USS Contingent Contributions and Short Term Monitoring: an alternative approach

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Draft

Contingent contributions (CCs) are an attempt to deal with short term risks not allowed for in pension valuations. They involve setting a technical provisions (TP) deficit target threshold which if breached would automatically require a specific additional contribution within the boundary of the increases that the covenant allows. If the breach continued CCs would increase to a maximum overtime.

The next section of this paper looks briefly at the debate about the mechanism for the quantification of CCs. This gives a standard for comparison with other methods of dealing with short term risk. Section 3 then uses a management control lens to consider the USS's approach to short term risk management[3]. Management control is used extensively in industry and commerce and has been for many years especially for short term control. Budgetary control and Balanced Score Cards provide well-known examples. A management control perspective involves using deviations from plans to measure the performance of both managers and of organizations and their divisions. Management control theory is used in the penultimate section to suggest an alternative method of dealing with short term risk and management control. Section 5 provides brief conclusions.

CCs did not figure in the 2014 valuation. Here the concern was that the covenant allowed USS to call upon the difference between employers' contributions expressed as a percentage of total annual salaries required by the valuation and the maximum allowed by the covenant in extremis. Short

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[2] Abbreviations: CCs= Contingent Contributions, DB=Defined Benefits, JEP=Joint Expert Panel, JNC= Joint Negotiation Committee, TP =Technical Provisions, TPR= The Pension Regulator and SS=Self-Sufficiency.

[3] See Merchant and Van-der-Stede 2017.

term risk was considered in the 2017 consultation it was said "However, it may be necessary to consider the need for more rapid pre-agreed short term reliance responses" (USS 2017, p.10)[4]. Industry comments suggest that this proposal was not well received by the employers.

The possibility of CCs figured strongly in the 2018 consultation (USS 2019a). USS asked UUK to suggest the detailed mechanics or architecture for setting CCs and their quantification following principles required by USS but USS rejected most of their suggestions and produced generally quite different numbers (see next section). The USS and UUK had a number of meetings but agreement did not seem possible.

This is reflected in the three offers made by USS to close the 2018 valuation (USS 2019b). Only Option 2 directly involves CCs. Option 1 increases contributions to protect USS from not having access to CCs and the third option added averaged maximum CCs to the required standard contributions. Thus CCs have not gone way has but rather have been camouflaged.

In order for USS to be comfortable with Option 3 it also required universities to provide it with information allowing annual debt monitoring and information on the security being offered on the other debts of universities. The objective is to monitor changes in the covenant.

The intermediate results of the 2014 and 2017 were monitored using the well-known Tests 1, 2 and 3. The regulator's current guidance rather calls for the USS to introduce a new monitoring and action framework shared with and agreed by the stakeholders (TPR 2019e and 2019f). This was to be legally required by a bill going through Parliament in 2019 which was lost due to the December 2019 election. It is thought likely to be reintroduced after the election as it has cross party support.

At the end of October 2019 the USS voluntarily adopted this framework and issued details of the process they intend to use to monitor the progress of the valuation until the next valuation and to take mitigating action where required (USS 2019f). This preserves several of the characteristics of CCs. This includes short term trigger metrics which measure the SS deficit affordability

[4] Cites to publications by Aon, USS and UUK will only be given on their initial cite to avoid multiple cites in the paper.

ratio and the covenant's strength[5]. As with CCs each of these measures will have trigger thresholds but breaches will not invoke a predetermined mitigating action even though this is the regulator's expectation. USS's sees its actions as being based on a holistic view of all the signals available to it. A breach of one or more thresholds will require a USS board meeting within five working days.

The SS deficit affordability ratio their short risk measure is given by dividing the SS deficit by the present value over 30 years of the additional contributions believed to available over the period. These contributions are assumed to be 10% of salaries per year in extremis rather than seven percent, the previously entertained margin of the covenant. Increases in the ratio indicate lower coverage of the SS deficit. The trigger is set high at 85% and would be triggered if the breach persisted for more than five days which suggests high expected volatility.

From a management control perspective it is difficult to see this ratio a short term (Aon, 2019b). Short term signals are those generated over a period or a few periods ex post which can be used for performance control and in aiding future planning. The short run signals relative to plans inputted into the SS deficit measure include changes in the discount rate, changes in payroll, alterations in the mix of member types and member mortality, changes in the mix of assets and their values and changes in the covenant. Most of these help planning but seeking in valuations to simply extrapolate them in summary form over 30 years is hard to justify especially as low discount rates dominate such valuations. Rather the approach should be to use them in disaggregate form in management control and forecasting. A clear short term measure would be whether accrued benefits at a valuation are covered by the assets.

The trigger for the covenant is a downgrade of the covenant. This seems a very blunt instrument. Rather there could be a scale indicating movements towards or away from downgrades.

Mechanics of Contingent Contributions:

[5] The other metrics refer to the long term and are: the future service coverage ratio and the deficit recovery contribution adequacy ratio.

As part of the 2018 valuation consultations and in answer to USS'S request to the UUK the actuarial advisors of UUK suggested a mechanism for determining CCs on behalf of the employers. They generally accepted the USS framework, principles and the numbers in the consultation except for the total expected contributions and the amount of the expected deficit without contingent contributions (Aon 2019a). The mechanism used by both UUK and USS used to derive CCs are fairly simple in principle. It employs the feedback system of control widely used in management control which however seems novel to the pension industry.

In the 2018 consultation the information signals are revisions of the TP pension deficits for each year over the three years between valuations based on updated information but only about gilts. Deficits which exceed a target TP deficit or a constant trigger deficit threshold require a specific programmed CC to be implemented.

Aon advocate a £10Bn deficit threshold. They assume that if breaches persist the required CCs increase in steps of one percent of salaries with six months' notice to a maximum of three percent. A six months lag in implementation allows the incorporation of new information and gives adjustment time to the employers and time for the JNC to consider reforming the scheme.

The trigger is a fundamental element of the scheme. Aon quantify the trigger by selecting what they consider a reasonable probability of 30 percent that the trigger will be breached in the three year period between valuations. The lower the triggering deficit the greater is the probability of breach.

The USS in their response to UUK follow the same track but disagree strongly with Aon on a number of things especially Aon's view that the level of the deficit recovery contribution in the upper bookend is too high and a trigger threshold which they set at £4Bn implying a 60 percent possibility of a breach (USS 2019b). The stepped increase in contributions they set at two percent with a maximum of six percent. They do not say where these parameters come from but they seem to reflect the maximum risk they are willing to take. Appendix 1 presents in some detail the Aon's/UUK's position on CCs in column 2 and also summarises two of the USS's options that of the lower

bound or bookend with maximum CCs (Option2) and their third option which incorporates the average maximum CCs in the contributions.

Triggers are used widely in a wide range of disciplines. They are utilised in medicine in many studies where for example information about a set of symptoms which at a critical level trigger an investigation into a specific illness. In law information can trigger the invalidation of contracts and breaches of covenants. In environmental management they can trigger concerns about the degree of pollution or of species' reductions. In management control a given degree of variance between actuals and budgets can lead to management action. Similarly a given level of managerial performance can trigger the award of incentives to managers. As may be expected the meaning of triggers, the conditions required for triggers and indeed the feedback mechanisms themselves may differ substantially across disciplines.

USS's response to UUK basically rejected most of the UUK's (Aon's) suggestions on CCs, set out the details of the contingent contributions the USS required and a provided a third option (USS 2019c).

The contribution rates for Option 1 are high to protect USS from not having the protection from explicit CCs. Option 2 does feature CCs and incorporates two of the JEP'S suggestions deemed risky by USS. The contribution rates for Option 3 incorporate stepped maximum CCs averaged over two periods of two years each reigning at least until the next valuation but does not include the JEP's risky suggestions. CCs have not gone away rather they are incorporated in the required regular contributions by Option1, in a slightly modified form in Option 3 and they figure explicitly in Option 2[6].

Despite Aon generally accepting the USS framework, principles and the numbers in the consultation and themselves being actuaries, there is little commonality between the rival CC proposals. This is not so much about different long run assumptions but rather to do with differing assumptions about the major short run problems that may occur and their believed

[6] Option 3 uses the same assumptions as Option I but in earlier years requires a total contribution of around 30% but will only yield the same overall total contribution as Option1 if Option3 's highest rate of contribution continues for several years.

amounts and likelihoods. It is also about the perceived necessary sensitivity of the trigger.

This illustrates a fundamental problem when seeking to value DB pensions. These require estimates of the future including the distant future. This means that assumptions have to be made and can be expected to differ between individuals. Thus favouring one valuation model over another is a choice between assumptions or beliefs not facts. Necessary empirical evidence is generally unavailable as indeed are long term market prices. Markets for long term liabilities are generally thin and imperfect. Only empirical experience can say eventually who if anyone was correct.

Some Concerns about Short Term Performance Control from a Management Control Perspective

The general model of management control is shown below.

Chart 1 The Management Control Process

organisational objectives $\longrightarrow$ strategies $\longrightarrow$ processes and activities $\longrightarrow$ levels of performance required of processes and actions $\rightarrow$ rewards for performance $\longleftrightarrow$ information flows required for learning from experience and for behavioural adaption.

Here the lens of management control is used to examine firstly some of the problems of using both the USS's various monitoring approaches and their CCs mechanism to monitor and respond to increased short term risk. Secondly to suggest in the next section an alternative approach grounded in the management control literature. This at least provides an additional method widely used in industry and commerce for monitoring short term performance and short term risk.

Control is perhaps easier to deal with in the short run. Here the actual performances of processes and activities over a period are compared with their target performances and the variances used to cause change in future performances. Budgetary control compares actual amounts of individual revenues and costs with their budgeted amounts and generates variances. This

type of control is labelled ‘diagnostic’ (See Simons 1995, chapter 5). It says ex post that there have been divergences from plans. Where variances are due to management performance this involves the future control of managers.

Variances may also be due to uncertainty and incorrect assumptions about the environment requiring managers especially senior ones to interact in altering future plans where appropriate though this is complex. For example, setting and resetting budgets often takes a great deal of time in organisations. This type of control is called ‘interactive’ (Simons 1995, chapter 6). Managers also use leading indicators to help them in interactive control. Achieving the above types of control seems to be what USS is trying to attain when implementing short term measures but of a very different kind.

Modern management control strongly emphasises learning from performance. Adopting this perspective suggests a number of concerns discussed below about the USS pension scheme and in suggested changes in the mechanism used to determine the required contributions and the deficit recovery amounts.

The management control perspective places an emphasis on providing disaggregated signals about the components of overall measures such as accounting profit thereby allowing the drilling down to underlying information. For example overall investment performance can be disaggregated to investment classes showing capital gains and losses and changes in the interest rate and comparing these with plans (called the reference portfolio by USS). Breaches in deficit triggers on their own provide no information concerning the behaviour of components comprising the trigger.

Additionally the management control approach takes a short term perspective and neither seeks to extrapolate short term information without question nor is it influenced by discount rates which otherwise often dominate outcomes and distort short run signals. Information likely to impact in the long term is considered for incorporation into organizational strategy or in USS’s case future valuations**.**

Currently the USS monitors short term performance in a number of ways. It publicly provides interim valuations which comprise of deficits based purely on the changes in gilts. This metric provides no information on other variables or

its underlying components and distorts any information provided as deficits are measured over the long run. The major short run measure in the USS's monitoring and action framework is as indicated above is the ratio formed by the SS deficit relative to the present value of the additional contributions that can be afforded by employers using the SS discount rate. The level of this ratio indicates the gap to SS and reductions indicate the speed at which this gap is being closed. In USS parlance it measures what the USS call the "current distance to SS". It is inherently long term.

Communication

There are many USS documents but they are rather technical and in pension 'speak' making it difficult to find and comprehend crucial information. Understandably given the JEP's views the general tone of the 2018 consultation is rather defensive but perhaps unfairly the general tone of USS documents especially those aimed at critics seems one of privileged knowledge reluctantly used to explain to others the errors of their ways. They clearly have special knowledge (modelling for example) but seem to be averse to sharing it.

Statements concerning increased the risk of extra contributions being required tend to just announce this. These statements are hardly ever quantified in terms of the probabilities associated with the contributions required if something happens or some action is taken, for example, accepting the JEP's suggestions. Costs similarly are quantified only selectively.

With this type of statement there is no possibility of interrogating information to determine the factors driving these results. Generally it is impossible for parties other than USS to compute information. With the existing information it is difficult to see how the parties can make decisions about risks. There is no way that even actuaries can either replicate USS modelling or determine their workings without further information from USS. TPR in its letter to USS (TPR 2019a) made similar points as did the JEP (USS-JEP 2018) and encouraged USS to further share risk information especially where its discovery would be inefficient or impossible for others. This request was coupled with suggestions to develop information sharing protocols and a shared set of

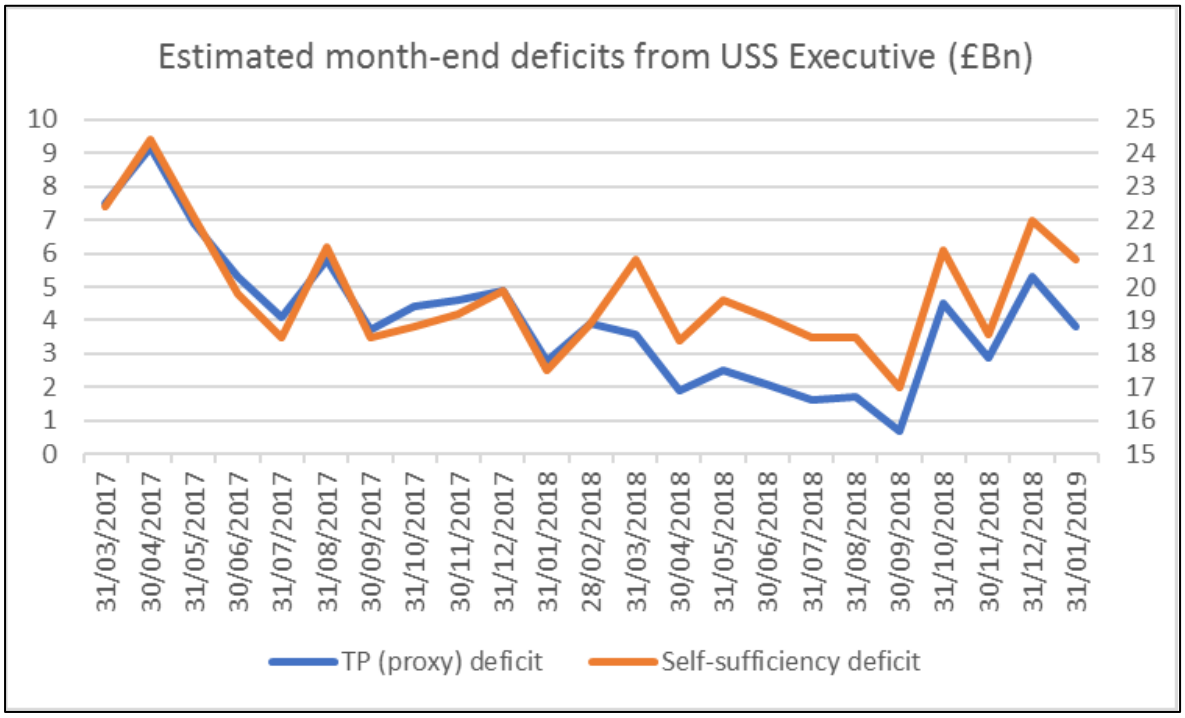
mitigations to revealed downside risk though some commentators may feel this amounts to micro-management.

The alternative approach suggested in the final section of this paper does not attempt to solve all these communication problems. It does however provide much more information about the short term and gives a richer understanding of what is going on by disaggregating the information and indicates some of the detailed reasons for changes in future valuations. This information should allow substantial analysis by the stakeholders.

Volatility

A major concern from a management control perspective is the high volatility of the signals (variances against a target deficit) used by USS to set the CCs and the use of these volatile signals to evaluate the scheme's performance. Looking at Aon's chart 5 (Aon 2019a, reproduced below as Chart 2) suggests that the average change in TP deficits where these are based on the USS gilts plus monitoring approach is around one billion pounds per month with approximately 60 percent of monthly changes being deficit increasing.

Chart 2 Monthly SS and TP Deficit



Aon Chart 5: Estimated Technical Provisions (proxy [gilts plus] approach) at all month ends since 2017 valuation. The chart is based on information provided to Aon by the USS.

SS deficits will be discussed below. Smoothing the TP deficits over three monthly periods reduces the volatility somewhat at the cost of losing information of economic significance but some large changes still remain. Taking quarterly figures in Chart 2 as suggested by Aon reduces the number of significant reversals or switches from increasing deficits to decreasing and vice versa falls from 12 with monthly calculations to six, reduced further by requiring actionable breaches to be sustained for two quarters. The chart is only an example but it is characterised by strong volatility. This volatility which is confirmed by USS publications needs to be analysed more fully including looking at its past history of volatility. The yearly deficits published by USS confirm the strong volatility as announced in TP deficits.

Table 1 Yearly Deficits

Year	2014	2015	2016	2017	2017	2018	2019
Deficit £Bn	5.3	8.2	10	5.1	7.5	3.6	6.6
Source	2014 valuation	Interim* valuation	Interim* valuation	September valuation: no de-risking first 10 years	November valuation: immediate de-risking	2018 consultation	Interim* valuation

* *Based only on gilts plus changes*

The figures in Table 1 suggest that considering the longer term does reduce volatility but it still remains. Both the formal valuations and the interim valuations show downward trends but the interim results are generally significantly higher. It is difficult to manage with two such different sets of signals provided at different times either of which may be taken by the market and commentators as providing 'the' measure of deficits. Commentators may choose the measure which supports their views of the state of the scheme.

This problem is redoubled as at least four other deficit figures are published including that reported in published financial reports. Often either the most recent measure or the most publicised is taken as the correct measure of a deficit. The variety of measures available must surely cause confusion. More guidance is needed here.

Aon's chart (Chart 2) would suggest to management control practitioners and researchers that similar variability in the levels of actual TP deficits would be too great for actual use in control. Managers would face signals seemingly of great significance but which often point in different directions over a short period.

Deficits will always be variable because they are the net results of two large numbers, the value of liabilities and that of assets. Management control by disaggregating these numbers allows the drivers of deficits to be isolated and to be considered individually. Short term management control strips out discount changes which often otherwise dominate the determination of deficits and other signals relevant to deficits.

Short Term Risks

In the 2018 consultation USS are clearly worried about major possible short term risks not incorporated in the long term plan. They say on page 12 of the 2018 consultation:

" So while there is a plan for the long-term risk to be kept under control, it is evident that there are credible short-term scenarios which could result in reliance reaching levels which, if sustained, would be difficult for the sector to support.

While we certainly do not expect to have to move to a self-sufficiency strategy in the short term, there are credible scenarios that could make the current risk position difficult to recover from – such that the ability to move to a self-sufficiency strategy in the long term moves out of reach."

No further explanation is provided except to say they include here the JEP risky options they are willing to accept. The quoted statement also suggests that there are additional short term risks that could occur not included in the level of CCs currently being suggested. This could include a cost of some £4 billion if bond prices do not revert to more normal levels.

There seems general agreement that CCs should be seen as bridging between valuations at least on their initial introduction. Short term management control signals are rather based on information about the elements in plans gathered over a past period compared with their planned behaviour. The variances

generated provide signals about managerial performances and alterations in the environment relative to plans.

With performance variances information causes actions to either remedy poor performance or to build on superior performance. Planning variances are of especial importance to USS as many variances are beyond their direct control and may indicate the need to change plans. Planning variances are often leading indicators where they are forecast to continue but they also facilitate learning and cause changes to future plans either to incorporate environmental changes or to mitigate their effects in the future (interactive management control). The extent of the revision to plans depends upon how long the alterations in the environment are forecast to reign, their probabilities, the possibilities for mitigation and their importance to the organisation. This process continues with the information in later periods, the length of these may need to be kept very short where outcomes are significantly variable and environments dynamic. Short term control can thus aid planning for the future.

In the pension industry the use of deficits as signals is heavily ingrained in practice but deficits are inherently long term. For example one metric used by the USS to publically monitor short term performance between valuations reports only on changes in gilts with these changes extrapolated over the long term via the changed discount rate. It says nothing about other changes. Deficit based signals are not focused either on short term performance or the ability of signals to serve as leading indicators of problems and the need to change plans in the short term, that is deficits in themselves are not control variables. Currently the calculation of deficits is dominated by low discount rates and by the long term which tend to distort the short term value of signals.

Deficit signals do not detail the changes in the inputs into valuations. Stakeholders are therefore faced with only two main options to deal with deficits (increasing contributions or reducing benefits) and perforce are ignorant of the pension provider's reactions to detailed signals. These weaknesses require further analysis. An alternative or complimentary approach is suggested below.

TP Valuation versus SS Valuation

A major difference between Aon/UUK and USS seems to be that USS places great weight on SS valuations. This difference is detailed in UUK's response to the USS consultation document (UUK 2019). UUK says that USS is focused upon SS valuations and on SS deficits and wishes to carry this focus over to the CC mechanism. USS statements of the legally required TP deficits measures are usually coupled with statements of SS deficits. Their announced short term metric in their monitoring and action framework for the first time incorporates SS into one of their formal metrics to be shared by stakeholders. SS seems to a major part of USS'S beliefs system stemming from the over whelming belief that their fundamental responsibility is to assure the payments of benefits when due.

USS's valuations based on SS value liabilities in year 20 use the low discount rate generated by a low return but safe portfolio generated by de-risking in years one to 20. The SS valuation of these liabilities at year 20 is therefore substantially higher than the TP valuation at this time when using the reliance definition of SS liabilities *less* TP. The amount of reliance needed to be imposed upon employers is seen as a measure of risk.

This gap between the two valuation methods measures the reliance placed on employers and can be closed in two ways. One is by de-risking the portfolio during years one to 20. This de-risking generates a portfolio of assets the return from which is equal to the SS discount rate thereby decreasing the TP discount rate over time and increasing the value of the TP liabilities. The other is by requiring additional contributions expressed in real terms at year 20 from employers up to the maximum reliance that can be placed on the covenant.

The use of reliance as a risk measure seems restricted to the pension industry and is believed rarely used even here. These calculations form the basis of the much criticised USS'S Test 1 which checks that reliance has not increased between valuations but which seems to have disappeared in recent USS publications with emphasis being placed on reliance. These concerns and criticisms of Test 1 are really problems of the SS approach itself (see USS-JEP 2018, pp. 25-31).

USS rules require them not to generate surpluses though the law does not require this (USS 2015). The TP asset value in year 20 is therefore set via changes in contributions and investment strategy to equal to the TP value of the liabilities in year 20[7]. That is USS assumes that the TP liabilities are exactly fully funded at year 20.

The USS also use a more direct definition of reliance: SS minus assets held at the time of valuation. Using this definition it has been shown using the USS's prudent assumptions for asset growth in 2017 TP valuation the assets in 20 years would grow to generate a surplus over the TP liabilities sufficient to allow any deficit to be more than covered by planned de-risking. This suggests that substantial reductions in deficits are possible (Marsh 2018). The USS rejected this argument saying that it smooths results over 20 years and ignores the possibilities of short term events.

Both Chart 2 and Table 1 above suggest there is a connection between the two above deficit concepts. Using an SS basis moves the focus away from unplanned deficits to unplanned additional reliance relative to planned contributions. Using just SS deficits would seem to lead to greater pressure for greater contingent contributions.

Reliance and SS deficits are highly volatile. For example, at March 2019, the time of the 2018 valuation, reliance was £20 billion but by August 2019 had risen to nearly £31 billion (USS 2019e and USS 2019f). If reliance is beyond the trustee's risk tolerance increased deficit recovery contributions, additional contributions or changes in benefits are required.

However useful this distance to SS may be as risk metric it is difficult to see it either as a short term measure or relevant to short term control and risk. Whether major short term risky events imperil moving to a low risk portfolio in 20 years is secondary to dealing with the event's effects. As USS state it is

[7] This is a simplified presentation of a complex calculation that USS have not explained in detail. Good attempts at this are: the first JEP report, pp. 25-27, (USS-JEP, 2018 and Marsh, 2018). In practical terms this amounts to first finding a discount rate which when used to deflate the value of the SS liabilities in year 20 reduces their value to that of the TP liabilities in year 20 (thereby deducting maximum reliance from the SS liabilities). The TP assets value in year 20 is assumed by USS to be equal the TP liabilities with the assumptions that these are fully funded and that no asset surplus is entertained. Discounting this asset value to the valuation date at the rate used to deflate the SS liabilities and deducting the assets held generates the SS deficit.

possible short term risks can be listed but actual occurrences cannot be discerned until these begin to be apparent. Management control focuses on discovering such occurrences and charting actual progress towards objectives and aiding planning. USS's metric seems unnecessarily complex for a short term measure. Its perspective is long term and it thus says nothing explicit about why things have changed in the short term.

No details of the possible results of using a SS basis for calculating contingent contributions have been published but Chart 2 gives an example which shows that although the two deficit measures move to a substantial degree in common the SS deficits are much larger (some 3 or 4 times) and more volatile.

USS makes it clear that reliance is not a decision variable. Rather it is seen as risk measure or metric measuring long term risk. Although the USS uses a TP mechanism, the shadow of reliance permeates most their documents especially later ones. Reliance is also seen as allowing a measure of whether long term risk is within both the employers' and USS's risk appetites[8]. In the past USS said that reliance would only bite when the scheme was in extremis and that it was intended that reliance should be held constant over time. These sentiments have disappeared in recent publications.

It is difficult to believe that such a powerful metric does not influence behaviour. Indeed it already does. In the long term, it is the force that requires de-risking in achieving the reliance target and the setting of CCs. Additionally, USS often says that some suggestions are beyond its risk appetite implying they involve too great a reliance. Some of the Aon's/UUK suggestions for the setting of CCs were rejected due to both their imposed increased reliance and their effects on the SS deficit. The JEP said something similar about the weight give to reliance and to Test 1 but postponed further consideration to their second phase. There are myriad ways of planning progress towards pension objectives. Why USS privileges such a risk averse path is not clear but it suggests that it weighs a pound of deficit much more heavily than a pound of surplus.

[8] Risk appetite is perhaps an inappropriate term. Appetite normally refers to something desired. Risk tolerance may be a better phase.

The industry view is as the employer's covenant gets weaker risk increases and contributions have to go up to move funding nearer to the buyout value. The USS scheme is a multi-employer scheme and very large and therefore difficult assign a buyout value. The SS valuation is therefore used as proxy. However buyout value is based on market prices whereas a SS valuation has to be constructed[9]. It is this construct and its chosen characteristics that drive much of USS's view of risk and its treatment including de-risking. It is not clear that the current rather convoluted approach is necessary. USS could directly determine its risk attitude and that of the employers preferably using more rigorous methods than currently and de-risk to the extent indicated. There are other constructs that could be used.

From a management control perspective USS would actually seem to using two aggregative performance measures, the TP and SS measures which often differ both in their measurements but also in their consequences. It is not impossible to use different measures to evaluate a given outcome if they are complementary and look at different aspects of the outcome. Here the two measures would seem often to give signals of very different strengths and timing and seem to have different underlying objectives. A measurement of the TP deficit indicates a deficit on existing accruals and legally requires a recovery plan to be actioned. In contrast an SS deficit indicates the unfunded amount of reliance prior to action to correct this.

The SS approach infringes the USS's principle that CCs should be legally enforceable as SS is currently not a legal concept whereas TP is legally required.

SS valuations are counterfactual in that they assume that all employers' contributions will cease at some time in the future. This is eventuality is not provided for in the scheme rules unless the scheme is wound up. These rules can be altered either by the USS with the concurrence of the JNC or by the JNC subject to certain conditions. Such changes may also cause TPR some concerns. A general cessation of contributions is likely only if the scheme was planned to be run off. With the USS scheme this requires that the scheme first be wound up which is not easy under scheme's rules.

[9] TP is also a construct but is legally required.

Individual universities are unlikely to withdraw except in extremis as they would be responsible for their share of the buyout valuation of the scheme and of any deficit (USS Employer Debt, undated).

The assumption that the scheme cannot continue to rely on income from the usual TP asset portfolio at the time of moving into SS takes a rather unlikely view of future. Such an occurrence would suggest the presence of a major financial crisis causing universities overwhelming difficulties. If a number of universities become insolvent it is likely that these would be amalgamated with other universities but this may reduce the strength of the covenant.

Short Term Control: An Alternative Approach

Normally performance measurement relates to items substantially within the organisation's control. Many of the parameters which affect USS valuations are not within the control of USS or its managers. This makes it essential to know what has changed ex post in the recent time periods and to learn from the signals from leading indicators. Where control is lacking measurement acts as a signal that something has gone wrong and extra contributions or other actions may be needed.

Some changes may be amenable to reactive changes within the control of USS. Radical changes in the investment market can be ameliorated by portfolio adjustment and protective hedging. At least in the short run little can be done if expected inflation changes radically and is unhedged even though it will affect declared reliance substantially. Monetary policy may also have major effects uncontrollable by USS though again mitigating actions may be available.

Some other items do not change quickly or have relatively minor impacts in the short run. Substantial changes in the covenant usually happen slowly and scheme benefits and their structure can normally be changed only every three years. The usual diagnostic control model can be used directly for performance measurement in two USS areas, investment management where mitigating actions are possible and USS costs where the USS has substantial control.

However all of the adverse scenarios presented by USS in the 2018 consultation focused entirely on possible changes in the value of and the

returns from the investment portfolio. Short term measures of the type discussed may provide indications of such investment problems. Similarly the occurrence of a wider set of elements in the actuary's sensitivity analysis in the 2018 consultation may be best reflected in changes in short term measures free of any noise generated by calculations of deficits.

In the context of management control it is unusual to have programmed and automatic reactions to variances above a trigger point as is the situation with CCs as originally defined. Generally trigger points are not used and interventions are a matter for managerial judgements. Management are given incentives to act appropriately as is the case with USS investment management.

It is impossible to give either a detailed or a numerical example of how the management control approach might be used by USS. The information required is not publicly available though it seems reasonable to assume that USS does have at least a substantial amount of the required information and uses it for management and planning.

Indeed much information of the type required related to investments is shown in the USS's annual reports and accounts but selectively. In the 2019 report the investment section shows the portion of the overall portfolio accounted for each asset class and proportion planned to be held in the planned reference portfolio (USS 2019d). The returns achieved by the overall portfolio over a number of yearly periods of different lengths are compared with planned reference portfolio returns which are peer benchmarked. The costs of investment management are given but not the details of the bonus system for the managers. Additional information relative to investment is contained in a graph in the actuarial section of the 2019 report and accounts. This shows for three monthly periods overall asset values from March 2017 to March 2019 comparing these with the planned values and the market's performance over time (p. 85).

An illustrative pro forma report is presented below in the budgetary control format well known to managers and similar to the financial element of a balanced score card. The report is similar to the management accounts (detailed internal accounts) used by most firms. The entries and their order of

presentation are those used in the USS financial statements. The first column lists at a high level revenue and cost categories. Each element can be presented in detail. The type of risk represented by each element is also shown in the first column where applicable. The second column presents the actual amount of each element for a given period. The third column shows planned or budgeted amounts taken from the data supporting the relevant TP valuation with their probabilities. Additional columns could be added showing the year to date and the forecast for the rest of the period. The fourth column shows the variances between actuals and planned amounts. The final column indicates changes in financial and non-financial leading indicators. Below it is used rather to give comments on characteristics of items in the table including whether elements are fixed over time, are controllable by USS or subject to mitigating actions and possible leading indicators. The report would also provide a narrative with for comments on the periodic results and on changes in leading indicators which could form an extra column.

Table 2 Pro Forma Performance Report

Revenues and costs	Actuals for period	Budget for period	Variances	Characteristics and changes in leading indicators
Contributions, Related risks: covenant and mortality				Fixed over short period; leading indicators: changes in mortality; changes in strength of covenant and changes in staff and student populations
Less Benefits payable, Related risk: mortality and inflation				Change slowly: significant continuing variances may be leading indicators as may be changes and possible alterations in retirement policy
Less Administrative expenses, Related risk: cost increases, excessive turnover				Some controllable by USS- cost reduction programmes. Continuing significant changes in costs are lead indicators as are changes in staff and in staff mix
Subtotal : dealings with members				
Investment income net of tax, Related risks: market risks		Adjusted for normal market changes		Partly controllable by de-risking; most non-controllable: for example government policy and inflation but mitigating actions available;

				leading indicators are substantial changes in market values and returns and in forecasts of these
Changes in market value of net assets Related risks: market risk		Adjusted for normal market changes		Mainly not controllable but de-risking and available defensive assets; function of market movements, monetary policy and investment policy, forecasts may be leading indicators
Less Investment expenses Related risk salary increases				Some controllable; significant continuing significant variances are leading indicators as are changes in system management
Subtotal: Monetary return on investments				Basis for changes in the discount rate
Total : Operating surplus/deficit, return on investment – dealing with members				
Value of assets at year end				

The report follows management control thinking and disaggregates performance into its constituent parts. Further information is obtainable by drilling down. Positive variances are in practice often ignored but they are very important for learning purposes. However, given USS's concern with possible short term risks not considered in valuations it is significant adverse variances that matter. The report indicates to pension providers how well they are doing now and previous reports how they got there.

The suggested report uses the planned results for each category as a trigger for that category rather than using an overall trigger though these can be aggregated if wished. Those variances within USS's control require management action. The great majority of variances are likely to arise from incorrect assumptions about risks in a dynamic and complex environment. Planned mitigating actions may be available for some of these and such actions also need to be considered in the next valuation for continuing variances believed to be continuing in the next period(s). Continuing variances not within USS's ability to mitigate and their funding would be incorporated in the

next valuation. The three year gap between valuations allows more informed pictures of variances to be formed.

In the absence of detailed published data about plans or budgeted information an illustration of the magnitudes involved can be given by comparing the USS's financial results for March 2019 and March 2018. Dealing with members yields a small deficit in 2019 relative to 2018 (£217m-£251m=£34m) with a small increase in contributions payable in 2018 of £85m less pay outs of £119m.

Comparing the market value of DB assets with what was expected yields a positive or favourable variance of £7.3Bn at the end of March 2019 and a favourable variance of £4.0Bn in March 2018-a better performance in 2019[10]. These figures include outperformance over the expected returns (shown in a chart on page 85 of the USS 2019 report and accounts) and are not adjusted for normal market movements.[11] The out of performance variance would not be fully recognised in valuations as here asset values are adjusted for prudence and outperformance is usually only allowed for in deficit calculations and not for future service costs.

The variance for the category services to members and that for the monetary return on investment in Table 5 could be considered separately possibly with separate summary aggregate triggers. Both elements figure strongly in the sensitivity analysis in the 2018 consultation though the greater importance accorded to the latter is indicated by the four adverse scenarios also investigated in the consultation all being in the latter category.

Even this high level analysis suggests that more detail about individual items and the plans for them and how they move over time helps understanding and analysis and allows the investigation of statements often made currently without explicit support. The movements in items over time should help in planning.

[10] The expected performance figures are derived from the graph referred to above and therefore are approximate.

[11] Actual net assets at the end of the year 2019 were £67.3Bn just a bit above on the limit of normal market behaviour and their expected value was £60Bn, an out performance of £7.3Bn. Actual assets at the end of the year 2018 were £64.0Bn just on the limit of normal market behaviour, an out performance of £4.0Bn.

The results shown by the performance report are not meant to be reconcilable with valuation deficits as they are geared to showing results in between valuations without projecting them into the long term future. They report steps on the journey and influence the future of that journey. This pro forma report is suggested to USS as an alternative way of reporting short term performance. It yields a much richer picture of the situation faced by USS than both USS's monitoring valuation which only allows for past gilts changes and its CCs mechanism with an overall trigger. If published, such a performance report or more likely a summary would give stakeholders a much clearer view the scheme's situation. Variances and leading indicators would aid in anticipating the results of the next valuation perhaps reducing the shock seemingly produced by every new valuation and encourage early planning. Provided this type of statement to stakeholders should increase trust. It is an attempt to overcome the silo mentality with regard to information and is consistent with the move to 'open book' accounting where purchasers and their suppliers share all relevant information

Brief Conclusions

This article focuses on USS's requirement throughout the 2018 negotiations that it has contingent protection from short term risk not included in valuations.

The amount of CCs required depends upon a large number of variables. Although UUK and USS both used the same mechanism for setting their preferred CCs they made different assumptions giving quite dissimilar quantifications. The USS does not justify its numbers. The lack of empirical evidence pertaining to the long term such as market prices means that this debate is often a battle of assumptions or beliefs.

The lack of agreement here may explain the absence of explicit CCs in two of the three contribution options offered by USS but CCs have not gone away. Contributions required by Option 1 are set to provide protection from its lack of CCs and Option 3 incorporates maximum CCs in the contributions required by this option and TPR expects them to be used.

Looking at the adopted CC mechanism with a management control lens suggests a number of weaknesses. In communications USS produces a large

number of papers but they often miss the point in terms of allowing decisions by other parties such as in dealing with risk. Statements of the need for more contributions and of increased risk are generally just stated not allowing others to check their modelling. Very little of the information provided is disaggregated or allows disaggregation by others.

USS's favourite information signals the changes in deficits would seem too volatile to be useful in short term decision making. Seemingly highly significant variances can change quickly over time. Using deficits as the short term monitoring device means that their signals are long term orientated. Deficits provide highly aggregated information without the means to determine the behaviour of their underlying elements. Moreover USS's concern to be able to move to SS means that their short term risk measure of reliance placed on employers cannot avoid being influenced by the long term.

The penultimate section of the article provides a suggested conventional management control system report adapted to pension provision as either an alternative or complement to USS's short term reporting system. This should help to engender trust between the stakeholders.

References

Aon (2019a), 2018 Valuation and Contingent Contributions, 27 February.

Aon (2019b), USS Proposal for 2018 Valuation Monitoring and Action Framework, Aon, 6 November.

Marsh, S. (2018), Understanding 'Test 1': a submission to the USS Joint Expert Panel, #USSbriefs 32, 10 July. https://medium.com/ussbriefs/understanding-test-1-a-submission-to-the-uss-joint-expert-panel-4f14201cf14, archived 8 September.

Merchant, K. and Van-der-Stede, W. (2017), Management Control Systems, 4th Edition, Pearson UK.

Simons, R. (1995) Levers of Control: how managers use innovative control systems to drive strategic renewal, Boston Harvard Business School.

TPR (2019a), email entitled: Universities Superannuation Scheme Actuarial Valuation as 31 March 2018 (the 2018 Valuation) from Mike Birch (TPR) to Sir David Eastwood (USS), The Pensions Regulator, 6 August. https://www.ussemployers.org.uk/sites/default/files/field/attachemnt/letter-mike-birch-to-sir-david-eastwood-13.8.19.pdf, archived 8 August.

TPR (2019b), Annual Funding Statement 2019 for defined pension schemes, 31 October.

USS (undated), Employer Debt, Universities Superannuation Scheme, undated,

https://www.uss.co.uk/employers/application-procedures/employer-debt,

accessed 10 September.

USS (2015), RULES OF UNIVERSITIES SUPERANNUATION SCHEME, Universities Superannuation Scheme, 19 November.

USS (2019a), 2018 Actuarial Valuation: A consultation with Universities UK on the proposed assumptions for the scheme's Technical Provisions and Statement of Funding Principles, Universities Superannuation Scheme, 2 January.

USS (2019b), USS trustee reply to UUK TP Consultation feedback 2019, Universities Superannuation Scheme, 9 March.

USS (2019c), Trustee's reply to UUK's feedback and questions on the 2018 Technical Provisions, Universities Superannuation Scheme, 7 May.

USS (2019d), Universities Superannuation Scheme Report and Accounts for the year ended 31 March 2019, Universities Superannuation Scheme, 17 July.

USS (2019e), Consultation on the Schedule of Contributions and the Recovery Plan for the 2018 valuation, 23 August, published by UUK. https://www.ussemployers.org.uk/sites/default/files/field/attachemnt/letter-bill-galvin-to-alistair-jarvis-23.8.19.pdf, archived 10 September.

USS (2019f), Monitoring and Action Framework, 2018 valuation, Universities Superannuation Scheme, 31 October.

USS-JEP (2018), First Report of the Joint Expert Panel, Universities Superannuation Scheme/Joint Experts Panel, 13 September.

UUK (2019), Consultation on the Proposed 2018 Technical Provisions Actuarial Valuation: Universities UK Response, Universities UK, 19 March.

Appendix

Appendix 1 Comparison of Aon's/UUK Proposal for Contingent Contributions and USS's Options 2 and 3

Parameter	Aon's proposal	USS's Option 2 with max contingent contributions (CCs)	USS Option 3 with max CCs in place
Initial contribution rate	29.2% of salaries: TP valuation including JEP'S risk neutral recommendation plus two risk generating recommendations and a modest amount of smoothing over time	29.7% of salaries: TP valuation including JEP'S risk neutral recommendations plus two risk generating recommendations	29.7% of salaries: TP valuation including JEP'S risk neutral recommendations
Trigger threshold and minimum breach period *Breach probability*	Deficit exceeds £10Bn; two successive quarters *30%**	Deficit exceeds £4Bn Rolling Average sustained over 40 consecutive working days (approximately 2 months) 60%*	Assumes deficit exceeds £4Bn Assumes 100%
Notice period	6 months	6 months	Not applicable
Breach ceases	*Contributions returns to zero in an orderly way*	Not stated	Not applicable
Detailed points *Debt monitoring*	Quarterly gilts + monitoring, averaged over 3 months *No*	Monitoring No	Usual monitoring Yes and *pari passu* security to the Trustee
Periodic measurement	*Gilts plus (monthly)*	Gilts plus rolling average	Usual monitoring
Revalued at year end for:	*New estimate of investment returns and changes in mortality*	No	No

Based on Table 2 of Aon's proposal ((2019), additions in italics and USS reply (USS 2019b. Aon's figures calculated by USS.*