Report for UCU
The parameters of USS Test 1

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Introduction

This report has been prepared for the Universities and Colleges Union, on the instructions of Paul Bridge.

The Universities Superannuation Scheme (USS) uses three tests to examine the contributions and accruing benefits. We were asked to examine Test 1, which has a number of parameters. We were asked to identify the potential range of each parameter and the scope for recalibration of Test 1.

Contents

The USS's three tests

These descriptions of the tests are taken from the USS publication An Integrated Approach to Scheme Funding, July 2014. The detail of the tests may evolve during 2017, but this is where a good description of the current tests may be found.

Test 1 - Benefit security and additional contribution cover

The difference between the liabilities assessed on a self-sufficiency approach and the actual technical provisions basis should generally not exceed what we refer to as the amount of contributions payable in extremis, which we will indicatively measure as the difference between (i) the maximum contribution of 18% of salaries stated by the employers as being desirable and (ii) the maximum identified as being affordable by employers (in the independent covenant review undertaken by EY on behalf of the trustee board) of 25% of salaries, over a long period such as 15 to 20 years.

The rationale is that, at any given time, the trustee could be required to replace the investment returns assumed in the funding of current benefits with additional contributions from the participating employers, if such a response were needed due to scheme or economic circumstances.

In considering the development over time of the relationship between the liabilities measured on a self sufficiency basis and on the technical provisions basis, the position at the end of a 20 year horizon will be used. The size of the technical provisions at the end of 20 years will be determined so that the difference between it and the self-sufficiency value of liabilities is maintained broadly constant. This informs the trustee of the size of the technical provisions required, and from that the required investment strategy can be derived.

It's the gap to the self-sufficiency funding level that is critical, and that is maintained (and not allowed to grow disproportionately) by keeping the technical provisions value at a sufficient level over time.

Test 2 – Stability of contributions

Modelling will be carried out to quantify the scope of the contributions that the scheme might require (using the technical provisions basis) when risk is assessed over a three year horizon.

It is proposed that the contribution levels required to meet: (i) the cost of the future benefits accruing and (ii) any deficit on the technical provisions basis – at the end of a three year period – should have a high probability of not exceeding 18% of salaries and a very high probability of not exceeding 21% of salaries.

In assessing the risk parameters the following will apply:

- A high probability will be broadly 70% or above.
- A very high probability will be broadly 90% or above.

Test 3 - Benefit security and the asset base of the participating employers

The net asset value of the participating employers will be compared to the deficit on an economic basis (for this purpose a discount rate equal to the yields on gilts is used) plus the amount of additional assets required to meet a 'tail risk', one in one-hundred, funding event.

The 'tail risk' will be measured using a Value at Risk (or VaR) at a 99% level over a one year period. This comparison will be a guide to the extent to which, in all but the most extreme circumstances, the trustee could rely on sufficient funds to secure the benefits promised by the scheme.

The trustee acknowledges that the net asset value of the scheme's participating employers is not precisely quantifiable. As such the trustee will monitor the ratio of (i) the deficit on an economic basis plus VaR at 99% level to (ii) the estimated net asset value of the scheme's participating employers. Should the ratio increase above 90%, then the trustee will commence a discussion with stakeholders as to whether any mitigating responses are required.

The net asset value of the scheme's participating employers would be assessed on a basis which might include the use of insurance replacement value measures if this is judged to be more representative of fair value than book value.

Brief comments on the three tests

Rather than consider Test 1 in isolation, we think it is helpful to see how Test 1 works in conjunction with Tests 2 and 3.

Test 2

Test 2 is the primary test examining the likelihood of being able to work within the employers' willingness to contribute. It is a direct consequence of Test 2 that the accruing benefits should not be too large, if the target maximum contribution rate is not to be exceeded.

Test 3

There are two sources of wealth of the employers:

- The net assets they have built up from past activities
- The net revenue they may be able to generate from future activities

This test checks whether the employers' net assets are sufficient to cover the deficit on an "economic" basis just after an extreme adverse investment event has occurred.

The test checks whether the deficit on the economic (and self sufficiency) bases are, in principle, within reach, even after an extremely bad event. The employers have material net assets relative to the size of the USS and the test is passed.

The test examines whether accrued benefits are excessive relative to the available resources (assuming low risk/return investments) but it does not look ahead for the implications for accruing benefits. It would be useful to project ahead and examine the range of possibilities for the interaction between the accrued and accruing liabilities (on an economic or self sufficiency basis), the assets and the contributions. This is what Test 1 does.

Test 1

Like Test 3, Test 1 looks at the affordability of self sufficiency funding (we view economic value and self sufficiency in low risk / low return assets as near equivalents). It builds on Test 3 by looking ahead 20 years, which USS calls the reliance horizon. Because Test 1 includes future benefit accrual for a period, it may also be a constraint on the size of accruing benefits.

The test seeks to maintain a broadly constant difference between self sufficiency and technical provisions. Why does the difference need to be "broadly constant"? Does it not suffice that self sufficiency is within reach?

Parameters of Test 1

This is a table of parameters of Test 1, taken from Table 2 of the USS publication, Methodology and Inputs for the 2017 Valuation: Initial assessment, 17 February 2017.

Description of input	2014 assumption	2017 proposal
Reliance horizon: Period over which reliance is measured i.e. the desired relationship between technical provisions and self sufficiency is established	20 years i.e. at 31 March 2034 consistent with the covenant horizon assessment of at least 20 years	To maintain the period at 20 years
Level of contingent contributions	7% = 25% (in extremis contributions) of pensionable pay less 18% (regular contributions) agreed to fund the benefits	7% (maximum in extremis contributions less regular contributions)
Period over which contingent contributions are payable	15-20 years	Base case of 20 years with a range of 15 – 25 years being discussed
Growth in reliance over time	CPI inflation	Either CPI or salary inflation
Return on a "self sufficient" low risk investment portfolio	Gilts + 0.5%	A range of gilts +0.5% to +0.75%

Reliance horizon

It is not clear that a reliance horizon of 20 years is long enough. To test the objective of the USS not becoming too large relative to the employers, we need to project the USS forward far enough into the future to observe the effect of benefit changes. It takes 80 years for a 20 year old member to die aged 100 – a reduction in benefit accrual takes this long to fully work its way through. If a 20 year time horizon is worked to, the improvement in the relative manageability of the USS brought about by the benefit accrual reductions of October 2011 and April 2016 are not fully brought into account. There are further improvements after 20 years still to emerge.

A scheme of longstanding which had not had a benefit change in its past would be in a hypothetical steady state. It would make little difference whether the scheme's situation is examined in 1, 20 or 80 years' time. Where a benefit change has been made in the past, we need to look beyond when the change has fully worked through to observe the new projected steady state.

Reliance horizon – range of options and recommendation

Option	Description
1 year	Suitable for a scheme of long standing with no benefit changes in its history
20 years	Suitable for a scheme of long standing with a benefit change in the distant past, which will finish working through in the next 20 years.
80 years	Suitable for a scheme which has had a benefit change in its recent past, which needs this time to work through. **This is our recommendation**

An alternative, which might be mathematically simpler than running a projection long enough for benefit changes to work through, could be to make an estimate of what members' benefits would be had the current benefit structure been in force since the scheme began. That is, rather than waiting for the scheme to mature in a projection, make it instantly mature by estimating what the benefits would be had the current structure been in force all along.

Level of contingent contributions

It is not clear why only contributions from future revenue are considered in Test 1. The available resources to the employers comprise both the net assets they have built up from past activities as well as the revenue they can retain from future activities.

If we were to consider Test 1 as the projection into the future of Test 3, then the net assets from past activities would be taken into account, this being the approach of Test 3. And we would still have a test with the objective of ensuring that a self sufficiency value of liabilities is within reach and that the accruing liabilities are not too large.

If the USS is managed within the 18% employers' contribution rate, an objective which requires the accruing benefits to be appropriately sized, the extra 7% counted in Test 1 might never be paid. The issue is the scope to pay, not the actuality of paying. The employers' scope to pay contributions is not limited to contributions out of future revenue, but includes the various methods of realising value from their assets.

Working within the scope for contributions from revenue, it is common for employers shutting down DB in favour of DC to contribute less to the DC scheme than the future service cost of the DB scheme, to release money for deficit reduction contributions to the DB scheme. Were this to come to pass in the USS, contributions spent on the replacement DC scheme could be less than 18% and the deficit reduction contributions to USS could be more than 7%. The extreme possibility is 22% on deficit reduction contributions and 3% on minimum contributions qualifying for auto-enrolment.

This is not to say that we or the UCU would support or welcome such an outcome. However, the context is one of contingencies: things which could happen, but hopefully will not.

Level of contingent contributions – range of options and recommendation

Contributions from future revenue	Comment
7% of salaries	The current approach
15% of salaries	Dividing the 18% + 7% budget into 15% to DB deficit and 10% to replacement DC **This is our recommendation**
22% of salaries	The most which can be spent on deficit reduction contributions out of the current budget

As we understand them, the employers would rather their contributions do not go above 18%, as tested by Test 2. The issue for Tests 1 and 3 is whether self sufficiency is within reach, given all the resources of the employers. It is arguable that it is better to rely on existing resources (accrued assets) than the potential for future resources (contributions from future revenue). Comparing the reliance on covenant metric with the net assets of the employers would make Test 1 consistent with and a projection of Test 3.

Period over which contingent contributions are payable

Placing a limit on the period of payment of contingent contributions is unrealistic. In practice, an employer which still exists is liable to pay whatever contributions are needed to support its defined benefit scheme.

Notwithstanding that The Pensions Regulator seeks to discourage extensions to recovery plans, it is the case that carrying on paying after a recovery plan has expired is an available contingent action, one which is possibly rather easier to execute than another increase in contributions.

The employers' covenant is very good, with very high reliability of the ability to contribute for a long period of time. This reliability of the ability to contribute is not likely to disappear overnight, upon the expiry of the assumed period of payment of contingent contributions.

Given the nature of the employers' industry, which will always exist in some form, one could go so far as to suggest unending scope for contingent contributions in an open scheme (which itself is an unending entity while it is open).

A compromise position would allow for full contingent contributions over the period specified, followed by a tailing off of contingent contributions over a long period thereafter, representing a declining certainty of covenant that far ahead.

Period over which contingent contributions are payable – range of options and recommendation

Option	Description
15 years	The lower end of the range of options based on visibility of strong covenant
20 years	The middle of the range of options based on visibility of strong covenant
25 years	The upper end of the range of options based on visibility of strong covenant
Full contingent contributions for 25 years, tapering linearly to zero over the next 50 years	The employers' ability to contribute does not end at the expiry of the period of visible covenant. A tapering off of the contributions represents their increasing uncertainty with the passage of time. **This is our recommendation**.
Infinite time horizon	For as long as USS is open to new entrants it has an infinite time horizon. If the USS is managed successfully within the employers' covenant, it can remain open and the time horizon does not shorten.

If Test 1 is adjusted to compare the reliance of covenant with the employers' net assets, the period of payment of contingent contributions ceases to be a parameter. Setting aside this possibility for the moment, the range of options for the period of payment of contingent contributions is given in this table.

Growth in reliance over time

We question whether it is either desirable or necessary for the reliance on covenant metric to be held constant. As bond and non-bond markets move relative to each other, change in either or both of the reliance of covenant and the prudent margin is to be expected.

That said, for the purposes of the model, it is necessary to decide on the rate of projection of the reliance on covenant metric, even if in the real world its growth is expected to be variable.

In a long run projection of liabilities and assets, the liabilities accrue as a proportion of salaries and will inflate in proportion to USS salary growth. The employers' ability to contribute and the employers' ability to award pay rises will be closely related. In the short run, these are competing demands on limited resources. In the long run, and it is the long run we are seeking to model, the same economic success provides for both.

In the long run, the liabilities will grow in proportion to the growth in the salaries of employees. The appropriate assumption for the growth in the reliance on covenant metric is the salary growth assumption for the projection of members' salaries.

Alternative definition of reliance on covenant

The reliance on covenant metric is the difference between the self sufficiency and technical provisions values of liabilities, although it might alternatively be defined as the difference between the self sufficiency value and the assets.

The point at issue is whether we can find the resource, if needs be, to add to the assets to attain self-sufficiency. It is not essential to separate this into two activities: attaining 100% of technical provisions and attaining self-sufficiency from a position of 100% of TPs funding. The future return achieved on the assets is an important component of projections long into the future.

For as long as the USS remains open to new entrants, the USS has an infinite investment time horizon. Income generating perpetual investments, rather than investments with a fixed term, are the natural choice. The return on such investments should capture global economic growth.

Growth in reliance over time – range of options and recommendation

Option	Description
Price inflation – CPI	As the world economy grows, a parameter indexed to prices gets relatively smaller
Price inflation – RPI	As the world economy grows, a parameter indexed to prices gets relatively smaller
Salary inflation of USS employees	This is the reliance on covenant growth rate which represents a static position over time, which is the trustees' objective. The self sufficiency and TP liabilities will each grow as members' salaries grow. The difference between them will also grow in proportion to members' salaries. **This is our recommendation**.
Salary inflation in the global economy	This could become more relevant were the reliance on covenant metric to be redefined as self sufficiency less assets.

Option	Description
Growth rate of the global economy	This could become more relevant were the reliance on covenant metric to be redefined as self sufficiency less assets.

Return on a low risk, self sufficient investment portfolio

Working initially with the assumption that the self sufficiency is in low risk assets, the return assumed will be close to the yield on assets such as gilts and UK corporate bonds.

The proposed assumption is related to gilt yields. It would be possible to relate the assumption, at least in part, to corporate bond yields. The yield margin between corporate bonds and gilts can change from time to time, and this would be captured were corporate bond yields an input to the assumption. There has been little change in the yield margin between corporates and gilts over the period 31 March 2014 to 31 March 2017, however, so this is not a significant factor at this valuation.

Test 1 requires an opinion on gilt yields at the end of the "reliance on covenant" period. In the discussion of the discount rate assumption[1], we note that there is a difference of opinion between the USS and Mercer over the potential for a greater reversion of interest rates than currently envisaged in the market break even yields.

It is important for consistent assumptions to be made. If the discount rate assumption includes an opinion on the future change in gilt yields, then the future gilt yields used in Test 1 probably ought to be consistent with this opinion.

It seems to us that the monetary effect of the scope for alternative decisions on the reliance on covenant horizon, the level of contingent contributions and the period over which contingent contributions are payable is much more significant than the monetary effect of adjusting the return on the low risk investment portfolio.

The return on the low risk investment portfolio has a noticeable effect if all other inputs are held constant.

We would also suggest an examination of what self-sufficiency in other kinds of assets looks like. While it is perhaps unlikely that a self sufficiency in equities target would be substituted for a self sufficiency in gilts target, such an investigation would have other important uses. It would serve to highlight the relative importance of a self-sufficiency-in-gilts target. If the equity self sufficiency target were much lower, less emphasis could be placed on the self sufficiency in gilts target when making a balanced decision in light of competing objectives. An equity self sufficiency target could be useful for deciding prudent assumptions for the expected returns on equities, and as an aid to setting technical provisions.

[1] In the USS publication, Methodology and Inputs for the 2017 Valuation: Initial assessment, 17 February 2017

Conclusions

Each of the parameters of Test 1 has a range of values which could be taken. We have set out a range for each, together with a recommendation.

We would say there is an important need in Test 1 for recognition to be given of the full effect of the benefit reductions already made.

If Test 2 is met, the USS will be managed within an 18% contribution rate, accruing benefits will be of a suitable size and contingent contributions will not be drawn upon. The scope for contingent contributions, which includes contributions from assets as well as from future revenue, is very large and self sufficiency in a low risk portfolio is well within reach.

Yours faithfully

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