

Further analysis of contribution affordability and risk for the 2018 valuation

1. Introduction

This paper summarises the results of further analysis of the affordability and risk associated with contributions undertaken for the Trustee Board in advance of completing the 2018 valuation. Any actuarial information referred to in this paper was created to assist the decisions of the Board of USSL only and may not be relied upon by any other party. This paper is provided only to inform UUK and USS sponsoring employers of matters considered by the Board. The data and information in this paper are not intended to contribute in whole or in part to any decisions made by UUK or USS sponsoring employers. If they or any other party believe actuarial advice on which it may place formal reliance is required to assist their decisions on these matters, they should obtain their own advice.

The analysis covered three areas:

- **Covenant and affordability:** More detailed analysis of the ability of participating employers to afford the level of contributions associated with Option 3 of the 2018 valuation over the full recovery plan and to respond to any downside events during that period.
- **Size of the Scheme relative to the sector:** Supplementary analysis of scenarios for the long-term growth of the Scheme relative to the growth of the sector, and in particular how numbers of active members and salaries might be impacted in downside scenarios. This is relevant in informing an assessment of the ability of the sector to support the Scheme at a future date.
- **Supplementary analysis of investment risk:** Supplementary stochastic analysis to elucidate the interaction between assets and liabilities over time and the potential volatility. This included the range of potential deficits, future service contributions and deficit recovery contributions.

To complete these additional analyses, three cross-team work streams were established which included members of USS, together with our covenant advisors (PwC and EY Parthenon), as well as the Scheme Actuary and his team at Mercer. These work streams have completed their work and the results are summarised below.

2. Summary of results

The additional work has *not* revealed any issues of which the Trustee was previously unaware. However, it does serve to reinforce previous work and to emphasise the potential future challenges. As a result, the Board made no changes to the technical provisions and proposed contributions. In particular:

- *Work stream 1* confirms the ability of employers to meet the contributions under Option 3 of the valuation over the full recovery plan, albeit there are employers who are already facing challenging financial circumstances due to broader sector risks.
- *Work stream 2* confirms that the potential growth in the size of the Scheme relative to the ability of the employers to support it remains manageable. However, it is recognised that there are risks on that journey which are, in part, considered in work stream 3.
- *Work stream 3* confirms that there is a wide range of potential future deficits and potential future contribution requirements at the next valuation. The majority of these are expected to be manageable within the contribution requirements proposed under Option 3. However, there are scenarios in which higher contributions and/or changes to benefits may be required.

3. Work stream 1: Covenant and affordability

Whilst our covenant advisors, PwC and EY Parthenon, have both previously advised that cost reduction by employers to meet higher pension contributions is possible, we commissioned PwC to undertake additional work to further substantiate this. This work has involved reviewing the accounts and business plans of a number of institutions and interviewing them about the actions they are likely to take in order to meet the contributions associated with the Option 3 of the 2018 valuation over the length of the deficit recovery plan.

In this work PwC have examined the financial information and business plans for 12 employers which span the three main categories of institutions that support the Scheme (namely, Broad-Based Research, Cusp and Scottish Research). The sample was selected to include institutions for whom PwC's previous analysis of public

information had indicated there may be some affordability constraints and/or higher debt leverage, as well as some institutions PwC had previously interviewed to understand trends in the institutions' financial position. The institutions interviewed are collectively responsible for approximately 25% of the Scheme's liabilities.

PwC's key conclusions are detailed below:

- The vast majority of employers will be able to meet the contribution requirements under Option 3 (with cost sharing) without fundamental changes to their business plan. There are already some institutions which are undergoing restructuring to address other challenges that will struggle to meet these contributions requirements.
- In a downside *in extremis* scenario where a higher level of contribution would be required to fill a deficit over a longer period, e.g., 20 years, then institutions would need to make deeper cost savings and/or more fundamental strategic changes.
- Views on the impact of implementing the Augar Review and Brexit varied across the sample. As written, Augar offers potential upside for some of the interviewed institutions, but for others some risk of reduced income, albeit there is little expectation it will be implemented as written. Brexit is expected to affect Scottish institutions more than others.
- A total of 10 out of the 12 institutions are already taking pre-emptive steps to address the uncertainties around the Augar Review, Brexit and higher pension costs.

The outcome of this work is consistent with PwC's previous work, which concluded that the employers' contributions associated with Option 3 of the 2018 valuation were affordable. Furthermore, while this previous work is still considered sufficient to support the decisions already made by the Trustee, the new interviews and analysis in work stream 1 provide more robust confirmation. In addition it has provided insight into institutions which have affordability constraints as well as into how to monitor appropriate debt levels going forwards.

Importantly PwC's report indicates that *in extremis*, if downside scenarios were realised, higher levels of contributions could be made available by institutions making more fundamental strategic changes.

4. Work stream 2: Size of the Scheme relative to the sector

In this work stream we developed and analysed additional downside scenarios for the evolution of the size of the Scheme relative to the size of the sector. The focus of this analysis was on the collective ability of USS employers to support the Scheme in scenarios in which the size of the Scheme relative to the sector becomes much larger than the central case assumed in the valuation. Note that scenario analysis of this kind had already been completed, but without a detailed narrative linked to the downside events.

As part of this work, EY Parthenon (specialist consultants for the higher education sector) were commissioned to (i) develop specific scenarios reflecting realistic potential outcomes which could have a negative impact on the sector (along with an appropriate narrative) and (ii) quantify these relative to their so-called Anchor case. In each of the scenarios they evaluated the:

- Impact on overall revenues / student numbers within the sector;
- Impact on overall payroll within institutions;
- Impact on surplus within institutions;
- Impact on key USS segments.

In developing these scenarios EY Parthenon have considered:

- **Price & Funding Levels:** Changes within the sector and in the regulatory environment that may impact total fees and/or surplus levels of institutions. These factors may influence the total payroll across institutions:
 - Impact of the Augar Report.
 - Radical Change in Government Policy (e.g. sector privatization).
- **Student Numbers:** Changes which primarily impact student numbers (and hence revenue) of the sector. These factors may influence total payroll across institutions:

Under each of EY Parthenon's downside scenarios, it continues to be the case that the size of the Scheme relative to the sector falls over the next 20 years. The only scenario under which it remains broadly similar is if all the downside cases are combined, an outcome which EY Parthenon considers to be extremely improbable.

The conclusion of this work stream is that the above benefit modifications combined with the planned de-risking will result in the Scheme being more manageable for the sector over time. It does however need to be recognised that there are still significant risks along that journey, which are considered in the next section on work stream 3.

Given that it is the size of the liabilities, together with the volatility associated with the investment strategy, scales the overall level of risk to the Scheme, it is desirable to move in this direction over time so that the size of the Scheme relative to the sector more manageable.

5. Work stream 3: Supplementary analysis of investment risk

This work stream involved a stochastic analysis of the potential future outcomes for deficits (both on a technical provisions basis and a self-sufficiency basis) and for contribution requirements (including contributions to cover both deficit recovery and future accrual). The underlying data and assumptions used for the analysis are the same as used for the 2018 valuation.

It is important to note that there is always a great deal of model-dependency in the results of any stochastic analysis and this is no exception. As a consequence not too much should be read into the precise results that emerge from this work stream, but the focus should be on the outcome in broad terms.¹

Over the course of both the 2017 and 2018 valuations we have performed stochastic analyses (with only economic variables stochastic) of the evolution of assets and liabilities. The most recent example of this included analysis of the triggering of contingent contributions.

The analysis carried out in this work stream involved the following two elements:

- A 20-year stochastic simulation of the evolution of the funded status of the DB section, but assuming no management action is taken post the valuation date. This demonstrates how the 33rd centile case corresponds to the prudent valuation outcome of full funding on a TP basis (to the accuracy allowed by simulation noise). The distribution of outcomes shows the range of potential TP deficits: in particular, 67% of scenarios in surplus on a TP basis and 33% in deficit (assuming no management action after the valuation date). This analysis also confirms the long-term reliance target (self-sufficiency deficit in 20 years' time) of £10bn in real terms.
- A shorter-term 3-year stochastic simulation to estimate the range of potential outcomes for the deficit recovery contribution (DRC), the future service cost (FSC) and total contributions, assuming no benefit change. This also estimates the potential range for the self-sufficiency deficit at the end of the three-year period.

Over a 20-year horizon, the worst case 5th centile outcomes for the deficits may seem extreme (c. £32bn for the technical provisions deficit and c. £45bn for the self-sufficiency deficit), but in practice these can and would be mitigated by management actions over the period (which are ignored in the modelling).

Over a 3-year horizon, there is a wide range of potential future contribution requirements at the next valuation date, as shown in Table 2. However, as shown in Table 3, the majority of outcomes (c. 65% of scenarios) are expected to be manageable within the contribution requirements under Option 3 for the 2018 valuation. Nevertheless there are scenarios in which higher contributions and/or changes to benefits may be required (c. 22% of scenarios give rise to a total contribution rate greater than 40%). These latter scenarios correspond to

¹ The stochastic analysis has been generated using 2,000 scenarios calibrated to the FBB return expectations. We determine the most appropriate number of scenarios via the trade-off between marginal gains in distributional stability against computational efficiency. In this context we acknowledge the associated estimation error in the distributional tail metrics, which is distinct from the uncertainties coming from the choice of the stochastic model and the parameters used.

situations in which real gilt yields remain at or below the negative levels on the valuation date and realised investment returns are significantly below the returns on a pure gilts investment strategy.

Table 2. Required contributions in three years at the expected, prudent (67th centile) and 95th centile levels.

	Deficit Recovery Contribution (10 year recovery)	Future Service Cost	DC & Admin Costs	Total Contribution*
Median (50 th centile)	0%	25%	2.7%	30%
Mean	5%	25%	2.7%	33%
67 th centile	7%	27%	2.7%	36%
95 th centile	22%	34%	2.7%	55%

* Note that the Total Contribution column does not necessarily equal the sum of the preceding columns, as the centiles of the respective distributions do not align (i.e., centiles are not additive).

Table 3. Likelihood of total contribution rate rising above 35% and 40% and the associated characteristics of the economic environment in 3 years' time.

Total Contribution Rate	Probability	Characteristics of the corresponding scenarios*	
		20-year UK Real Gilt Yield	Investment Return vs Gilts Liability Proxy (p.a.)
<26%	27%	-0.9%	+8.7%
26% - 35%	38%	-1.5%	+4.6%
35% - 40%	13%	-1.8%	+0.8%
>40%	22%	-2.1%	-3.6%

* The scenarios corresponding to the different contribution outcomes are characterised in the table by the 33rd centile worst case across all those scenarios within each total contribution range.

Over the three-year period the extreme outcomes for contributions shown in the tables are mirrored by extreme outcomes for the deficit. Specifically, the 5th centile worst-case outcome in three years for the technical provisions deficit is c. £19bn and for the self-sufficiency deficit c. £36bn. We note, however, that contributions of 10% of payroll over 30 years (which is the covenant horizon) are sufficient to address this extreme outcome for the self-sufficiency deficit. (Note aggregate payroll is assumed to grow at CPI + 2%).

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