

## Annex 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 2018-19, setting out the qualitative and quantitative considerations that have influenced them.
- 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 (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. 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 Both Gilt-Edged Market Makers (GEMMs) and end-investors have reported ongoing demand for conventional and index-linked gilts that is well diversified across the maturity spectrum and by investor type.
- B.6 At the annual consultation meetings in January and February 2018, attendees noted that demand for long conventional bonds was anticipated to be particularly strong at the ultra-long area, and for index-linked gilts it was expected to move from the ultra-long area to the 15- to 30-year maturity area.<sup>1</sup>

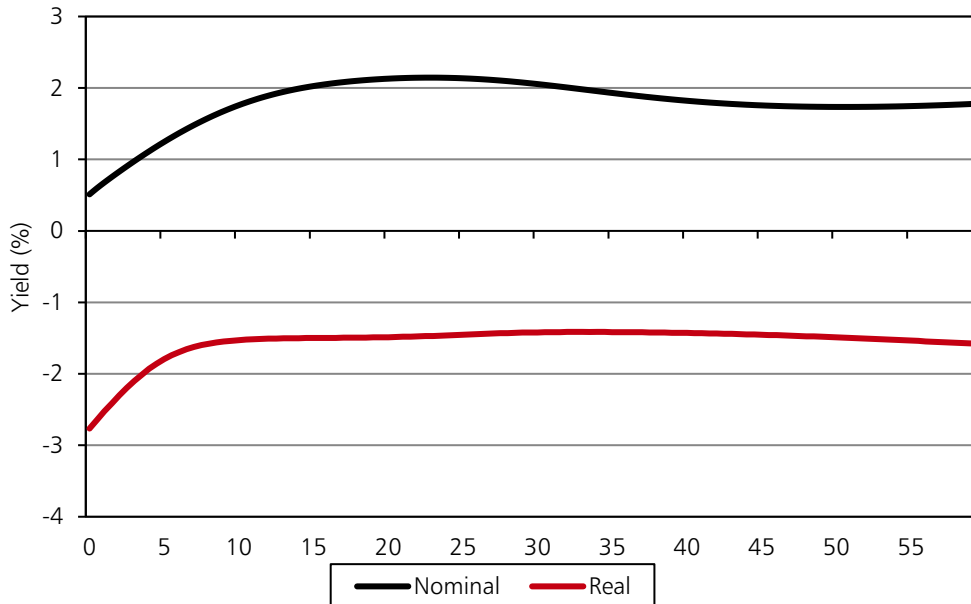
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<sup>1</sup> Minutes of the meetings are available at: [www.dmo.gov.uk/media/15325/sa300118.pdf](http://www.dmo.gov.uk/media/15325/sa300118.pdf) and [www.dmo.gov.uk/media/15330/sa050218.pdf](http://www.dmo.gov.uk/media/15330/sa050218.pdf)

## Cost

**B.7** 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 15 February 2018.

**Chart B.1 Nominal and real spot yield curves (15 February 2018)**



Source: DMO.

**B.8** Conventional asset pricing theory suggests the observed yield on a bond can be decomposed into 2 components: a 'risk neutral' yield and a risk premium. The risk neutral yield is the interest rate under 'pure expectations'.<sup>2</sup> In practice, forward yields follow a different path, as markets demand higher yields in order to protect investments against a variety of risks. This gives rise to a risk premium.<sup>3</sup> The variability and trends in risk premia reflect investors' risk preferences over time. It is cost-effective for a government to issue at maturities where the risk premium demanded by investors is lowest relative to other maturities.

**B.9** Chart B.2 shows risk premia in the nominal yield curve between January 1999 and December 2017.<sup>4</sup> Results indicate the existence of a time-varying

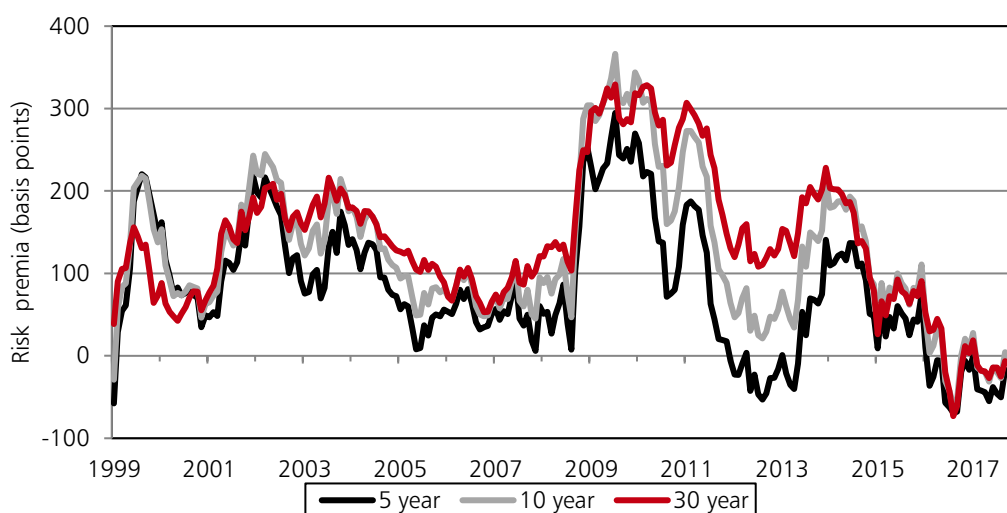
<sup>2</sup> The investor typically charges the issuer through yields for risks associated with investment in bonds. For example, the investor may charge a premium for illiquidity and/or inflation risk. The 'pure expectations' referred to here excludes these premia.

<sup>3</sup> The risk premium has several components, including, but not limited to: (i) a premium which compensates investors for duration risk that increases for longer maturity investments; (ii) a credit and default risk premium; (iii) a liquidity premium owing 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 owing 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.

<sup>4</sup> This analysis is based on academic research: 'The Affine Arbitrage-Free Class of Nelson-Siegel Term Structure Models', Christensen, Diebold and Rudebusch, *Journal of Econometrics*, 2011. The model has not been adjusted to account for 'zero bound effects'.

risk premium in the conventional gilt market which is usually positive and, as a general rule, increases with maturity, although the premia at different maturities have recently been in a compressed range. In 2017-18, risk premia remained close to historically low levels at all key benchmark maturities. This suggests that, on this measure, conventional gilts across the maturity spectrum are more cost-effective than has historically been the case.

**Chart B.2 Risk premia**



Source: DMO.

- B.10** Alongside this analysis of the relative cost-effectiveness of conventional gilts across different maturity sectors, the government undertakes an evaluation of the cost-effectiveness of index-linked gilts, using conventional gilts as a benchmark for comparison, by examining breakeven inflation rates, which reflect the difference between nominal and real yields.<sup>5</sup>
- B.11** Similar to nominal yields, breakeven inflation rates can also be decomposed into 2 components: a 'risk neutral' inflation rate, which is the pure market-implied expectation of future inflation embedded in nominal yields, and a risk premium, which includes the premium for inflation risk in conventional gilt yields.<sup>6</sup> The government can choose either to pay the inflation risk premium and the level of inflation priced in the conventional gilt yield, which is 'fixed' at issue for the life of the bond, or it can issue an inflation-linked gilt, pay future realised inflation at a later time and bear the inflation risk. The 2 strategies are cost-equivalent if future realised inflation turns out to be equal to the level implied in the breakeven rate at issue. Chart B.3 shows the cost-effectiveness of the issuance of index-linked gilts, relative to

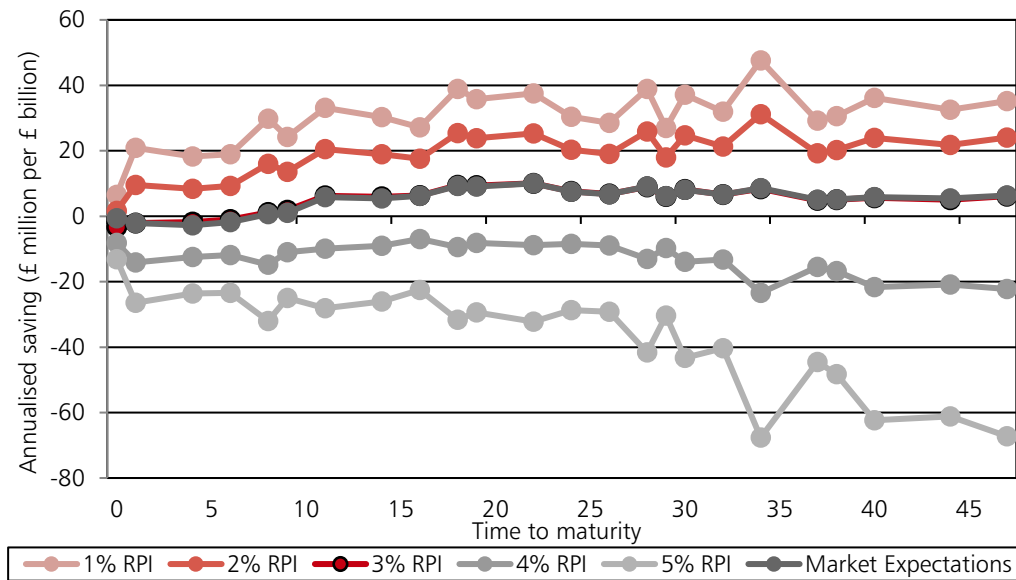
<sup>5</sup> A more detailed explanation of the methodology used in this analysis can be found at: [www.oecd-ilibrary.org/finance-and-investment/assessing-the-cost-effectiveness-of-index-linked-bond-issuance\\_5k481881kjwh-en](http://www.oecd-ilibrary.org/finance-and-investment/assessing-the-cost-effectiveness-of-index-linked-bond-issuance_5k481881kjwh-en) and [www.bankofengland.co.uk/working-paper/2015/the-informational-content-of-maket-based-measures-of-inflation-expectations-derived-from](http://www.bankofengland.co.uk/working-paper/2015/the-informational-content-of-maket-based-measures-of-inflation-expectations-derived-from)

<sup>6</sup> There is an additional risk due to liquidity conditions in the 2 markets. This relates to the cost of financing the purchase of the bond in the money market and transacting in the secondary market. A more detailed explanation of the methodology for estimating breakeven inflation risk premia can be found at: [www.bankofengland.co.uk/working-paper/2015/the-informational-content-of-maket-based-measures-of-inflation-expectations-derived-from](http://www.bankofengland.co.uk/working-paper/2015/the-informational-content-of-maket-based-measures-of-inflation-expectations-derived-from)

conventional gilts, under a range of paths for future inflation, which also includes market-implied 'pure expectations'.<sup>7</sup>

**B.12** At end-January 2018, the model shows that for an assumption that the Retail Prices Index (RPI) remains constant at 3% over the life of the bond, index-linked gilts are generally neutral to slightly more expensive than equivalent conventional gilts until around the 10-year maturity point, whereafter they generate savings. Results using the market-implied inflation forecast are very similar. Compared with a year ago, the expected cost-effectiveness of index-linked gilts has decreased across the curve, especially in short and medium gilts, which are now more costly than conventional gilts.

**Chart B.3 The cost-effectiveness of index-linked gilts under different RPI assumptions (end-January 2018)**



Source: DMO.

## Risk

**B.13** In the context of the long-term focus of the debt management objective, 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 issuance decisions and assesses the relative importance of each risk in accordance with its risk appetite.

**B.14** The government places a high weight on minimising near-term exposure to refinancing risk. This exposure is managed partly by maintaining a sizeable proportion of long-dated debt in the portfolio, which reduces the need to refinance debt frequently. The government places importance on avoiding, when practicable, large concentrations of redemptions in any one year. To

<sup>7</sup> See previous footnote.

achieve this, the government will issue debt across a range of maturities, smoothing the profile of gilt redemptions.

- B.15 The government is mindful of the long-term inflation exposure in the public finances and gives due consideration to ensuring inflation risk is prudently managed. The government will manage this exposure through its decisions on the appropriate balance between index-linked and conventional gilts in its debt issuance in the coming years.
- B.16 Prudent debt management is also served by promoting sustainable market access, which the remit is designed to support. The government places significant importance on encouraging a deep, liquid and efficient gilt market and a diverse investor base in order to maintain continuous access to cost-effective financing in all market conditions.
- B.17 Promoting these features of the gilt market will also serve to minimise debt costs to the government because investors reward an issuer for providing a continuous and ready market and a globally recognised benchmark product.

## Modelling of cost, interest rate and refinancing risk

- B.18 The analysis underpinning the government's decisions on its issuance strategy includes an exercise in which debt interest cost and risk simulations are generated to illustrate the cost-risk trade-off associated with different issuance strategies. This allows the government to investigate the medium-term implications of different possible future issuance skews relative to the current annual issuance strategy.
- B.19 Debt interest cost is defined as the cost of the coupon payments and redemptions associated with government debt, accrued over the life of each bond, measured in terms of the relevant yield. Risk is defined as the standard deviation of debt interest cost or debt interest cost volatility, reflecting potential variation in the relevant yield. This can be seen as a measure combining both interest rate risk and refinancing risk.
- B.20 As in previous years the exercise has been carried out over a 15-year horizon, close to the average maturity of the gilt portfolio, and therefore captures a rollover of approximately half of it. The metrics resulting from this analysis combine the impact from alternative issuance strategies for financing new government debt (to meet the central government net cash requirement and the refinancing of redemptions) with the existing characteristics of the debt portfolio inherited from previous financial years.
- B.21 The Debt Management Office's (DMO) Portfolio Simulation Tool (PST), which calculates debt interest cost, is used in conjunction with a macroeconomic-based Vector Autoregressive (VAR) model, which provides 2 alternative distribution assumptions for simulating the yield curve, to depict risk in cost terms. In this way, the PST maps the projected yield curve distributions to a debt interest cost distribution so that simulated cost and risk metrics can be analysed.
- B.22 As an example, Table B.1 shows the issuance skew planned by the DMO at the start of 2017-18, which was well diversified across maturity ranges.

**Table B.1: Gilt issuance strategy composition for 2017-18 (%)<sup>1</sup>**

	Short conventional <sup>2</sup>	Medium conventional <sup>2</sup>	Long conventional <sup>2</sup>	Index-linked	Unallocated
Issuance skew for 2017-18	23.8	19.3	28.1	23.1	5.7

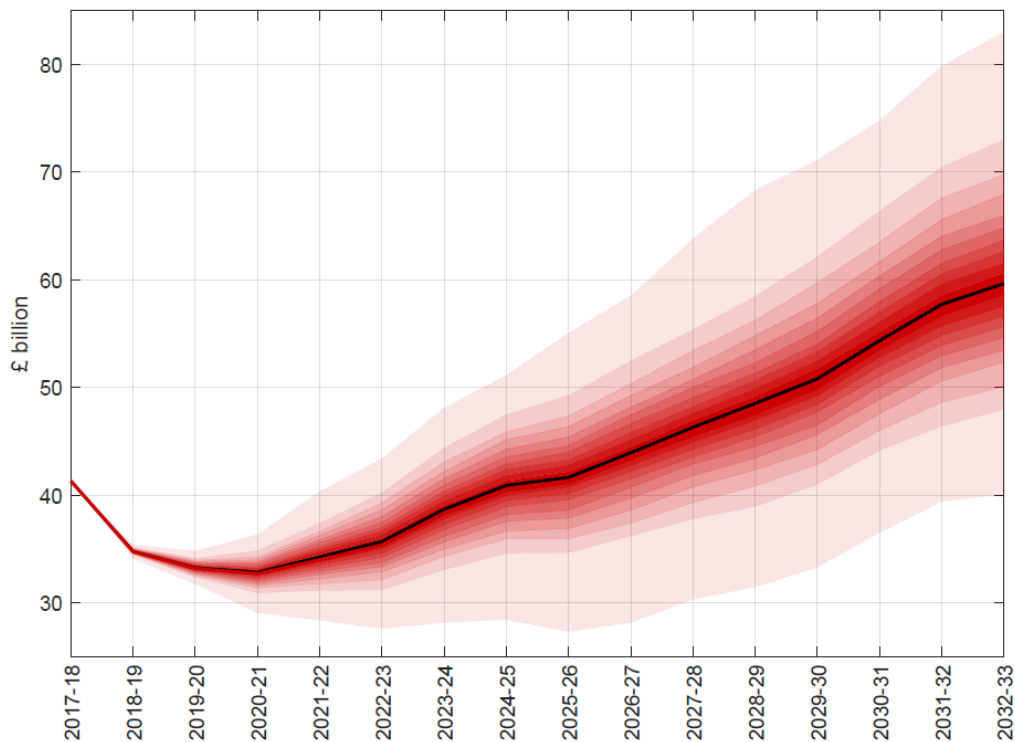
<sup>1</sup> Figures may not sum due to rounding.

<sup>2</sup> Maturities are defined as follows: short (1-7 years), medium (7-15 years), and long (over 15 years).

Source: *Debt management report 2017-18*.

**B.23** The resulting probability distributions of debt interest costs (if issuance continued to follow the current issuance maturity skew for the next 15 years) are shown in Charts B.4 and B.5. It is worth noting that the choice of distribution has a significant impact on the resulting projected yields and that neither distribution used generates short and long-run yields that are in line with current market expectations. This supports the view that there are currently negative risk premia priced in to the gilt yield curve.

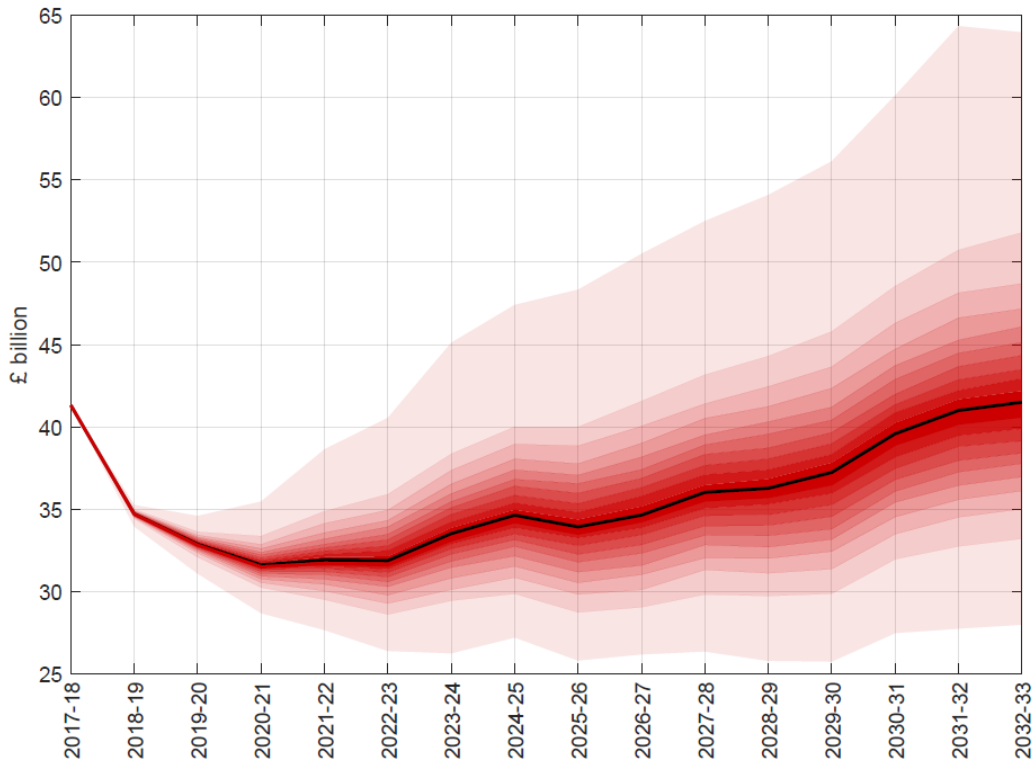
**Chart B.4 Probability distribution of debt service costs (normal distribution)<sup>1</sup>**



<sup>1</sup> This is net of the Bank of England's Asset Purchase Facility.

Source: *DMO*.

**Chart B.5 Probability distribution of debt service costs (bootstrapped distribution)<sup>1</sup>**



<sup>1</sup> This is net of the Bank of England's Asset Purchase Facility.

Source: DMO.

**B.24** The central line of each fan chart represents the median debt interest cost after 1,000 simulations using the PST model (each simulation has an alternative yield curve) for each financial year. The shaded red areas (from darker to lighter red respectively) around the median debt interest cost projection represent the percentiles of the probability distribution, with each colour area representing an additional 5% probability. The debt interest values in the lightest shades of red at the top and at the bottom of the fan chart represent the 'tails' of the distribution, with only 5% probability associated with each. For example, debt interest values on the upper tail of the distribution would not be expected to be reached with a 95% probability. Forecast uncertainty increases further into the future and, therefore, the 'fan' widens over the horizon. Overall, at the 15-year horizon, under a normal distribution it can be said with 90% certainty (i.e. excluding the 10% top and bottom 'tails' of the distribution) that debt interest costs will be between £50 billion and £70 billion, with a median value of around £60 billion. Under a bootstrapped distribution there is a 90% probability that debt interest costs will be between £35 billion and £49 billion, with a median value of around £41 billion.

**B.25** It is important to note that the debt interest simulations in Charts B.4 and B.5 reflect the combination of simulated future yields and projected debt issuance together with the unfolding of existing portfolio dynamics. As a consequence, debt interest appears to pick up in the latter part of the horizon. This reflects the redemption profile of the debt portfolio, with a higher volume of redemptions that will mature and be refinanced at new

interest rates, among other factors. Given the long average maturity of the UK's debt, which creates 'stickiness' in the evolution of the portfolio,<sup>8</sup> any impact from debt issuance is slow to take effect. In the 2017-18 issuance skew example, only about half of the entire debt interest cost bill would have been refinanced at new yield levels after 15 years.

## Gilt distribution

- B.26** Auctions will remain the primary method of issuance.
- B.27** The government will continue the syndication programme in 2018-19. Gilts of any type and maturity can be sold via syndication. However, the current planning assumption is that:
- syndications will be used to launch new gilts or to re-open high duration conventional and index-linked gilts
  - the size of transactions will be determined in response to the size and quality of market demand for the gilt being sold
- B.28** Reflecting the somewhat lower financing requirement in 2018-19 relative to 2017-18, the government expects to hold 4 syndicated offerings in 2018-19.
- B.29** Gilt tenders will be made available in 2018-19 for the issuance of conventional and index-linked gilts across maturities. The purpose of gilt tenders is to allow the government to respond more flexibly to changing market and demand conditions.
- B.30** The government remains committed to the GEMM model to distribute gilts through auctions, syndications and tenders and the government recognises that GEMMs play an important role in helping to facilitate liquidity in the secondary market.

## Gilt issuance by maturity and type in 2018-19

- B.31** In determining the split of gilt issuance, the government has considered its analysis of the relative cost-effectiveness of the different gilt types and maturities, its risk preferences including for the portfolio as well as the issuance programme, and the market feedback it has received.
- B.32** Continuing demand for short conventional gilts is anticipated, including due to redemption reinvestment flows, and from overseas investors. However, the relatively high weight that the government places on managing its near-term exposure to refinancing risk has also continued to influence its decision on the amount of short-dated conventional gilts to be issued.
- B.33** In deciding the proportion of medium conventional gilts to issue, the government recognises the important role that medium conventional gilts (particularly in the 10-year maturity) play in facilitating the hedging of a wide range of gilt market exposures through the futures market, which helps underpin liquidity in the sector.

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<sup>8</sup> Owing to the maturity structure and outstanding size of the debt portfolio, any change in issuance takes a long time to affect its composition.



- B.34** Market feedback suggests ongoing demand exists for long-dated conventional gilts from domestic investors in particular. Additionally, in determining the amount of long-dated conventional gilts to issue, the government has taken into account the role of long conventional issuance in mitigating its near-term exposure to refinancing risk.
- B.35** For conventional gilts, the risk premia analysis suggests that issuance across the maturity spectrum is more cost-effective than has historically been the case. Under market-implied inflation expectations, index-linked gilts are expected to be more cost-effective to issue than equivalent maturity conventional gilts for longer maturities.
- B.36** In relation to risk, the government is aware that the volume of index-linked gilt issuance in recent years has consequences for the long-term inflation exposure in the public finances. The UK's relatively high level of index-linked debt was one of the issues highlighted in the Office for Budget Responsibility's (OBR) 'Fiscal risks report' in July 2017. The government is considering the appropriate balance between index-linked and conventional gilts, taking account of structural demand, the diversity of the investor base and the government's preferences for inflation exposure. The 2018-19 financing remit reflects the government's current view on the appropriate balance between these factors, and in the coming years the government will further consider the appropriate balance between index-linked and conventional gilts. The government will provide additional reflections in its response to the OBR's 'Fiscal risks report' in the summer of 2018.
- B.37** Taking these considerations into account, the government's intention is to deliver in 2018-19 a gilt issuance programme that is well diversified among different types and maturities of gilts, but with a slight bias towards longer maturities.
- B.38** A similar portion of issuance will be held in an initially unallocated form in 2018-19 compared with 2017-18. The main purpose of the unallocated portion of issuance is to give increased flexibility to the DMO to issue any type or maturity of gilt by any issuance method in response to in-year evolution in demand and market conditions, while remaining consistent with the principles of predictability and transparency.

## Treasury bill issuance in 2018-19

- B.39** Treasury bills are used for both debt and cash management purposes. With regards to the former, changes to the Treasury bill stock have historically offered an efficient way to accommodate in-year changes to the financing requirement.
- B.40** As in 2016-17 and 2017-18, the government will not target a planned end-year Treasury bill stock in 2018-19. Information on the outstanding stock of Treasury bills will continue to be published monthly in arrears on the DMO's website.<sup>9</sup>

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<sup>9</sup> [www.dmo.gov.uk/data/treasury-bills](http://www.dmo.gov.uk/data/treasury-bills)

**B.41** It is expected that the net contribution from Treasury bills to debt financing in 2018-19 will be zero.