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Actuarial Valuation Report at 31 March 2020

Universities Superannuation Scheme

30 September 2021

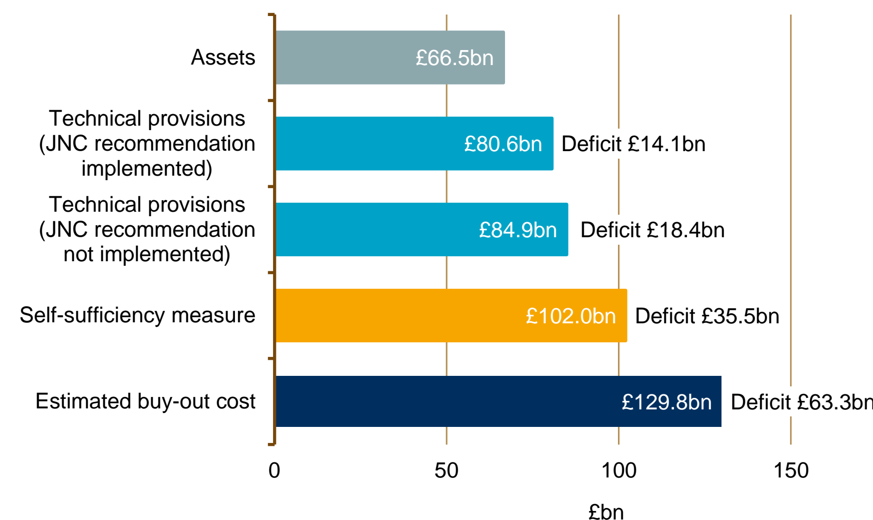
As instructed, I have carried out an actuarial valuation of the Universities Superannuation Scheme ("the Scheme") as at 31 March 2020. I now present my report which is addressed to the Trustee of the Scheme.

The main purpose of this report, required by the Pensions Act 2004, is to set out the results of and outcomes from the valuation. Scheme members will receive a Summary Funding Statement relating to the valuation in due course.

The Trustee is responsible for the choice of assumptions for the valuation and for then setting an appropriate level of future contributions (having taken actuarial advice from me), in consultation with Universities UK ("UUK"), the body nominated for these purposes under the Scheme rules to act as the representative of the employers who sponsor the Scheme. The Joint Negotiating Committee ("JNC") is responsible for deciding how any change to the required overall contribution rate will be addressed, whether by way of change to member and employer contributions, changes to the benefit structure, or both.

The JNC has recommended changes to future service benefits to apply from April 2022, which in due course will be the subject of consultation with members. In parallel, UUK has confirmed that the employers will provide an enhanced level of covenant support to the Scheme (including a 20-year moratorium on employer exits, which would be replaced by an interim moratorium lasting a single valuation cycle in the event that the JNC recommendation is revoked by resolution of the JNC and not replaced by a further JNC recommendation by 28 February 2022). The Trustee has determined that different assumptions should apply dependent on whether or not a deed has been entered into effecting the recommendation of the JNC on or before 28 February 2022. This report covers both possibilities.

The main results are summarised here, with further detail in the following sections, appendices and the attached Statement of Funding Principles, Recovery Plan and Schedule of Contributions. The valuation and this report relate solely to the defined benefits section of the Scheme in respect of benefits accrued up to the valuation date. Contribution requirements relate to both the defined benefit and defined contribution sections of the Scheme.



Summary of agreed contributions	Employer contributions	Member contributions
From 1 October 2021	21.4% of Salary	9.8% of Salary
From 1 April 2022 in the event that the JNC recommendation is not implemented	23.7% of Salary increasing thereafter every 6 months up to 38.2% of Salary from 1 October 2025	11.0% of Salary increasing thereafter every 6 months up to 18.8% of Salary from 1 October 2025

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- Schedule of Contributions and certificate
- Recovery Plan

Professional standards

This report is part of the work in connection with the valuation of the Scheme. The report has been produced for the information of interested readers and not with the intention that it should support any decision that they may make. Our work in preparing this report complies with Technical Actuarial Standard 100: Principles for Technical Actuarial Work, together with Technical Actuarial Standard 300: Pensions.

The use of our work

This work has been produced by Lane Clark & Peacock LLP and Aaron Punwani as the Scheme's Actuary ("we" or "us") under the terms of our written agreement with the Trustee of the Universities Superannuation Scheme ("Our Client").

This work is only appropriate for the purposes described and should not be used for anything else. It is subject to any stated limitations (eg regarding accuracy or completeness). Unless otherwise stated, it is confidential and is for your sole use. You may not provide this work, in whole or in part, to anyone else without first obtaining our permission in writing, although we acknowledge that you are required to pass it to the employer(s) sponsoring the Scheme and that you may make it available to Scheme members. We accept no liability to anyone, including but not limited to employers and Scheme members, who is not Our Client.

If the purpose of this work is to assist you in supplying information to someone else and you acknowledge our assistance in your communication to that person, please make it clear that we accept no liability towards them.

Calculations

Calculations of the technical provisions, other liability measures, and contribution rates have been performed by USSL's Funding Strategy Team using PFaroe, the Trustee's third-party valuation tool. We have reviewed the output and are satisfied that it is suitable for the purposes of this report. The PFaroe calculations are based on the membership data and benefits as set out in the appendices.

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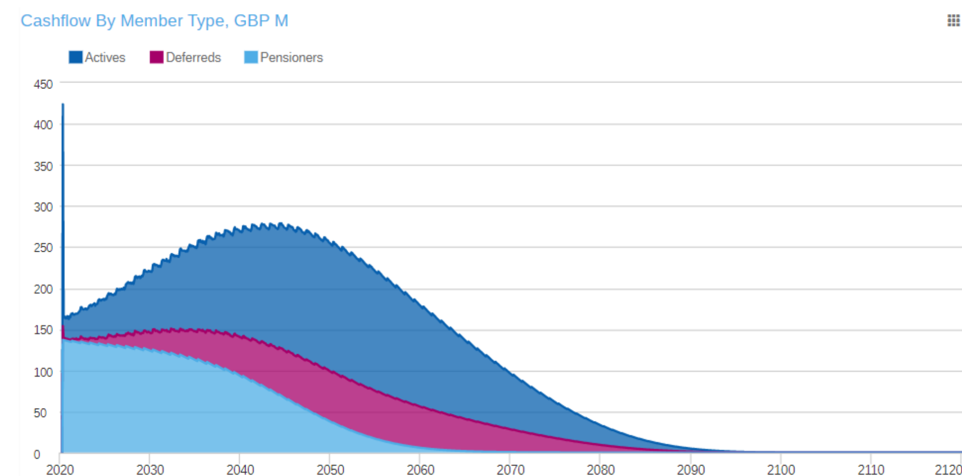
Funding objective and method

Principles in setting objective and method

- The Scheme's statutory funding objective is to hold sufficient and appropriate assets to cover its technical provisions.
- The Trustee took advice from me to determine the method and assumptions to use for this valuation, in consultation with UUK.
- The valuation adopted the "projected unit method" with a one-year control period, under which the technical provisions are calculated as the amount of assets required as at the valuation date to meet the projected benefit cash flows, based on benefits accrued to the valuation date and the various assumptions made, and the future service contribution rate is determined to be sufficient to reflect the expected increase in technical provisions from an additional year's accrual of benefits.
- The technical provisions are not intended to be sufficient to enable the Scheme to be wound up and its benefits secured in full with an insurance company.
- After considering the strength of the employers' covenant, the Trustee has set assumptions as set out in the Scheme's Statement of Funding Principles, a copy of which is attached. In particular, the Trustee took account of the employers' likely ability to pay additional contributions in the future if future experience proves to be less favourable than projected under the assumptions. The Trustee determined that different assumptions would apply depending on whether the benefit changes proposed by the JNC are implemented. The different assumptions in part reflect the fact that different covenant support would in practice be expected to apply depending on whether those benefit changes are implemented. See below for details of the assumptions chosen.

Projected benefit cash flows as at the valuation date



Source: PFaroe

- The chart above shows projected monthly benefit payments from the Scheme based on the demographic and inflation assumptions adopted for the 2020 actuarial valuation, based on benefits earned by members prior to 31 March 2020[1].
- In practice benefit payments from the Scheme are expected to be higher as a result of additional benefits that members will earn for service after the valuation date.
- The majority of benefits are linked to CPI inflation.
- There is a risk that the assumptions are not borne out in practice and that the future progression of the funding position is materially different from that expected. Further details on the risks the Scheme faces are set out in the Appendix.

[1] The spike in month 1 on the chart reflects the assumption that non-pensioner members over their normal pension age will retire immediately on the valuation date

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Assumptions

Key financial assumptions

- The investment model is an important financial assumption. The Trustee has:
  - Chosen an investment model that assumes that the Scheme adopts a notional portfolio in respect of benefits in payment (with a lower risk / more closely matched investment strategy post-retirement) and a different notional portfolio in respect of benefits not yet in payment (with a higher return-oriented strategy pre-retirement). This approach is often known as a "dual discount rate" model.
  - Taken advance credit for future returns on the post-retirement portfolio that are 1.0% pa over the return from gilts (net of investment management expenses);
  - Taken advance credit for an additional return on the pre-retirement portfolio over the return from gilts of 2.75% pa (net of investment management expenses) in the event that the JNC-recommended benefit changes are implemented, and 2.0% pa (net of investment expenses) otherwise.
- A summary of the key financial assumptions for the technical provisions is shown in the table below.

	% pa
Price inflation	
RPI	2.8
CPI	2.1
Return from gilts	0.7
Return above gilts	
Pre-retirement portfolio	2.75 or 2.0[2]
Post-retirement portfolio	1.0

- The above rates are illustrative single-equivalent rates at 31 March 2020. In practice, full yield curves for gilts and inflation have been used in the calculations.
- Pension increases before and after retirement are assumed to be 5bps higher than the CPI curve for current benefits (either uncapped or with soft cap of 5%[3]) and 35bps lower than the CPI curve for benefits in line with CPI with a minimum of 0% and maximum of 2.5% pa.
- In addition, the Trustee has decided to allow for additional assumed investment returns during the deficit recovery plan, as described later in this report.

Key assumptions differences compared with the previous valuation

- The investment model is fundamentally different from the approach adopted at the 2018 actuarial valuation, where the investment strategy was assumed to de-risk over a defined time period (20 years) such that the projected technical provisions at that point in time would be within a certain distance of the Trustee's self-sufficiency measure.
- The Trustee has continued to have regard to the self-sufficiency measure as part of its Integrated Risk Management Framework (IRMF), as an indicator of reliance on the employer covenant from time to time, but there is no longer any automatic assumption that the investment strategy will de-risk towards a self-sufficiency strategy. Rather, the dual discount rate approach means that the technical provisions will respond naturally to any changes in the maturity and liability profile of the Scheme – eg the assumed investment strategy would move towards the post-retirement portfolio if the profile of the liabilities becomes more weighted towards pensioners.
- There has been a significant fall in gilt yields between 31 March 2018 and 31 March 2020. While the assumptions are expressed relative to gilt yields, the Statement of Funding Principles does not specify a fixed premium above gilts for the pre- and post-retirement portfolios at all dates and has regard to the anticipated returns on assets on each of the notional portfolios. The premiums adopted as at 31 March 2020 are higher than might be expected at other dates, based on the market conditions prevailing at that date.

[2] Dependent on anticipated benefit reform: 2.75% if implemented and 2.0% if not implemented.

[3] The soft cap of 5% refers to benefit increases in line with full CPI up to 5%, plus 50% of any CPI increase between 5% and 15%.

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- Expectations for RPI price inflation have reduced since the 2018 valuation, and the expected gap between RPI and CPI has also reduced reflecting government proposals to change the calculation of the RPI index. Overall, the assumption for CPI at the 2020 valuation, and associated pension increases, is slightly higher than that adopted in 2018.
- The mortality assumption has been updated based on a more recent mortality experience analysis for the Scheme, and to use more recent future projections prepared by the Continuous Mortality Investigation (the "CMI 2019" future projection tables). The updated mortality assumption results in slightly shorter assumed life expectancies than at the previous valuation.
- Minor updates have also been made to other demographic assumptions following analysis of recent Scheme experience, including a change to the proportion of members assumed to leave a dependant entitled to a pension following their death. These changes have led to a slight reduction in the technical provisions compared to the previous assumptions.
- The allowance for additional assumed investment returns in the recovery plan differs from the last valuation – there was no similar allowance made in 2018.

The Appendix shows the effect on the valuation of changing some of the key assumptions.

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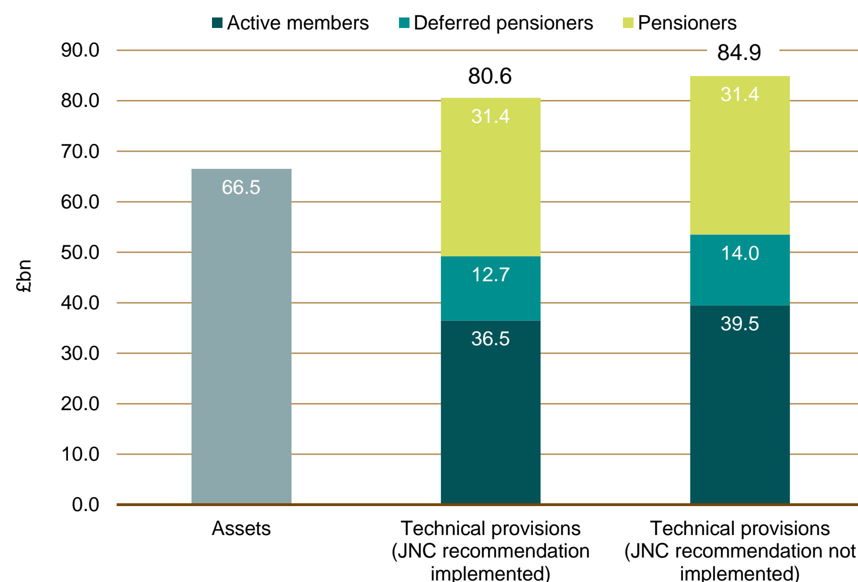
Technical provisions and future service contribution rate

Technical provisions as at 31 March 2020



As I have noted, the Trustee has determined that different assumptions should be adopted depending on whether the JNC recommendation for benefit reform is implemented. The different assumptions in part reflect the fact that different covenant support would in practice be expected to apply depending on whether those benefit changes are implemented.

As at the valuation date the technical provisions would be £80.6bn and there would be a deficit of £14.1bn. This is on the basis of a deed being entered into implementing the recommendation of the JNC on or before 28 February 2022.

Otherwise, the valuation outcomes provide for a higher target of £84.9bn at the valuation date, with a deficit of £18.4bn to be recovered.

The calculations are based on the membership data, benefits and assets as summarised in the Appendix.

Future service contribution rate

The future service contribution rate calculated to be sufficient to meet the increase in the technical provisions arising from the accrual of additional pensionable service also depends on whether or not the JNC recommendation for benefit reform is implemented. The required future service rates in each case are shown in the table below. Note the different rates reflect both the difference in benefits and the difference in assumptions that would be adopted if the benefit change is implemented.

% of Salary	Current benefits	Revised benefits
Future service rate for DB benefits	34.5%	19.2%
Total cost of DC benefits	2.1%	5.3%
Allowance for non-investment expenses	0.4%	0.4%
Future service rate	**37.0%**	**24.9%**

The total cost of DC benefits includes allowance for investment management costs relating to the DC section of 0.1% of salaries.

The future service rate for DB benefits is based on the relevant technical provisions assumptions plus allowance for an element of additional investment return of 0.5% pa for 10 years (current benefits) or 18 years (revised benefits) as it applies to future service contributions.

Certification of technical provisions

Under the Pensions Act 2004, I am required to certify that the technical provisions have been calculated in accordance with the legislation, and my certificate is attached. For this purpose, I am certifying the technical provisions of £80.6bn that are applicable on the basis of a deed being entered into effecting the recommendation of the JNC on or before 28 February 2022.

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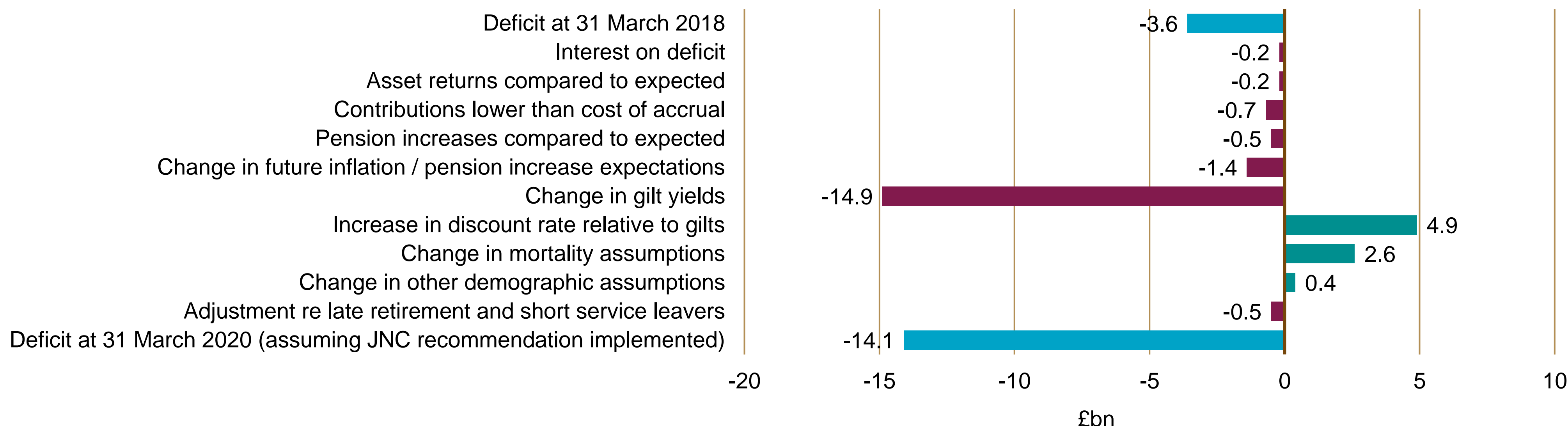
Reconciliation of experience to 31 March 2020

Explanation of movement in technical provisions deficit from previous valuation



- As at the valuation date the deficit was £14.1bn on the basis of the JNC recommendation and associated enhanced covenant support being implemented. Otherwise, the valuation outcomes allow for a deficit of £18.4bn to be recovered – in the chart above this would reflect a reduction in the “change in assumed returns relative to gilts” item.
- Had experience since the previous valuation been in line with the assumptions adopted for that valuation, and allowing for contributions paid over the period, the Scheme would have been expected to have a deficit of £4.5bn at this valuation date – the increase being largely due to the time lapse between the 2018 valuation date and implementation of the 2018 valuation outcome.
- The actual position is therefore worse than expected and the reasons for this are shown in the chart.
- The contributions paid since the previous valuation are allowed for in the “contributions lower than cost of accrual” item. These were £2,010m in 2018/19 and £2,440m in 2019/20.

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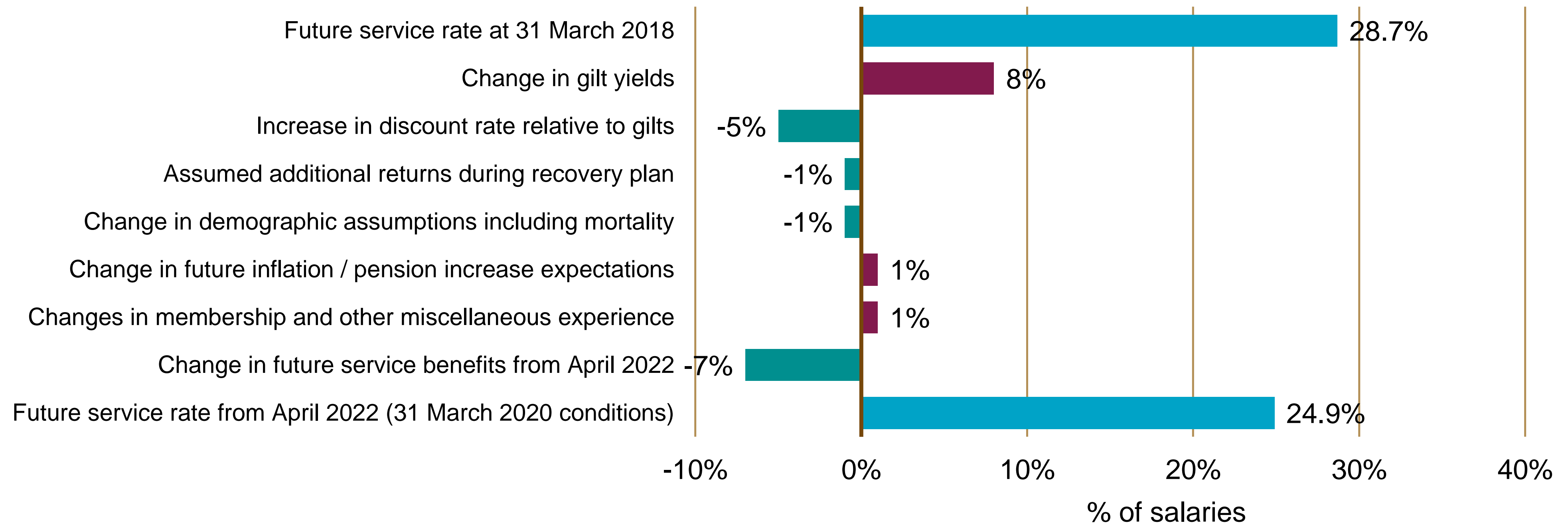
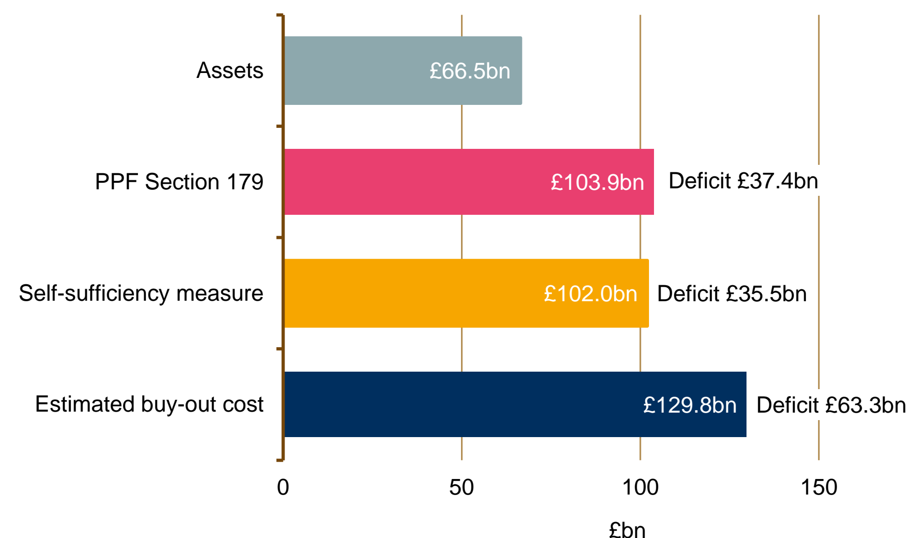
Explanation of change in contribution rate from previous valuation



- The chart above shows the change in the future service rate on the basis of the JNC recommendation being implemented.

Buy-out and self-sufficiency measures

The position were the employers to have ceased sponsoring the Scheme on the valuation date



Derivation of the solvency position

- The buy-out or solvency position has been calculated by estimating the cost of securing all benefits by purchasing annuities with an insurance company and winding up the Scheme. In this situation, active members' service would cease and they would become deferred pensioners. We have also included an allowance for the expenses that would be incurred in winding up the Scheme. This measure of solvency is referred to as the "buy-out cost". It represents my statutory estimate of solvency as at the valuation date.
- We have not obtained quotations but have produced our estimate using the assumptions described in the Appendix. In practice, the actual cost can be determined only by completing a buy-out. In our experience, actual insurer pricing can frequently vary by +/-5% compared to our solvency estimates for a given scheme due to variations in insurer appetite. The solvency estimate shown is intended to represent a central figure within this range. However, there are also cases where actual pricing is outside such a range, for example due to scheme characteristics, or general supply and demand mechanics in the market. Further, given the size of the Scheme it is not likely to be possible to secure all benefits with one or more insurers in a short space of time and so in practice a series of transactions over many years would be needed. The actual cost for the Scheme could therefore be very different from the estimate shown.
- The estimated buy-out deficit at the valuation date was c£63bn. This corresponds to an estimated buy-out funding level of 51%, which compares with 56% as at the previous valuation. The reasons for the change are similar to those explaining the change in the technical provisions, together with changes in insurers' buy-out pricing.

Self-sufficiency measure

- The self-sufficiency measure represents the minimum level of assets the Trustee would wish to hold in order that it could follow an investment strategy that would give a very high level of confidence of being able to pay all benefits when they fall due without the need for any additional contributions, while maintaining a high funding ratio.
- As noted above, given the size of the Scheme, it is not likely to be possible to secure all benefits with one or more insurance companies in a short period of time in the event of discontinuance. In this scenario, the Trustee may decide instead to run on the Scheme for a period without covenant support, in which case the self-sufficiency measure is relevant.
- In practice, the self-sufficiency measure is used primarily as an indicator of the level of reliance on the employer covenant under the Trustee's Integrated Risk Management Framework.
- The assumptions adopted for the self-sufficiency measure at the valuation date are included in the Statement of Funding Principles.

Interaction with the PPF

- Where a pension scheme is discontinued because of the insolvency of the employers, the Pension Protection Fund ("PPF") is required to assess whether the scheme is eligible to enter the PPF. This includes assessing whether the scheme is insufficiently funded.
- In broad terms, if the PPF is satisfied that the scheme's assets are insufficient to buy-out benefits equal to PPF compensation with an insurance company, then

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the assets would be transferred to the PPF to pay members PPF compensation in place of scheme benefits.

- If the assets are sufficient, the scheme can be wound up outside the PPF with the assets first used to secure benefits equal in value to PPF compensation, and the balance applied to secure benefits above that level in accordance with the scheme's rules. If it is not possible to secure benefits with an insurer or insurers, eg because of the size of the Scheme, the Trustee can apply to the PPF to continue as a closed Scheme.
- As a proxy for the financial assessment required by the PPF in these circumstances, we consider a statutory "Section 179" valuation. These assumptions are set by the PPF and not by the Trustee. On this basis, there was a deficit in the Scheme of £37.4bn as at 31 March 2020.
- This indicates that, had the employers become insolvent at the valuation date, with no other sponsor to succeed them and no additional funding, it is likely the Scheme would have entered the PPF. In practice, on insolvency of an employer, a debt equal to their share of the solvency (buy-out) deficit would be triggered, and the extent to which such debts are recovered would determine whether or not the Scheme would enter the PPF.
- Full details of the Section 179 valuation as at 31 March 2020 were set out in my separate report and certificate produced for the Trustee for that purpose.

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Experience since the valuation date

Development of position since 31 March 2020

I have considered the position as at 31 March 2021 on assumptions consistent with the Statement of Funding Principles.

At this date expectations for future inflation were higher than at 31 March 2020. Gilt yields had increased, although expected returns relative to gilts on many asset classes were lower, and so the discount rates relative to gilts had decreased. The value of the Scheme's assets had also increased significantly. As a result, the technical provisions deficit was lower as at 31 March 2021 and the notional future service contribution rate was higher.

The position as at 31 March 2021 compared to 31 March 2020 is shown in the table below. Note that the position as at both dates is on the basis of a deed being entered into effecting the recommendation of the JNC on or before 28 February 2022.

	31 March 2020	31 March 2021
Technical provisions (subject to JNC recommendation being implemented)		
Key assumptions		
CPI (single equivalent)	2.1% pa	2.5% pa
Pre-retirement discount rate	gilts + 2.75% pa	gilts + 2.45% pa
Post-retirement discount rate	gilts + 1.0% pa	gilts + 0.55% pa
Technical provisions	**£80.6bn**	**£86.2bn**
Assets	£66.5bn	£80.6bn
Technical provisions deficit	**£14.1bn**	**£5.6bn**
Self-sufficiency measure	**£102.0bn**	**£111.0bn**
Assets	£66.5bn	£80.6bn
Self-sufficiency deficit	**£35.5bn**	**£30.4bn**
Future service rate (revised benefits in line with JNC recommendation from April 2022) (% of Salary)	**24.9%**	**25.6%**

The Trustee was aware of the position as at 31 March 2021 (as well as 31 March 2020) when it first provided the indicative contribution rate in relation to the benefit structure that ultimately formed the JNC recommendation.

The Trustee also adopted an interim monitoring framework which indicates that the technical provisions deficit as at 31 July 2021 was similar to that as at 31 March 2021, and the notional future service contribution rate at 31 July 2021 was higher than that as at 31 March 2021. This provides a directional indication of how the position has continued to change, although a full analysis of assumptions consistent with the Statement of Funding Principles has not been carried out at dates subsequent to 31 March 2021. I advised the Trustee that this is within the bounds of normal fluctuations which should be expected on a month-to-month basis and consequently the Trustee determined it was not necessary to revise its decision on the contribution rate.

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Contributions and future projections

Contributions

As the Scheme had a deficit as at 31 March 2020, the Trustee has determined in consulation with UUK that the employers will pay contributions to clear this deficit, as set out in the Recovery Plan and summarised below.

The level of the deficit, and the contributions towards clearing it, depend on whether or not the JNC recommendation for benefit change is implemented. The table below shows the level of deficit recovery contributions in each case.

Contributions shown as % of Salary	JNC recommendation implemented	JNC recommendation not implemented
Technical provisions deficit	£14.1bn	£18.4bn
Deficit contributions from 1 October 2021	Nil	Nil
Deficit contributions from 1 April 2022	6.3%	Nil
Deficit contributions from 1 October 2022	6.3%	3% increasing by a further 3% every 6 months up to 18% from 1 April 2025 and then 20% from 1 October 2025
End date of Recovery Plan	31 March 2038	31 July 2032

The alternative recovery plans allow for additional returns on assets of 0.5% pa in excess of the applicable discount rates for either 18 years (subject to a deed being entered into effecting the recommendation of the JNC on or before 28 February 2022) or 10 years (if not) from the valuation date.

In addition, the employers and members will make contributions towards the costs of further benefit accrual and scheme expenses (including PPF levies) and the total rates payable are set out in the Schedule of Contributions. For the period to 1 April 2022 (subject to a deed being entered into effecting the recommendation of the JNC on or before 28 February 2022) or to 1 October 2022 (if not), the total rates payable are lower than the assumed cost of future service benefits and therefore the deficit would be expected to increase over this period – this is allowed for in the calculation of the required recovery plan contributions.

If after engagement with a participating employer under the Trustee’s debt monitoring framework the Trustee considers it is not possible to agree satisfactory mitigation measures with an employer, or if a participating employer does not comply with the framework, then the Schedule of Contributions provides that the Trustee may consider and - where it so determines in line with the debt monitoring framework - implement the acceleration of deficit recovery contributions for that participating employer, after taking advice from me as Scheme Actuary on the level of contributions at the time.

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Projected funding levels at the next valuation

The projected funding levels three years after the valuation date are shown below.

These projections are made on the basis that:

- a deed effecting the recommendation of the JNC is entered into on or before 28 February 2022;
- the active membership remains broadly the same;
- experience from the valuation date is in line with the assumptions underlying the technical provisions, as set out in the Statement of Funding Principles, including additional returns on assets of 0.5% pa higher than the discount rates;
- contributions are paid as set out in the Schedule of Contributions; and
- there is no change in the insurers' buy-out pricing.

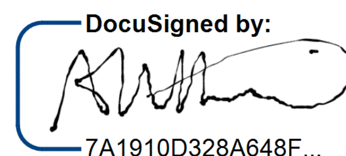
Experience from the valuation date is likely to be different from the assumptions made. Therefore, the position at the next valuation is likely to be different from that illustrated. The previous section of this report discusses developments since the valuation date so far.

Measure	31 March 2020	31 March 2023
Technical provisions (if JNC recommendation implemented)	83%	83%
Buy-out	51%	50%

The fact that the funding level is projected to be the same as at 31 March 2023 as it was in 2020 reflects the time taken to implement the outcome of this 2020 valuation, with contributions being lower than the future service contribution rate for a period as noted above.

Certification of contributions

Under the Pensions Act 2004, I am required to certify that the Schedule of Contributions is consistent with the Statement of Funding Principles, and that payment of contributions at the agreed rates can be expected to lead to the Scheme having sufficient assets to cover its technical provisions by the end of the Recovery Plan. There is provision under the legislation for me to have regard to the position as at the valuation date when providing this certificate, and I have adopted this approach. My certificate forms part of the Schedule of Contributions.



Aaron Punwani FIA
Partner
Appointed Scheme Actuary

+44 (0)20 7432 6785
Aaron.Punwani@lcp.uk.com

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Appendix 1

Key risks faced by the Scheme

Risk	Comment / description of risk
Employer covenant	The employers are not able to support the Scheme, and in particular are not able to pay increased contributions if experience is unfavourable. The Trustee has agreed steps that the Trustee believes have the effect of protecting the covenant, for example by extending the moratorium on employer exits noted below.
Employers exiting the Scheme	Stronger employers may choose to exit the scheme (after paying their section 75 debt) leaving a weaker remaining covenant. There is currently a moratorium in place to prevent this, and the enhanced covenant support measures being implemented extend this for a minimum of 20 years. If the JNC recommendation is revoked, this extended moratorium would be replaced by an interim moratorium lasting a single valuation cycle.
Investment strategy	Changes in asset values are not matched by changes in the technical provisions. The technical provisions are linked to gilt yields and anticipated returns on other assets, but the Scheme assets include a substantial holding in return-seeking assets the market value of which can be very volatile, so the two may move out of line as investment conditions change. For example, if equity values fall with no changes in gilt yields, the deficit would likely increase (although this would also be influenced by changes in expectations for future equity returns).
Investment returns	Future investment returns are lower than anticipated. The greater the allowance made in the technical provisions for returns on return-seeking assets, the greater the risk that those returns are not achieved. In particular, no allowance is made for specific risks, such as climate change, which may have an effect on investment returns.
Discount rates	Asset values and the technical provisions do not move in line as a result of changes in the yields available on fixed interest and index-linked gilts, and in the expected returns on other assets such as equities and corporate bonds, or because of a mismatch between the Scheme's holding in lower risk assets and its technical provisions in terms of their nature (ie fixed or inflation-linked) and/or their duration. To mitigate this risk, the Scheme holds a proportion of its assets in lower risk investments.
Inflation	Actual inflation is higher, and so benefit payments are higher, than anticipated. In addition there is a potential mismatching risk if inflation linked liabilities behave differently to the inflation linked assets held to protect against inflation changes – for example where RPI linked assets are used to match CPI linked liabilities.
Mortality	Scheme members live longer, and so benefits are paid longer, than anticipated. In particular, no allowance is made for specific risks, such as climate change, so members may live for a different length of time than assumed.
Member options	The incidence of Scheme members exercising benefit options which are potentially not "neutral" to the Scheme's funding position (such as early retirement or commutation) is different from that anticipated.

Size of Scheme	The size of the Scheme is itself a risk insofar as it may not be possible to implement investment decisions quickly eg because there may not be market capacity for a large asset transition, or if there is, the transition may itself move the market.
Regulatory	In future the Scheme may have backdated claims or liabilities arising from equalisation or discrimination issues or from future legislation or court judgments.

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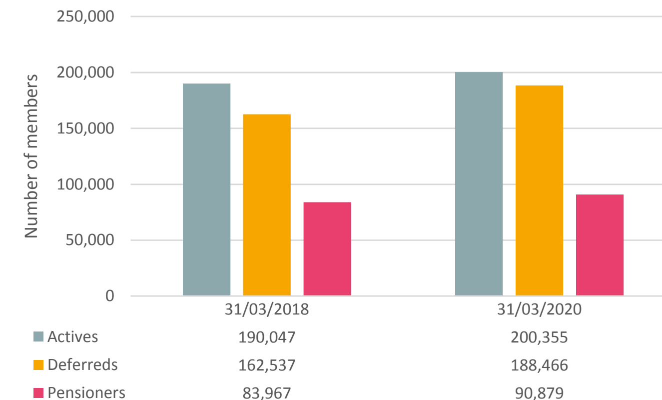
Appendix 2

Membership data and benefits

Summary as at 31 March 2020 (31 March 2018 in brackets)

	Number		Average age		Total Salaries / Pensions (£'000 pa)	
Active members	200,355	(190,047)	44	(44)	8,962,000	(8,205,000)
Deferred members	188,466	(162,537)	45	(45)	441,000	(379,000)
Pensioners and dependants	90,879	(83,967)	73	(72)	1,617,000	(1,482,000)
Total	**479,700**	(436,551)				



Further information on the data

- I have been provided with a full membership data extract as at the valuation date by the USSL Funding Strategy team. I have relied on this data and have no reason to doubt its overall accuracy and suitability for the purposes of the valuation.
- I have been provided with a note by the Funding Strategy Team dated 12 June 2020 setting out details of any approximations in how the data has been adjusted. I am satisfied that the approach taken is reasonable.
- The pensionable salary figures for active members have been obtained by totalling uncapped salaries.
- The pension figures for deferred pensioners have been obtained by totalling members' past service pensions as at 31 March 2020, with no allowance for the 1 April 2020 increase. The pension figures for pensioners and dependants have been obtained by totalling members' pensions in payment at the valuation date but including the 1 April 2020 increase.
- Pensions in payment (in excess of GMPs where relevant) were increased since the previous valuation, as required under the Scheme's Rules. There have been no discretionary benefits granted since the previous valuation. The general increases based on CPI over the period were 3.0% in April 2018, 2.4% in April 2019 and 1.7% in April 2020.
- The membership numbers exclude those records with zero salaries / pensions in the data. For members with active records showing zero salary but including an accrued pension, the accrued pension has been valued.

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Current benefits in the Scheme

- The valuation and this report relate solely to the defined benefits section of the Scheme in respect of benefits accrued up to the valuation date. Contribution requirements relate to both the defined benefit and defined contribution sections of the Scheme.
- The benefits valued are as set out in the Trust Deed and Rules dated 19 November 2015, as subsequently amended. A summary of the Scheme benefits for current active members is available on the USS website. I have made no allowance for discretionary pension increases.
- The future service rates shown in this paper allow for the increase in Normal Pension Age to 66 from October 2020.
- Members' benefits are yet to be adjusted to remove inequalities caused by GMPs earned after 17 May 1990. I have valued the current benefits. I understand from the USS legal team that the Scheme's rules neutralise the vast majority of any inequality arising from GMPs and therefore the impact of GMP equalisation is not expected to be material in the context of the Scheme.
- I understand a number of members with deferred benefits retain a right to a transfer value on a higher short service benefit. The transfer value is potentially greater than the reserve held in the valuation for the deferred benefit. Further investigations are being undertaken and for the purposes of this valuation I have included an approximate allowance for this potentially more valuable benefit in the technical provisions.

JNC recommendation for future benefit changes

- In outline, the JNC recommendation is to maintain the existing hybrid defined benefit / defined contribution structure but modified in the following way for benefits accrued from 1 April 2022:

    1. Reduction in salary threshold from c £60,000 pa to £40,000 pa.
    2. Reduction in accrual rate from 1/75 to 1/85.
    3. Pension increases and revaluation before retirement restricted to CPI up to a maximum of 2.5% pa.
    4. Leavers with more than three months' but less than two years' service would receive the standard deferred benefit rather than the current entitlement to a lower benefit based solely on member contributions.

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Appendix 3

Assets and investment strategy: Summary as at 31 March 2020

The value of assets attributable to the defined benefit section of the Scheme was £66.5bn as at 31 March 2020 per the audited report and accounts.

The Scheme's reference portfolio at 31 March 2020 was as follows.

USS reference portfolio

Asset class	31 March 2020
Equities	56.75%
Property	6.75%
Fixed income	18.25%
LDI liability proxy	31.00%
Cash	-12.75%
Total	**100.00%**

The reference portfolio represents the benchmark against which the Scheme's investment manager is measured. The Scheme's implemented portfolio contains less concentrated exposure to mainstream equity assets and a sizeable allocation to private market investments.

The Scheme's investment strategy is currently under review.

The breakdown of the equity and fixed income portfolios within the reference portfolio is as follows.

Breakdown of equity portfolio

Asset class	
UK	25%
World ex-UK (developed markets)	60%
Emerging markets	15%
Total	**100%**

Breakdown of fixed income portfolio

Asset class	
UK investment grade credit	40%
Global investment grade credit	20%
Global high yield	10%
Emerging markets credit	15%
US TIPS	15%
Total	**100%**

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Appendix 4

Sensitivity to assumptions

- The valuation results are sensitive to the assumptions chosen and we illustrate here the effects of changes to some of the key assumptions.
- The results are particularly sensitive to the advance credit for future investment returns.
- By way of illustration, the approximate effect on the technical provisions deficit and future service rate of changing some of the key assumptions is shown in the table. All sensitivities are relative to the technical provisions assumptions based on a deed being entered into effecting the recommendation of the JNC on or before 28 February 2022, and the revised future service benefits that would apply from April 2022 in that case.
- The table shows each of the sensitivities shown relative to the base position. If two or more sensitivities were combined the effect on the technical provisions deficit and change in future service rate would not necessarily be additive.

Description	TP Deficit (£bn)	Future service rate (revised benefits) (% of salaries)
Discount rate assumptions of gilts + 2.75% / gilts + 1.0% pa	**14.1**	**24.9**
A Increase pre-retirement discount rate to gilts + 3.0% pa	12.8	24.0
B Decrease post-retirement discount rate to gilts + 0.75% pa	16.9	25.5
C Assume longer life expectancy by reducing the adjustment to the base mortality tables by 5%	15.3	25.1
D Make greater allowance for mortality improvements by increasing the annual long-term rates by 0.2%	14.7	25.1
E Allow for all ex-Final Salary members to retire from service at age 60 with no reduction for early payment on the pre-2011 element	15.8	24.9
F: CPI inflation lower by 0.1% pa	12.6	24.3

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Appendix 5

Assumptions used for assessing buy-out

- We have based our estimate of the solvency position on our in-house insurer buy-out pricing model. The model is based on similar but simplified principles to those used by insurance companies in setting their prices. It is calibrated against actual quotations and final transaction prices received for other schemes.
- We have not obtained an actual quotation for the Scheme, and there is considerable volatility in prices. Insurance pricing at 31 March 2020 was lower than typical owing to financial market conditions at that date. Therefore, were the benefits actually to be bought out, the position could be very different from that illustrated.
- These assumptions differ from those set out in the Statement of Funding Principles and they result in an estimated buy-out cost that is higher than the technical provisions.
- All else being equal, non-pensioners are more expensive to insure than pensioners, due to the more limited appetite from the insurers and the additional uncertainty (for example, due to the longer duration of non-pensioners' benefit payments and uncertainty around the particular options that can be exercised by members before and at retirement).
- The demographic assumptions we have used are generally the same as those used for the technical provisions (where relevant) except as shown opposite.
- We have calculated our estimate of the solvency position assuming that the insurer's terms for members' options are adopted.
- Additionally, we have included a provision of £0.6bn for the costs that would be incurred by the Trustee in winding up the Scheme, and a per-member allowance for the cost of administration with an insurer. In practice, the actual expenses could be very different.
- The size of the Scheme is such that it would not be possible to secure all benefits in a single transaction with an insurer, and it is likely that a series of transactions over an extended period of time would be required to secure all benefits. We have not applied any loading to the solvency estimate to take account of this extra risk.
- This basis has no relevance beyond establishing an estimate of the hypothetical buy-out cost and my statutory estimate of solvency as at the valuation date.

Main financial assumptions

Assumption	Pensioners	Non-pensioners
Illustrative single equivalent assumptions		
Discount rate	1.4% pa	0.7% pa
Rate of RPI inflation	2.8% pa	2.8% pa
Rate of CPI inflation	2.2% pa	2.2% pa
Pension increases in payment	Set consistently with market-based pricing for the relevant minimums and maximums	

Main demographic assumptions

Assumption	
Retirement age	65, with late retirement uplifts (designed to be cost neutral on the solvency basis) applied to reflect the value of benefits that can be taken unreduced at an earlier age
Proportion with dependants	As for 2020 technical provisions
Mortality assumption	As for 2020 technical provisions

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Key documents

- Certification of the calculation of the technical provisions
- Statement of Funding Principles
- Schedule of Contributions and certificate
- Recovery Plan