B Context for decisions on the Debt Management Office's financing remit

Introduction

B.1 This annex provides the context for the government's decisions on gilt and Treasury bill issuance in 2014-15, setting out the qualitative and quantitative considerations that have influenced the government's decisions.

B.2 The government's decisions on the structure of the financing remit, which are taken annually, are made in accordance with the debt management objective, the debt management framework and wider policy considerations during the period of fiscal consolidation (see Chapter 2).

B.3 In determining the overall structure of the financing remit, the government assesses the costs and risks of debt issuance by maturity and type of instrument. The government's decisions on the composition of debt issuance are also informed by an assessment of investor demand for debt instruments by maturity and type as reported by stakeholders, and as manifested in the shape of the nominal and real yield curves, as well as the government's appetite for risk.

B.4 Alongside these considerations the government takes into account the practical implications of issuance (for example the scheduling of operations during the course of the year and the appropriate use of different issuance methods).

Demand

B.5 The Gilt-edged Market Makers (GEMMs) and end-investors continue to report well diversified demand for conventional and index-linked gilts across the maturity spectrum. These views were most recently expressed at the government's annual consultation meetings with gilt market participants in January 2014.[1]

B.6 Continued demand for long-dated conventional and index-linked gilts from domestic pension funds and insurance companies is anticipated in 2014-15. Any improvements in pension fund solvency in the coming year may accelerate the pace of de-risking by funds undertaking liability driven investment strategies.

B.7 In recent years, international investors have been an important source of demand for gilts. In 2014-15, market expectations are for continued demand from international investors, including central banks and reserve managers looking to diversify growing reserves. However, cross-market flows into, and out of, gilts in 2014-15 may be affected by market expectations around the path of global economic growth.

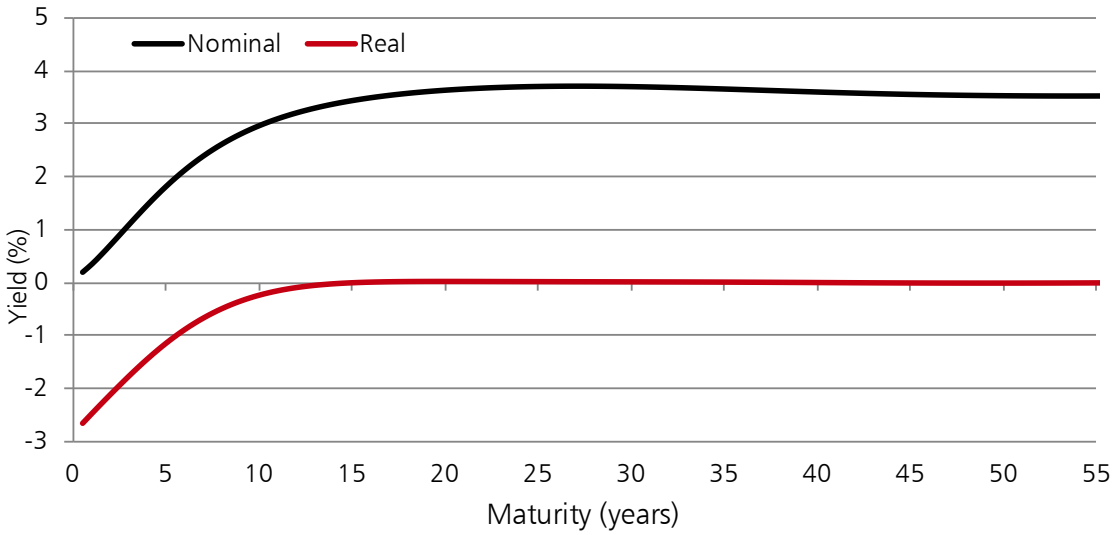
B.8 In recent years, there have been significant inflows into gilts from domestic banks and building societies, to meet forthcoming regulatory requirements relating to the maintenance of buffers of high quality liquid assets. Given the volume of purchases made to date, and current regulatory requirements, no major changes in gilt investment by domestic financial institutions are expected in the coming year.

[1] Minutes of the meetings are available at: http://www.dmo.gov.uk/documentview.aspx?docName=/gilts/press/sa130114.pdf

Cost

B.9 In assessing the cost of different types of debt issuance by maturity and type the Government undertakes an analysis of the nominal and real yield curves. Chart B.1 shows the shape of the nominal and real spot curves at 7 March 2014.

Chart B.1: Nominal and real spot yield curves (7 March 2014)



Source: DMO

B.10 As part of this analysis, the government seeks to estimate risk premia in the yield curve in order to identify maturity segments where gilt issuance could be more cost-effective.

B.11 Modern asset pricing theory suggests that the observed yield on a bond can be decomposed into two components: a 'risk neutral' yield and a risk premium. The risk neutral yield is the interest rate under 'pure expectations'. In practice, forward yields follow a different path, as investors impose a charge on the issuer in the form of higher yields in order to protect investments against a variety of risks.[2] This gives rise to the *risk premium*. Theory suggests that the risk premium should be positive and increase with maturity, reflecting the fact that investors require compensation for holding riskier (i.e. longer maturity) assets. The variability and trends in risk premia reflect investors risk preferences over time.

B.12 Results from the DMO's risk premia analysis indicate the existence of a time-varying risk premium in the conventional gilt market which is usually positive and, as a general rule, increases with maturity.[3] Premia increased at all maturities during the second half of 2008, but the magnitude of this rise varied with maturity and it was followed by a significant and prolonged fall after April 2011.[4] Over the past year, premia have risen at all maturities and by December 2013 were back at levels close to their historical averages.

[2] The risk premium can be considered to have several components, including, but not limited to: (i) a term premium, which compensates investors for the fact that uncertainty increases for longer maturity investments; (ii) a credit and default risk premium; (iii) a liquidity premium due to the lower level of liquidity in some bonds or maturities, which restricts investors ability to hedge; and (iv) an inflation risk premium to compensate investors in nominal bonds for uncertainty due to inflation. In general, the premium is the extra return investors expect to obtain from holding long-term bonds as opposed to holding and rolling over a sequence of short-term securities over the same period. The risk premium estimated by the DMO's model also includes a 'convexity premium' component – this increases with maturity and yield volatility and it offsets to some degree the other risk premium components as it represents a charge that the investor pays the issuer.

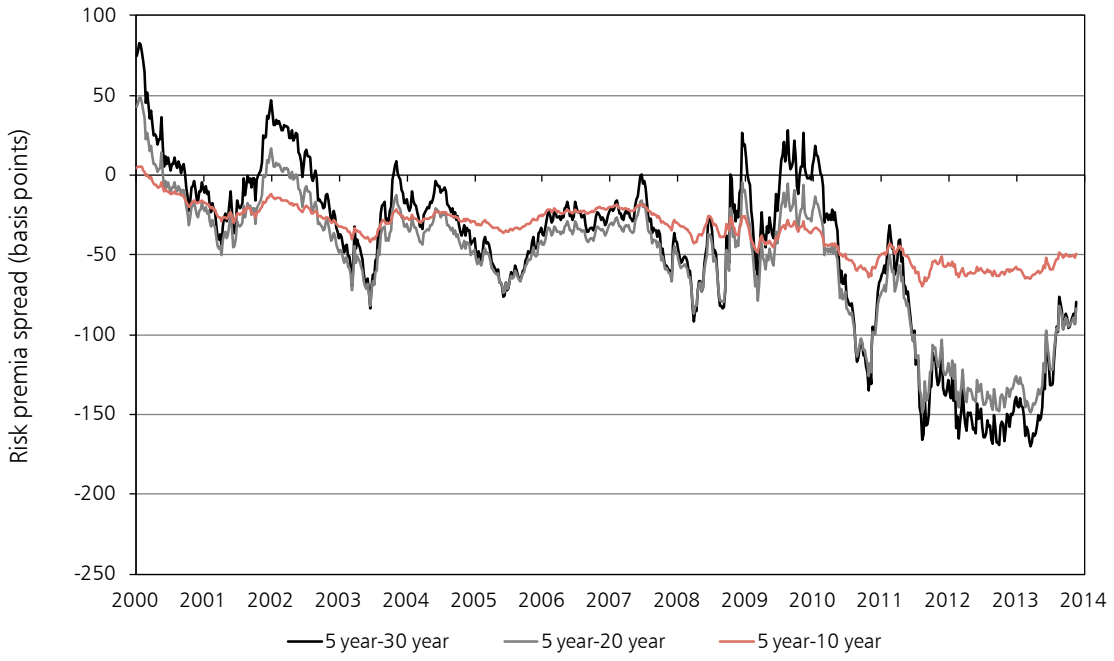
[3] This analysis is based on recent academic research by Christensen, Diebold and Rudebusch. Further details can be found in the DMO's Annual Review 2011-12: http://www.dmo.gov.uk/documentview.aspx?docname=publications/annualreviews/gar1112.pdf.

[4] The model has not been adjusted to account for 'zero bound effects' and if this had been done it would have tended to increase the premia estimates of short and medium gilts in the period since 2009.

B.13 For the period examined, the risk premium at the 5-year maturity has generally been lower than at other maturities, indicating that short gilts have been the most cost-effective maturity of conventional gilts to issue.[5] Chart B.2 plots the spread between the risk premium at the 5-year maturity and at other key maturities. It shows that spreads have generally been negative due to the premium at the short end usually being lower than at other (longer) maturities. These spreads widened significantly at the onset of the financial crisis, although the spread between medium maturity (10-year) gilts and 5-year gilts has been relatively stable. By contrast, in the last year the relative spread versus longer maturity bonds has halved, reducing the cost-effectiveness of 5-year gilts compared with longer maturity conventional gilts.

B.14 The results from the DMO's premia analysis have been tested for consistency against an analysis of the forward curve[6] and alternative scenarios for interest rates based on macroeconomic assumptions.[7]

Chart B.2: Risk premia spreads between different maturities



Source: DMO

B.15 Alongside this analysis of the relative cost-effectiveness of conventional gilts across different maturity sectors, the government undertakes an evaluation of index-linked gilt cost-effectiveness, using conventional gilts as a benchmark for comparison, by examining the evolution of break-even inflation rates.[8]

B.16 The break-even inflation rate is the rate of inflation that equalises the return on an index-linked gilt with that of a conventional gilt of the same maturity. It can be seen as the average

[5] Data: January 2000 to December 2013.

[6] Historical analysis of the forward curve provides a useful indication of the existence of historical risk premia.

[7] Risk premia estimation requires an estimate of the future short rate. Alternative scenarios for the future short rate were developed from historical regression analysis based on a set of inflation, output gap and Bank of England Rate data.

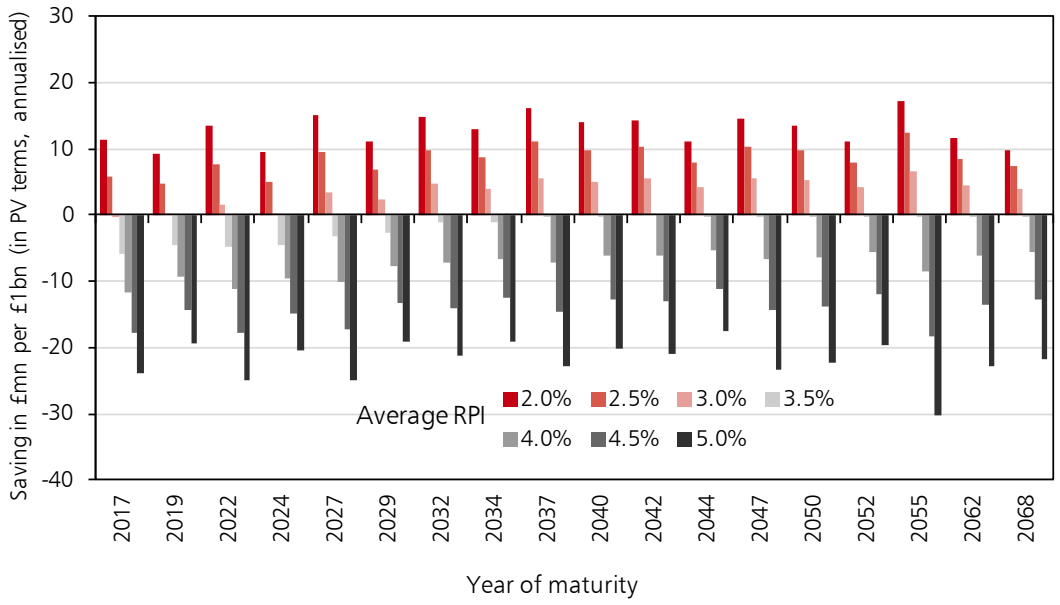
[8] A more detailed explanation of the methodology used in this analysis can be found in Knight, J. (2013). Assessing the Cost Effectiveness of Index-linked Bond Issuance: A Methodological Approach, Illustrated Using UK Examples. *OECD Working Papers on Sovereign Borrowing and Public Debt Management, No. 7.*

rate of inflation, over the life of an index-linked gilt issue, which will make the government indifferent on cost grounds between issuing either a conventional or an index-linked gilt.

B.17 To the extent that future inflation turns out to be higher or lower than the break-even inflation rate prevailing at the time an index-linked gilt is issued, it will have been more cost-effective for the government to have issued a conventional or an index-linked gilt respectively.

B.18 As such, the government can compare prevailing break-even inflation rates on index-linked gilts against a range of paths for future inflation (see Chart B.3) to evaluate, at a point in time, the relative cost-effectiveness of conventional and index-linked gilt issuance of equivalent maturities. In order to enable the comparison of cost-effectiveness by maturity, the data are evaluated on an annualised basis.

Chart B.3: Annualised cost-effectiveness of index-linked gilts relative to equivalent maturity conventional gilts under a range of RPI inflation assumptions



Source: DMO

B.19 The analysis shows that, for future average RPI inflation of up to around 3.5%, index-linked gilts are, at the margin, more cost-effective than conventional gilts (of equivalent maturity). This cost-effectiveness is slightly more pronounced for longer-dated index-linked gilt issuance.

B.20 On the assumption that inflation is in line with the Bank of England's target rate in the medium term, and based on a neutral assumption that inflation remains at target thereafter, an assessment of the path of long-term inflation relative to that priced in by the market indicates that, at the margin, index-linked gilts are generally cost-effective relative to equivalent maturity conventional gilts.[9]

Risk

B.21 The other key determinant in the government's decisions on debt issuance by maturity and type of instrument is its assessment of risk. In reaching a decision on the overall structure of the remit, the government considers the risks to which the Exchequer is exposed through its debt

[9] This conclusion is based on the assumption that the long-run wedge between CPI and RPI is within the range of external estimates.

issuance decisions, and balances its assessment of risk against its assessment of cost in order to reach a judgement about the skew of issuance.

B.22 Different maturities and types of issuance give rise to different risk exposures. The government assesses the relative importance of each risk in accordance with its risk appetite. These risks are also considered in the context of supporting fiscal resilience in the medium term while remaining consistent with the long-term focus of the debt management objective.

B.23 The government currently places a relatively high weight on reducing near-term exposure to refinancing risk. One of the ways in which the government can manage this exposure is by maintaining a high proportion of long-dated debt in its portfolio, which can reduce the need to roll over debt frequently. The government also places significant importance on avoiding large concentrations of redemptions in any one year. To achieve this, it will issue debt across a range of maturities, smoothing the profile of gilt redemptions.

Modelling of cost and interest rate/refinancing risk

B.24 An additional input to the analysis underpinning the government's decisions on its issuance strategy is an exercise in which cost and risk simulations are generated to illustrate the cost-risk trade-off associated with different issuance strategies.[10] This allows the government to investigate the near-term implications of different annual issuance strategies.

B.25 This exercise provides estimates of the evolution, over a 10-year horizon, of cost and risk metrics of the gilt portfolio.[11] Debt service cost is defined as the cost of the coupon payments and redemptions associated with government debt, measured in terms of the relevant yield. Risk is defined as the standard deviation of debt service cost or debt service cost volatility. This can be seen as a measure combining both interest rate risk and refinancing risk.[12]

B.26 The metrics resulting from this analysis combine the impact from alternative issuance strategies for financing new government debt (to meet the CGNCR and the refinancing of redemptions) with the existing characteristics of the debt portfolio inherited from previous financial years. The DMO's Portfolio Simulation Tool (PST), which calculates debt interest cost, is used in conjunction with a macroeconomic-based Vector Autoregressive (VAR) model, which provides a distribution of projections of the yield curve, to depict risk in cost terms.[13,14] In this way, the PST 'maps' the projected yield curve distribution to a debt service cost distribution so that simulated cost and risk metrics can be analysed.

B.27 Table B.1 illustrates three issuance strategies. Strategies 1 and 3 represent two extreme issuance programmes with 100% allocation of conventional gilts to short and long issuance respectively. Strategy 2 represents a split of issuance based on the actual 2013-14 issuance split followed by the DMO, which is well diversified across maturity buckets. All strategies have the same issuance split between conventional and index-linked gilts, 74% and 26% respectively.

[10] The government does not use this simulation tool to determine a single optimal debt issuance strategy.

[11] From years 5 to 10, a balanced budget assumption, i.e. CGNCR=0, has been made. This implies: (i) that in years 5 to 10 the debt interest cost incurred every year is covered by a surplus in the other components of the CGNCR; and (ii) that total financing for the DMO is equal to redemption refinancing, assuming no pay down of debt.

[12] Interest rate risk is the risk associated with new issuance while refinancing risk is the risk associated with the roll-over of maturing debt.

[13] There are differences in the methods used to calculate debt interest cost by the DMO and the Office for Budget Responsibility (OBR) (the latter publishes the official debt interest forecast).

[14] The variables in the VAR model are: GDP, CPI and the Bank Rate as macroeconomic variables and three 'latent factors' taken from the work of Diebold and Li (2006) that describe the yield curve, using 10 benchmark maturity points. The VAR is estimated using data from October 1991 to September 2013 with restrictions on the long-term mean of the output gap (zero) and CPI (2%), as well as the restriction that the nominal yields forecast should be positive. The VAR model is then used for forecasting. For each year of the 10-year horizon, a yield curve forecast is produced. In order to generate a distribution of yield curve forecasts, simulations around the central forecast are made by drawing from a normally distributed series of errors, one thousand times. This implies that the volatility of the yield curve forecasts varies every year, i.e. there is more uncertainty the longer is the forecast horizon. The VAR currently only forecasts nominal yields; the break-even inflation rate from the Variable Roughness Penalty (VRP) yield curve model (originally developed by the Bank of England) is used to derive the real yield curve.

Table B.1: Gilt issuance strategy composition (%)[15]

	Short conventional (0 – 7 years)	**Medium conventional** (7 – 15 years)	**Long conventional** (over 15 years)	**Index-linked**
Strategy 1	74	0	0	26
Strategy 2 2013-14 skew	29	23	22	26
Strategy 3	0	0	74	26

B.28 The probability distribution of debt service cost if issuance were to follow Strategy 2 for the next 10 years is shown in Chart B.4. The central line represents the average debt interest cost after 1,000 simulations using the PST model (each simulation using an alternative yield curve) for each financial year. The shaded red areas (from darker to lighter red respectively) around the central debt interest cost projection represent one, two and three standard deviations of volatility in debt interest cost.[16] Forecast uncertainty increases further into the future and therefore the 'fan' widens over the horizon. Overall, at the 10-year horizon, the model implies with 99% certainty that debt interest cost will fall in a range of £60 billion to £86 billion, with an average value of £73 billion.

B.29 This exercise is carried out for alternative issuance strategies. Of the three strategies considered, particularly in the first half of the 10-year horizon, Strategy 1 results in the lowest cost, whereas Strategy 3 results in the highest cost, with Strategy 2 somewhere in the middle. These results mainly reflect the upward sloping shape of the yield curve, i.e. short-term issuance is comparatively more cost-effective than long-term issuance in the near term.

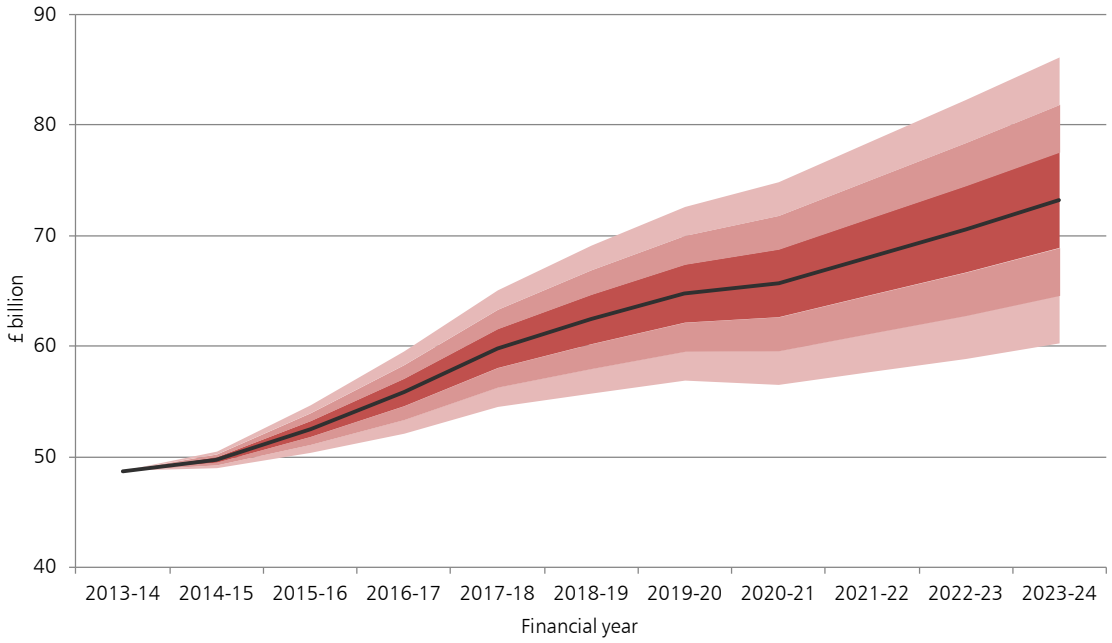
B.30 However, the standard deviation of debt service cost, or debt service cost volatility compared to Strategy 2, is larger for Strategy 1 and smaller for Strategy 3, as would be expected given that short-term yields are typically much more volatile than long-term yields. This would mean that Strategy 1 would show a wider set of probable debt interest values, with the opposite being true for Strategy 3.

B.31 Nonetheless, well-diversified issuance strategies which represent small deviations around Strategy 2 all depict very similar debt interest cost distributions.

[15] Numbers may not sum to 100 due to rounding.

[16] Assuming a normal distribution, the range of one standard deviation has a 68.2% probability of occurring (34.1% on each side). This means that debt interest costs have a 68.2% probability of falling within this range. Similarly, the range of two standard deviations has a probability of occurring of 95% (47.5% on each side). Finally, the range of three standard deviations has a 99% probability of occurring.

Chart B.4: Probability distribution of debt service cost (2013-14 issuance skew)



Source: DMO

B.32 It is worth noting that in the simulation it takes several years before the different issuance strategies start to diverge significantly in terms of their cost and risk characteristics.[17] This is due to the large existing debt stock relative to the flow of new issuance, as well as the long average maturity of the UK's debt portfolio, which induces 'inertia' in the debt portfolio. Consequently, any impact on its structure as a result of new issuance is slow to take effect. Following Strategy 2 for example would mean that even after 10 years, only about half of the entire debt interest cost bill would have been 're-fixed' at new yield levels.

B.33 Given the long-term nature of the government's debt management objective, further analysis is carried out to illustrate the impact on the profile of gilt redemptions and coupon payment obligations from projecting forward the current issuance strategy over a longer horizon.[18]

B.34 Overall, the results of the cost and risk simulations support the government's approach to issuance across maturities, which balances the estimated lower cost of shorter maturity issuance (with its higher exposure to near-term refinancing risk) against the higher cost (and reduced near-term exposure to refinancing risk) associated with longer maturity issuance. The results also provide a useful indication of the implications for the debt stock over a longer-term horizon of rolling forward a particular issuance strategy over successive years.

Liquidity, market management and portfolio diversification

B.35 The government places significant importance on maintaining a deep and liquid gilt market and a diverse investor base in order to maintain continuous access to cost-effective financing in all market conditions. To do so, the government will continue to issue both conventional and index-linked gilts at key maturities in sufficient size, seeking to achieve a benchmark premium for issuance.

[17] In order to depict completely the cost and risk characteristics of each issuance strategy, a longer horizon that covers all cash flows up to the maturity of the longest bond should be considered. This is, however, beyond the scope of this analysis.
[18] In practice, however, issuance strategies are determined on an annual basis.

Gilt distribution

B.36 The gilt issuance programme in 2014-15 will be somewhat smaller than in the previous financial year although still large by historical standards. To raise this amount of financing in 2014-15, the government will issue conventional and index-linked gilts across a range of maturities, with auctions remaining the primary method of issuance.

B.37 The government has reviewed the performance of the syndication programme in 2013-14 and has decided that it should continue to be used in the coming financial year in the same way as it was in 2013-14: (i) to launch new gilts and/or for the re-opening of high duration conventional and index-linked gilts; and (ii) for the size of transactions to be determined in response to market demand for the gilt being sold.

B.38 The government anticipates that there will be around four syndicated transactions in 2014-15.

B.39 There will also be a planned mini-tender programme. The main purpose of this will be to accommodate variations in proceeds from syndicated offerings, with the size of the mini-tender programme adjusted accordingly. Mini-tenders may be used for the issuance of conventional and index-linked gilts across maturities. The DMO will determine the maturity and type of gilts sold at mini-tenders in consultation with the market during the year.

B.40 To maintain the operational viability of the final syndicated offerings (by type) at the end of the financial year, the overall size of the long conventional and index-linked programmes may be increased by up to 10% (in cash terms) at the time of the relevant transactions. Scope to up-size the programmes in this way would only be deployed if the capacity to up-size syndications through reallocation of the mini-tender quantum had been exhausted.

Gilt issuance by maturity and type in 2014-15

B.41 The relatively high weight that the government places on managing its near-term exposure to refinancing risk has continued to influence its decision on the amount of short-dated conventional gilt issuance. Risk management considerations were weighed against an assessment that short conventional issuance in the coming financial year is likely to be relatively cost-effective in comparison with medium and long conventional gilt issuance, although less so than in 2013-14. On this basis, short conventional gilts will constitute a broadly similar proportion of gilt sales as in 2013-14.

B.42 The government recognises the important role that medium conventional gilts (particularly in the 10-year maturity area) play in facilitating the hedging of a wide range of gilt market exposures through the futures market, which in turn underpins the overall cost-effectiveness of the government's financing programme. In addition, given a large financing programme, the liquidity of the sector means that issuance of medium conventional gilts enables the government to raise financing in an efficient manner. Taking into account these factors, in the context of wider cost and risk considerations, as well as the shape of the redemption profile, the government intends to issue a broadly similar proportion of medium conventional gilts in 2014-15 as in 2013-14.

B.43 The analysis set out above suggests that long conventional gilts are less cost-effective to issue than shorter-dated instruments although the cost differential has narrowed over the last year. However, the government has also weighed the contribution that long conventional issuance can make to mitigating its near-term exposure to refinancing risk. Overall, the government has chosen to increase marginally the proportionate allocation of issuance to long conventional gilts in 2014-15 relative to 2013-14.

B.44 The government judges that index-linked gilts remain a cost-effective means of financing, especially at longer maturities. The government has also noted the anticipated demand for index-linked gilts in 2014-15 from domestic pension funds and insurance companies. As a result, the government has chosen to maintain a similar proportion of issuance of index-linked gilts in the coming financial year.

Treasury bill issuance in 2014-15

B.45 The government has also assessed the contribution to financing made by Treasury bill issuance and has concluded that Treasury bills continue to offer value in terms of cost-effectiveness as well as contributing to effective risk management. For example, changes to the Treasury bill stock offer an efficient way to accommodate in-year changes to the financing requirement (particularly towards the end of the financial year) and maintaining a larger stock is a means to increase investor diversification.[19]

B.46 Accordingly, the government has determined that the planned end-March 2015 Treasury bill stock should be increased by £16.5 billion to £73.0 billion, relative to end-March 2014.

Interaction with NS&I

B.47 In determining the contribution to financing of both Treasury bills and short conventional gilts, the government has also weighed the risk exposure that arises from the increased contribution to financing from NS&I in 2014-15. Inflows from NS&I are likely to be in the form of relatively short-dated deposits.

[19] In 2012-13 and 2013-14, the planned stock-build in Treasury bills announced at Budgets 2012 and 2013 respectively facilitated a smooth handling of a significant reduction in the financing requirement announced at the following Autumn Statement, protecting the gilt sales programme from a significant in-year change.