure of existing DB schemes affect UK pension funds, we recently concluded that strong demand for sterling fixed income assets can be expected for several years, *but* the scale of that demand is likely to fall off rather sharply about 10 years ahead.[4] Figure 6.7 shows an estimate of net new demand from corporate pension funds on the assumption that they aim to hold a much larger percentage of their assets in bonds.

Figure 6.7. Pension fund bond purchases versus gilt supply



Source: Morgan Stanley Research.

Specifically, we assume that corporate pension funds move from the position today where, on average, about 60% of the portfolios are in equities and about 25% in debt, to a situation of two-thirds of assets in bonds. We assume that this portfolio switch occurs gradually over an 8-year period. We also allow for the overall stock of assets to evolve as schemes mature. Based on those assumptions, we estimate that demand from UK corporate pension schemes for bonds will be significantly greater than net new supply of gilts for a period stretching ahead for more than five years. But the fall in demand after about 2011 is very sharp.

This is important if there are investors and issuers with the foresight and time horizons to take account of the potential for demand for sterling fixed income assets to fall sharply in the future. In that case, the impact on bond prices and yields of likely very strong demand for the next few years will be muted.

But there may be few investors with the scope to take advantage of likely big swings in demand over such a long horizon. If that is so, government and corporate issuers should take advantage of strong demand for long-duration fixed income assets by issuing very long-maturity debt at prices that could come to seem very favourable in the medium term. One possible impact of the de-gearing (or de-risking) of pension fund portfolios might therefore be

[4] D. Miles and M. Baker, 'Real yields, pensions and shifts in demand for bonds', Morgan Stanley, 4 July 2005.

that issuance of long-term corporate debt rises sharply. Indeed, we argue that the simple logic of Modigliani-Miller tells us that this is a natural response and one that shareholders should welcome. The idea here is that what really matters is the overall level of net debt obligations of a firm; if a company issues more debt that sits directly on its balance sheet, but simultaneously buys more debt to hold as a matching asset against its pension liabilities, it has not increased its net debt and its overall gearing has not changed. Indeed, this could create a gain because of the tax deductibility of the interest on the debt it has issued. In other words, a shift in corporate pension fund portfolios away from heavy reliance on equity holdings and towards corporate bonds, allied with a strategy of companies buying back their own shares and issuing corporate bonds, could leave overall corporate sector debt gearing effectively unchanged while allowing pension fund rebalancing towards assets matched against liabilities and in a tax-efficient way.

If that happens, then the bond and share price impact of even very major rebalancing in corporate pension schemes could be small. The extra demand for bonds to rebalance DB pension funds would be naturally matched by additional supply of corporate bonds issued to finance companies buying back the equities sold by other pension funds. If that happened, the whole notion of a shortage of supply in bonds would look strange – demand would create its own supply. If this process becomes important, then it would undermine the argument that an imbalance between demand and supply for bonds can keep bond yields at what are remarkably low levels.

We conclude that a combination of Modigliani-Miller-style reasoning and the potential for long-horizon behaviour by some investors and issuers should make us sceptical that the pension fund rebalancing story has as its inevitable conclusion that bond yields should be unusually low now and will stay low.

Conclusion

We have assessed some of the arguments for very low real interest rates and not found them entirely compelling. It would be too strong to say that this *proves* there is a bubble in the bond market and that bond prices will fall (and yields rise) at some time in the near future. We reach the more cautious conclusion that the risks are substantially biased one way – which is towards real rates being significantly higher, and perhaps in the relatively near term. How that observation should affect debt management is the key policy issue we turn to next. A natural starting point for that analysis is to think about the principles of optimal debt management.

6.4 How should the government fund its borrowing?

Managing uncertainty

There is an extensive academic literature on the principles behind optimal debt management. It is largely driven by the assumption that smoothing the average rate of tax is desirable. With that aim, governments should seek types of debt where the cost of servicing the debt (the interest rate) is negatively correlated with shocks that increase the amount of debt. So an optimal form of debt would be one whose interest rate (and market value) was lower when an adverse shock made government deficits higher. That might mean that ideal debt instruments

for governments to issue were bonds with values that were positively correlated with GDP growth – a bad outcome for GDP, which would typically mean higher government deficits and more debt, would reduce the cost of servicing the existing stock of debt.

In practice, it appears that this sort of contingent debt is rarely used. Recent evidence from Albert Marcet and Andrew Scott suggests that governments do not (and probably cannot) issue this sort of contingent debt.[5] There are several reasons why such contingent debt is not traded – partly because of practical issues to do with verification and data revisions and partly because of perverse incentives coming from linking the cost of government debt to outcomes that the government has some ability to control, e.g. the fiscal deficit or tax revenues.

So we have a narrower range of debt instruments: conventional/indexed; short/medium/long; and domestic/foreign currency.

The question as to how deficits should be funded optimally in a world with a limited range of debt instruments has been extensively studied; Barro (1995) remains a key reference.[6] He concentrates on two key guiding principles. The first is that it is preferable on risk and uncertainty grounds to fix the cost of servicing the national debt in real terms, i.e. to fix a real rate of interest on borrowing. Second, since the government typically wants to borrow over the long term, it is preferable to issue longer-dated debt (again, where the cost is defined in real terms). The idea is that this removes fluctuations in financing costs arising from changes in the short-term real interest rate.

Together, these criteria point towards a strategy of concentrating issuance in long-dated index-linked debt. In the event that this is not possible, Barro also suggests issuing short-dated nominal debt, e.g. in the form of Treasury bills. This form of issuance has the advantage that it essentially satisfies Barro's first criterion – over a short period of time, there is relatively little uncertainty over the inflation component of the short-term nominal interest rate. However, it clearly does not satisfy the second criterion – the financing costs associated with rolling over a Treasury bill portfolio will fluctuate frequently in line with changes in short-term interest rates.

Pension provision

Arguably, deficit funding strategy may also be optimised with reference to alternative criteria, e.g. to better meet the demands of the pension system. This could be justified on the grounds that the government has a responsibility to ensure that efficient pension provision is widely available. While this objective is less easily quantifiable than Barro's risk and volatility criteria, it is not obvious why it should not form part of an overall funding strategy, particularly if it does not increase the costs of funding. Other things equal, it seems reasonable that the government should exploit any opportunity it has, by the way in which it chooses to manage the composition of its own debt portfolio, to facilitate effective saving towards retirement. In principle, there could be a conflict between objectives of debt management based on the level and volatility of funding costs and that of enabling private sector pension

[5] A. Marcet and A. Scott, 'Debt and deficit fluctuations and the structure of bond markets', LBS mimeo and CEPR Discussion Paper, June 2005.

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

provision. In practice, the low real yields on those assets most in demand for private pension provision and the fact that they are long-maturity, real bonds (which the Barro analysis suggests is the kind of debt that should make up a high proportion of national debt) suggest that there is unlikely to be a conflict.

In the case of funded defined-benefit pensions, it is fairly straightforward to see how funding strategy can be used in support of pension provision. By issuing more long-dated, particularly index-linked, debt, the Debt Management Office (DMO) may be able to help companies match their pension liabilities at lower cost. But the recently published report by the Pensions Commission,[7] led by Lord Turner, suggests that debt management might also play an important role in helping pension provision through funded defined-contribution schemes.

In the report, the scale of the future demand for annuities was identified as a major challenge for pension provision. Annuities are financial instruments, usually provided by insurance companies, that promise a certain regular income until death. The providers are exposed to longevity risk in a similar way to those with defined-benefit pension liabilities. The demand for annuities is set to grow rapidly as more and more defined-benefit schemes are replaced by defined-contribution schemes. This implies that the annuity market will need to grow rapidly.

The Commission discusses two potential ways in which government debt issuance strategy might facilitate growth of the annuity market. In both cases, the idea is to create more financial assets that annuity providers can use to hedge at least some of the risks associated with annuities.

The most obvious hedge would come in the form of government-issued longevity bonds. The Pensions Commission argues, however, that this should not necessarily be encouraged as the government is already extensively exposed to longevity risk via the state pension system and public sector employee pensions. An alternative, though less effective, hedge for annuities comes in the form of long-dated index-linked bonds – this would provide insurance against inflation risk but not longevity risk. In this case, the Pensions Commission report argues simply that any artificial constraints on the issue of long-dated bonds, and of index-linked bonds in particular, should be avoided. In practical terms, this would mean the DMO continuing to take a flexible approach to its issuance strategy. This is the issue to which we turn in the next section.

6.5 The DMO's current strategy

In last year's Green Budget, we discussed a number of measures that we thought the DMO should consider as part of its funding strategy.[8] At that time, we suggested that the DMO seemed somewhat ambivalent about a strategy of issuing debt in such a way as to take advantage of cost minimisation opportunities. In this section, we review the DMO's funding approach, which we believe has become more flexible.

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[7] Pensions Commission, *A New Pension Settlement for the Twenty-First Century: The Second Report of the Pensions Commission*, The Stationery Office, London, 2005, http://www.pensionscommission.org.uk/publications/2005/annrep/main-report.pdf.

[8] See chapter 5 of R. Chote, C. Emmerson, D. Miles and Z. Oldfield (eds), *The IFS Green Budget: January 2005*, http://www.ifs.org.uk/budgets/gb2005/index.php.

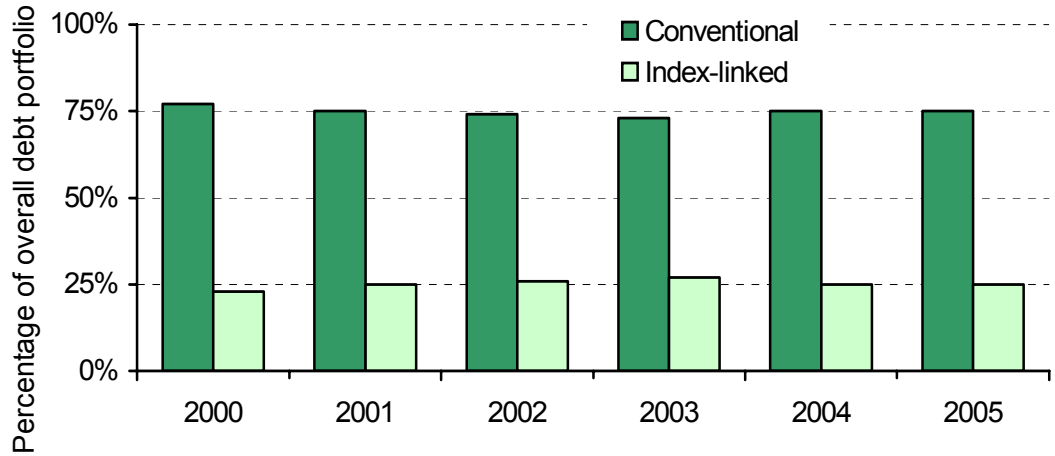
The DMO's approach to debt management is discussed in its annual publication, *DMO Annual Review*. In the latest review, for 2004–05,[9] the DMO's decisions about the structure of the debt portfolio are described as reflecting 'the debt instruments that are available to the Government, their expected cost and risk characteristics, and the preferences of both the Government and investors'. But how does the DMO actually weight these different factors in arriving at its funding decisions?

The big unknown here is the preferences of the government and how these affect the DMO's funding decisions in practice. As the DMO noted in the 2003–04 *Annual Review*,[10]

> Work is currently being done to clarify further the implications for the structure of the debt portfolio of the Government's attitude to risk. Our current practices are therefore based on past observations on the structure of the debt portfolio and issuance strategies, which we use as broad guidelines. The previous share of the debt portfolio with nominal versus real exposures demonstrates a preference for having approximately a quarter of the overall debt portfolio in the form of real exposure. We also maintain a well-diversified issuance strategy for nominal gilts such that our 'default' issuance strategy is broadly an even split between the three conventional maturity bands, on a cash weighted basis.

The implicit preference regarding the split between conventional and index-linked debt can be clearly seen in the data (Figure 6.8). In broad terms, there is also evidence of the DMO following the 'default' issuance strategy for allocating conventional gilt issuance across maturity bands (Figure 6.9). There is some deviation, however – as the DMO notes in the 2003–04 *Annual Review*, 'issuance in nominal gilts may deviate from our "default" strategy, when there is evidence that the shape of the nominal yield curve implies the existence of a "preferred habitat" premium'. Against this background, it is interesting to review the extent to which such considerations may have played a role in determining the composition of the government's debt portfolio in recent years.

Figure 6.8. Portfolio split between conventional and index-linked debt

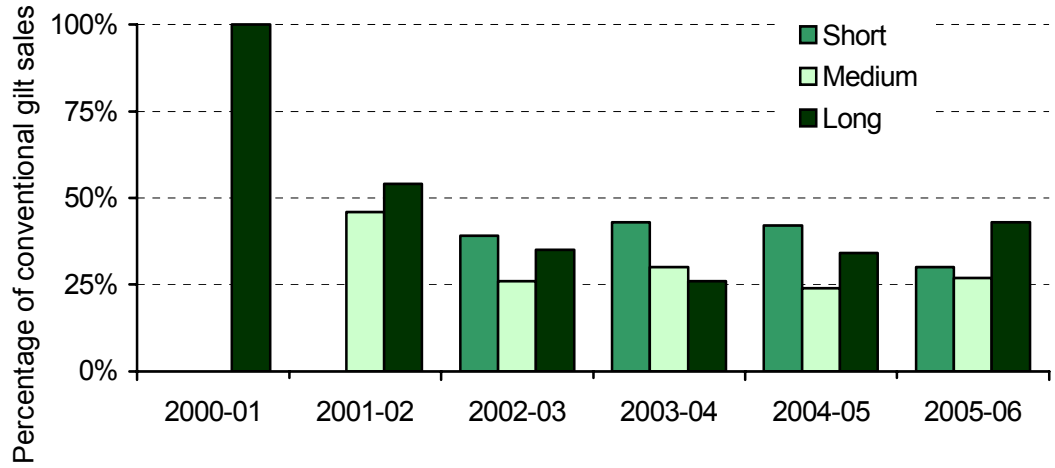


Note: Measures based on nominal (uplifted) par amounts outstanding at end March.
Source: Debt Management Office.

[9] *DMO Annual Review 2004–05*, July 2005, http://www.dmo.gov.uk/publication/f2ann.htm.

[10] *DMO Annual Review 2003–04*, July 2004, http://www.dmo.gov.uk/gilts/public/annual/gar0304.pdf.

Figure 6.9. Conventional gilt sales according to maturity type



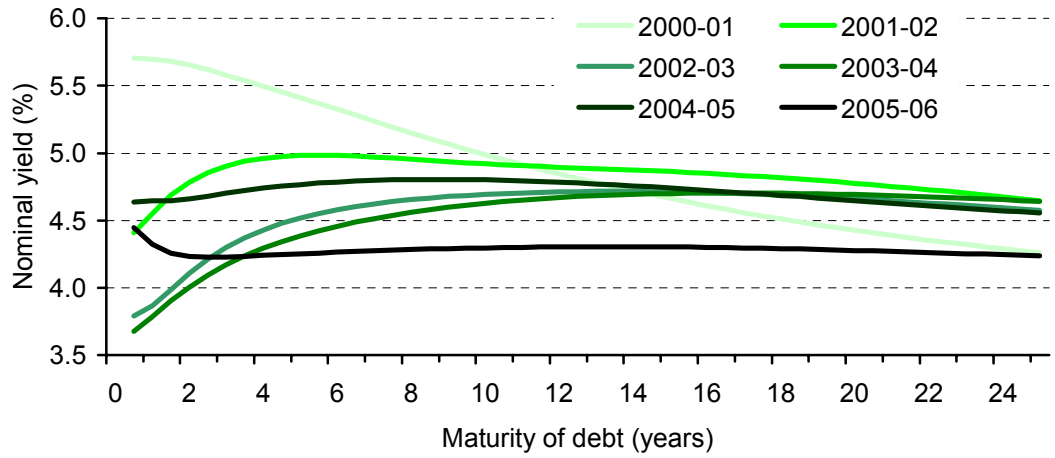
Source: Debt Management Office.

Evidence of 'opportunistic' behaviour

Deviations by the DMO from its 'default' strategy can be rationalised in terms of the stated policy objective 'to minimise over the long term, the costs of meeting the Government's financing needs, taking into account risk'.[11] Given the current range of debt instruments issued by the government, there are two primary ways in which the DMO could take advantage of market conditions to minimise its cost of funding:

- concentrate issuance in those maturity sectors of the gilt market that apparently attract a 'preferred habitat' premium;
- issue index-linked rather than conventional debt when the inflation premium is high.

Figure 6.10. Average nominal spot yield curves



Note: Nominal yields are funding-year averages of Bank of England estimated spot yields.
Source: Bank of England.

[11] *DMO Annual Review 2004–05*, July 2005, http://www.dmo.gov.uk/publication/f2ann.htm.

Table 6.8. Implied inflation premium to sell conventional debt

Funding year	10-year implied inflation rate 10 years ahead	Implied inflation premium	Proportion of funding index-linked
2000–01	2.26%	-24 bp	35%
2001–02	2.63%	13 bp	26%
2002–03	2.53%	3 bp	17%
2003–04	2.57%	7 bp	13%
2004–05	2.91%	11 bp	16%
2005–06	2.96%	16 bp	21%
End 2005	*3.01%*	*21 bp*	-

Notes: Implied inflation rates taken from index-linked gilt market and so refer to RPI inflation. Implied inflation calculated as difference between implied rate and inflation target assumed to be 2.5% up to funding year 2003–04 and then 2.8% to reflect the change in the Bank of England's inflation target.
Sources: Bank of England; Morgan Stanley.

Figure 6.10 shows the average nominal yield curve for each of the last six funding years, while Table 6.8 provides a crude measure of the inflation premium, calculated as the forward 10-year inflation rate in 10 years' time minus the inflation target. This forward 10-year inflation rate is based on the difference in yields between conventional (nominal) debt and inflation-proof (indexed) debt. Assuming that the inflation target accurately captures market expectations of future inflation, the inflation premium measures the additional return that the government has to offer investors to induce them to buy conventional bonds rather than inflation-protected index-linked gilts. The higher the premium, the more the cost saving should be from issuing index-linked rather than conventional gilts.

Comparing the yield curve and inflation premium estimates with the pattern of issuance over the last six years may be used as a guide to judging how opportunistic (or flexible) the DMO has been in recent times.

In 2000–01, for example, as we discussed previously, long-dated nominal interest rates were particularly low, probably as a result of regulatory incentives for institutional investors to hold long-maturity bonds. At that time, we saw 100% issuance of conventional debt at the long end.[12] During the period from 2002–03 to 2004–05, long rates were much higher, and the proportion of long-dated issuance fell as low as 26% in 2003–04. In 2005–06, as long-term interest rates have returned to the low levels seen in 2000–01, we have seen the proportion of long-dated issuance rise to 43%. So it would appear that the DMO has been willing to deviate from its default strategy when it is clearly cost effective to do so.

But in terms of the conventional/index-linked split in overall issuance, there is less evidence to suggest that the DMO has been opportunistic or demonstrated particular flexibility. As we saw previously, index-linked debt outstanding appears to have been kept very close to 25% of the overall amount of debt outstanding. Looking at the rough measure presented in Table 6.8, there has been little correlation between the cost incentive for issuing index-linked debt (as measured by a relatively high inflation premium) and issuance. Interestingly, however,

[12] There were only three outright conventional gilt auctions in the funding year 2000–01, all of which were in the 4.25% coupon gilt maturing 2032. In addition, there were three switch auctions into the 2032 gilt from the 8% coupon gilt maturity 2015. There were also a number of reverse auctions, as a result of which the government redeemed some debt early, primarily in the short-dated sector.

issuance of index-linked gilts has been higher in the current funding year than in the previous three years, and part of this reflects the unexpected increase of £0.8 billion announced in the Pre-Budget Report. Moreover, this increase has coincided with a relatively high implied inflation premium.

In conclusion, it appears that the DMO is fairly opportunistic (or flexible) in its funding. However, this approach appears to relate primarily to issuance within the conventional gilt market – in particular, lower longer-term nominal yields have coincided with the DMO skewing conventional issuance towards longer-dated debt. The split between conventional and index-linked issuance has remained much more stable, despite changes in the relative costs of issuing the two types of debt. That said, there are tentative signs that the DMO is willing to take a more flexible approach in this case too.

Prospects for future issuance

Whether or not this pattern of issuance is likely to change in the future is unclear. As discussed previously, the proposals contained within the Pensions Commission report could create greater demand for long-dated index-linked gilts in the future both as a savings vehicle for low-risk pension customers and as a hedge for annuity providers.[13] This suggests to us a clear motivation for the DMO to change the way in which it currently approaches the decision as to how much long-dated debt to issue and, more importantly, how to determine the size of index-linked issuance relative to the overall portfolio.

The experience of this fiscal year already suggests that a strategy aimed at issuing more long-dated debt in response to investor demand can prove to be rewarding. Back in May, the DMO issued an ultra-long conventional gilt (maturing in 2055), which was reasonably well bid at a bid-cover ratio of 1.6 and an average yield of 4.21%. This compared with a yield of 4.27% on the longest-dated gilt prior to the auction (the 4.75% coupon issue maturing in 2038). Perhaps more significantly, in September the DMO successfully launched the longest-dated index-linked bond in the world, again maturing in 2055. Issued by syndication, this was priced at 1.11%, compared with 1.29% on the 2% coupon issue maturing in 2035.

Even if there were no cost advantage to issuing more long-dated index-linked debt, it would serve the secondary objective of supporting cost-effective pension provision in the UK. More generally, there is no reason in our view why the DMO should not explore a more opportunistic approach. There is here an issue of transparency. Through its meetings with market participants (the minutes of which are published) and its statements in the Debt Management Review, the DMO does make its funding decisions in a relatively open way. As explained by the DMO in its 2003–04 *Annual Review*, its approach assumes that the government has an indefinite borrowing horizon and hence 'it has a preference for debt strategies that offer long-term benefits over ones that provide short-term opportunist gains but which may raise its long-term financing costs'.

Under the current system, issuance plans are announced once a year, with only small amendments arising as the state of the public finances is revealed (e.g. at the time of the Pre-

[13] It is not entirely clear that the Pensions Commission proposals, if implemented, would generate significantly higher demand for index-linked bonds. That would depend on a number of factors, including the portfolio choices by people in defined-contribution schemes and what happens to overall saving.

Budget Report). This means that the approximate amount to be issued in the form of conventional and index-linked debt is known throughout the year, as is the proposed maturity split in the case of conventional debt. At the beginning of the fiscal year, the DMO also releases the dates on which it intends to hold auctions of conventional and index-linked debt. The presumed intention is to reduce uncertainty within the dealer community and, in doing so, ensure that bids received are sufficient to cover the proposed auction size and are at a fair price. More direct issuance to investors, such as by syndication, is the exception.

This rigidity probably has its greatest impact in terms of the issuance split between conventional and index-linked debt. We think that the DMO should consider a more flexible approach both in terms of how it announces this split at the time of the Budget report in April and in terms of how it chooses to distribute the debt. This could enable it to take more timely advantage of structural shifts in the inflation premium, as well as responding more effectively to regulatory and government policy initiatives that may have the effect of raising demand for, particularly long-dated, index-linked debt. If the DMO clearly set out how it would behave in different states of the world, then a more opportunistic strategy could still be transparent. Concerns as to how the dealer community may respond to a strategy focused at a particular source of investor demand could further be allayed in our view by taking fuller advantage of alternative, direct methods of distribution, such as the syndication that we saw successfully implemented in September 2005.

6.6 Buying back company pension liabilities

David Willetts, the Shadow Education Secretary and former Shadow Work & Pensions Secretary, recently proposed that companies might be given the option of, effectively, selling to the government that part of their obligations to pay pensions to past and current employees that reflected the contracted-out rebate.[14] The scale of private sector pension liabilities that exist as a result of contracting out is hard to gauge accurately, but it is clearly very large; Willetts makes a rough estimate of £150 billion. In principle the idea is simple, though in practice there are difficulties. Here is how he describes the proposal:

> Companies and their pension schemes could be given the option of paying the government to take over the responsibility for the contracted out guaranteed minimum pension which they have built up over the years. It would not be compulsory: it would be an option. It would potentially involve a much larger but finite sum as it would involve shifting a stock of pension promises to the government rather than a future flow. It could potentially lead to a massive reduction in the future pension liabilities that companies face. They would pay much smaller pensions in the future because they would have paid the government to take them back … So the Government gets revenues in the short term, and a greater liability to pay pensions in the long term. The boost in revenues would have to be used, like for example the sale of the third generation of mobile phone licences, for debt repayment or some other form of asset building … If companies are able to pay the government to take back the obligation to

[14] The contracted-out rebate is the extra funds available to a pension scheme to be invested on behalf of scheme members in exchange for their receiving a lower state pension because they have opted out of the second state pension (formerly called SERPS). Those extra funds arise because the National Insurance contribution paid to the government is lower for contracted-out employees.

> pay a guaranteed minimum pension then this could be a significant step forward in capping their pension costs.[15]

There would be an economic gain if the cost to the public sector of having the obligation to pay higher state second pensions in future were smaller than the cost to companies of holding the same obligations. That might be true if companies were less able to manage the risks of holding those obligations – longevity risks and risks of assets underperforming. Whether the public sector does in fact have a comparative advantage in taking on those risks (or taking on *more* of those risks) is not, however, obvious. It would therefore be hard to set a price for taking on the liabilities at which one could be confident that the taxpayer and the company would end up sharing any economic gain appropriately.

The issue of whether the government should buy some of these pension obligations from companies is similar to the question of whether the government should issue longevity bonds, i.e. bonds whose value to the holder is higher the greater is life expectancy. In last year's Green Budget, we considered that question and concluded that because of the very great exposure the government already has to unanticipated rises in life expectancy, it was far from clear that it should be a major issuer of longevity bonds.[16] The Pensions Commission second report reached much the same conclusion.[17]

Indeed, in some ways, the attractiveness of the government buying obligations to pay pensions off UK companies is even less than the advantages of issuing longevity bonds. Longevity bonds are relatively straightforward. But working out the details of how much lower company pensions paid to scheme members would be if they sold their contracted-out obligations to the government is not straightforward. And if individual members could not veto any sale by the company of pension obligations, there is an issue of fairness. Yet if individual members could veto any sale, the administrative difficulties for companies in selling parts of their pension obligations could well be insurmountable.

The resources that could be generated for the public sector in the short term by taking such future liabilities back in exchange for payment are very large – potentially much larger than the £22½ billion revenues created by the sale of third-generation mobile phone licences. But how should the government treat the extra public sector pension liabilities it is taking on in accounting terms, given its desire to reassure people that the public finances are being managed in a fair and sustainable way?

On the face of it, treating this part of the obligation to pay future state pensions as debt – while not counting existing obligations to pay accrued pension rights under the state second pension, and its predecessor SERPS – would be strange. This implies that the revenues received by the government in the short term could be spent on capital investment projects that might otherwise not be affordable without breaching the 40% debt-to-GDP ceiling (for example, the Crossrail project to improve transport infrastructure in London).

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[15] Speech given by David Willetts, MP, Senior Advisor Punter Southall, 17 October 2005.

[16] See chapter 5 of R. Chote, C. Emmerson, D. Miles and Z. Oldfield (eds), *The IFS Green Budget: January 2005*, http://www.ifs.org.uk/budgets/gb2005/index.php.

[17] Pensions Commission, *A New Pension Settlement for the Twenty-First Century: The Second Report of the Pensions Commission*, The Stationery Office, London, 2005, http://www.pensionscommission.org.uk/publications/2005/annrep/main-report.pdf.

But for the government to finance extra investment through this mechanism would give additional ammunition to critics of the sustainable investment rule who argue that it is flawed in failing to include all public sector pension liabilities (as well as future Private Finance Initiative payments and some contingent liabilities). We have argued that these liabilities should be borne in mind in assessing the long-term health of the public finances, but that the sustainable investment rule as currently defined may still be a helpful rule of thumb. Deliberately increasing off-balance-sheet obligations to finance investment would go against the spirit of the rule and might well further undermine the already weakened credibility of the fiscal framework. It would strengthen the case for counting all future public sector pension liabilities as debt for the purposes of the sustainable investment rule and setting a new ceiling to reflect this.

6.7 Conclusion

We think real yields on bonds issued by the UK government are significantly more likely to be higher in the future than to stay at current low levels or fall further. Yields on long-dated index-linked bonds have fallen well under 1%. The UK government may look back in 10 years and regret that it issued anything other than long-dated index-linked bonds at yields under 1%. We believe that issuing long-dated inflation-proof debt represents a good deal for future taxpayers. It is not that one can be *sure* that we are in the midst of a bond market bubble and that yields have obviously been driven well under sustainable levels. Indeed, there are some reasons to believe that sustainable real yields may have moved down over the past decade. But the scale of the fall in real yields is so great that the risks have now become asymmetric – the chances of real yields going higher from here are greater than their going lower. Locking in at today's low real yields by issuing long-dated indexed debt is therefore sensible.