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The University pension scheme – a way forward

David Miles and James Sefton

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The University pension scheme – a way forward:

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Abstract

The University Superannuation Scheme (USS) is trapped between a rock and a hard place. We propose a way forward.

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The current problem:

The USS is in a difficult position. Given its portfolio of assets, it is more than likely that it has sufficient funds to make good on all the pension promises made to scheme members over the years. But it holds risky assets. The returns on its assets could turn out to be below expectations. There is a significant probability that it will have insufficient funds to pay these promised pensions; in a recent paper[1] we estimate this probability to be between 20-40%. The universities would then be left with a financial hole that would need to be filled from somewhere. Though the Pension Regulator (TPR) is not transparent about precisely what is an acceptable level of risk, they have made it very clear that the current level of risk is more than is acceptable. They require that steps be taken to reduce the risk of underfunding.

Universities have said they are already near the limits of what they can afford to contribute; as a result the Joint Negotiating Committee (JNC) has recently proposed only marginally increasing contributions, with most of the adjustment to be done by reducing the generosity of future pension rights. As a result, current active members would be paying slightly increased contributions for diminished pension rights. This prompted the call for a strike from the Universities and College Union (UCU).

One of the key considerations for the TPR in assessing whether risk is acceptable is the strength of the covenant – a measure of both the level of commitment, and the ability to pay more, of the universities so as to make good in the event of shortfall in the pension scheme. This is not judged to be as strong as it could be due to the size of the USS fund. The USS is the biggest pension fund in the UK by some margin, meaning that any shortfall could be substantial and large enough to threaten the viability of some universities.

A way forward

We believe there is a way forward. It is one that need not create any losers. We suggest that members be given a chance to transfer out some – not all - of their existing pension rights at a fair rate. Effectively these members would swap a proportion of their accrued pension rights for a cash settlement. This cash would then be invested in a personal pension plan (SIPP). We suggest that this would simultaneously offer these members a better risk adjusted return to their pension contributions, and potentially more flexibility in retirement options. At the same time it could strengthen the covenant of the USS principally through a reduction in the size of pension liabilities and the resultant fall in risk. This reduction would leave the USS – and its backers, UK Universities – in a stronger position and one which could reduce the

[1] Miles, D and Sefton , J (2021) " How Much Risk is the USS Taking", National Institute of Economic and Social Research Policy Paper 29, September. Available at https://www.niesr.ac.uk/publications/how-much-risk-uss-taking.

need to raise contribution rates and to cut generosity of the pension offer for those who want to continue to be members of the scheme.

Why do we argue that there need to be no losers? Firstly, we propose a flexible *option* to transfer out. Those members who prefer the low but safe return offered by the USS pension plan can remain in the scheme. However, we believe that there will a significant number of members who will find it attractive to invest a proportion of their pension rights in a riskier but higher (on average) return asset with a significantly better than even chance of improving their final pension. If such an option were to be taken up it means that risk is being shifted from the USS onto its members which is why it could give the USS greater leeway to sustain the generosity of current pension arrangements. But this "risk" that is transferred is of a sort which makes the odds of winning favourable; the returns to risky equity assets have historically been a lot higher than those on safe ones. The terms of such an option to transfer should be set in such a way as not to weaken – but actually strengthen – the claims of those who do **not** transfer out (we make this precise in the Annex to the paper).

The problem today is that risk sits in the wrong place, *not* that risky assets are bad. The USS has to ensure (or at least come close to ensure) that they have enough assets to pay promised pensions; this is because currently the obligation to make good any asset shortfall sits largely on shoulders of Universities whose ability to bear it is limited. So the USS and Pensions Regulator cannot comfortably let the downside risk be at all significant. Thus the USS is pushed towards holding a portfolio that is appropriate for someone unable to take much risk and that means holding a lot of hedging assets of relatively low yield. The guarantee the USS has issued to scheme members for their past contributions is therefore very expensive. But those who "own" the guarantee may consider the guarantee they have bought with their pension contributions a very high cost one and consider selling some of it back to the scheme at the right price.

We shall describe – first with a simple example but in much more detail in an annex – the sort of option that could be offered. We describe the ways it could work given where the USS stands today. Towards the end of this short paper we consider some of the real world complexities which mean that it is not a panacea. Nevertheless, making it easier for members to transfer some of existing pension rights into a different form (via flexible transfer options) does have the potential to create benefits and offers a way forward from the current impasse.

Risk Return Trade-off

The key to all this is that the risk-return trade-off available in financial markets is in many ways particularly favourable to those who currently take very limited amounts of investment risk. The problem is that for the USS such risk is not small relative to its resources. By risk we mean the implications of uncertainty about asset returns. The implications of this risk are not at all bad; in fact our work suggests that the chances of a USS surplus are higher than that of

a deficit. This is not like the risk of your house burning down; it is not the risk of something uncertain happening which has to be bad. Indeed, it is disproportionately good risk by which we mean the odds are well in favour of the upside over the downside. Yet Universities and those currently contributing to the scheme may not be well placed to accept all of that risk. Those who *have* accumulated pension rights might want to take some of it – giving them a clear option to do so may be very valuable. This would be an option; it is absolutely not an obligation. It is an option that has been there in the past but in an inflexible form – the process of transferring out of the USS has been an all or nothing one: leave 100% or stay in 100%. It has also been an expensive and lengthy process for the few who wanted to take accumulated pension rights from the scheme; it has sometimes involved taking the option of removing all one's accumulated rights and agreeing to transfer it without having a firm transfer value[2]. Something much better is feasible and on terms that could be attractive to many members while leaving the USS in a stronger position which could allow it to offer better pensions in exchange for new contributions.

A simple example:

Suppose you are a member of the pension scheme with accumulated rights and you are 20 years from retirement. Suppose those accumulated pension rights would mean you had a pension at retirement of £20,000 a year in today's money. That pension is inflation proof, but no more –its retirement value will stay (in inflation adjusted terms) at £20,000. In recent years a guaranteed real return of 0% would be rather more than one could expect from investing in safe assets, but let us assume that is the rate available on a guaranteed safe investment each year. Assume also the pension scheme has invested in such assets to be sure it can pay your guaranteed pension and that it has worked out that in exchange for your past contributions the £20,000 pension is fair - given a zero real return on its assets. The pension guarantee is valuable – you will never lose money - and should you be very risk averse you might value this certainty highly.

Suppose you could trade *some* of that guaranteed pension – say 10% of it – for an investment in assets that on average earned a real annual return in excess of zero but with a risk that they could generate negative returns. Whether or not that would be worth doing depends on two things: your attitude to risk and the chances of returns being above zero (by a little or a lot) and the chances that you lose money because the real return is less than the 0% return earned on your guaranteed pension.

If the risky (but high average return) asset is a stock market investment we have some idea of plausible estimates of the average returns and risks each year. For illustrative purposes suppose those *average* annual real equity returns (net of all charges and transaction costs) are

[2] The USS does give a guaranteed transfer value for completely leaving the scheme on request. But that guarantee lasts only for three months while the process of a member being able to finally agree to transfer can take longer. The USS does not have to give another guaranteed transfer quote within 12 months of a first quote.

+4.5% a year but the volatility (standard deviation) of annual returns is 15%. These are plausible numbers – and certainly not overtly optimistic about the estimated average return on stocks and shares. Nonetheless this is high return, high risk. If we assume the risks are normally distributed (or more precisely that logarithmic returns are normally distributed) we can assess what the chances of different outcomes are for money invested over 20 years. It turns out that £1 invested on these terms over 20 years has the same average value and risk (standard deviation) as having a 50% chance that £1 invested ends up worth only £0.60p and a 50% chance it is worth £4.22. This has an average value of about £2.41 (which is (1.045)^20)), but there is substantial risk. That compares with a zero real return on a pension investment which guarantees to be worth a fixed real amount in the future.

So now consider cashing in 10% of the guaranteed pension – reducing the pension due to £18,000 – and for twenty years investing the proceeds in an asset that has the risk and return characteristics equivalent to getting either £4.22 for every pound invested or only £0.60 with equal chance. The £2,000 of pension income you invest in this risky way could then generate a pension pot that might pay an annual pension of £2,000 * £0.60 or £2,000 * £4.22 with equal chance[3].

So the outcomes are:

1. Remain completely in the pension scheme: generating a guaranteed pension £20,000 a year
2. Cash in £2,000 worth of pension rights and invest in equities creating the potential for a pension at the end of 20 years of *either* (£18,000 + £2,000 x 0.60) = £19,200 or of (£18,000 + £2,000*4.22) = £26,440.

Swapping 10% of the guaranteed pension for one whose value reflected the return on risky equities would mean there is an even chance of having a pension worth £6,440 a year more or worth less by around £800. The odds are highly favourable and probably attractive for at least switching a modest part of pension rights that are guaranteed into one invested in assets that don't guarantee a pension at the end of 20 years but on average give a much higher one.

This example skips over many real-world complexities and some of these we consider below. But the general point is this. Given that the return on safe assets with guaranteed real returns is much lower than the average returns on risky assets, then switching at least a modest amount (though some people might choose more than a modest amount) from a guaranteed pension into one whose value is linked to returns on assets which are not guaranteed could be very attractive.

[3] We assume here that should people wish to annuitise their assets at retirement they can do so on the same terms as was used by the scheme in calculating a transfer value for giving up 10% of the scheme pension. We consider this point in more detail below. In practice the terms might be more or less favourable depending on what happens to interest rates.

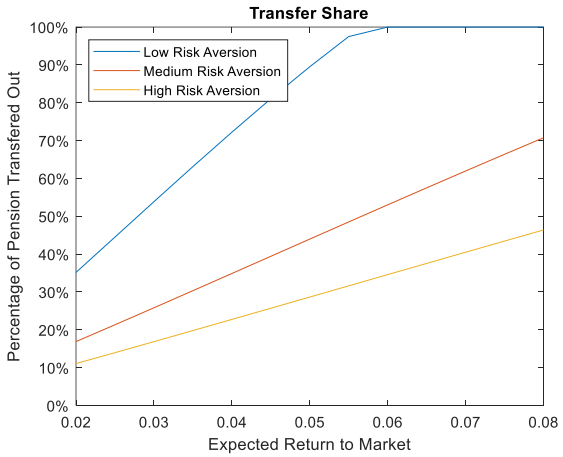
In the annex we spell out the nature of such a switch in a much more realistic setting – including that the scheme may be in deficit when transfers are offered - and below we consider some real-world complexities which mean caveats need to be made. But the simple example illustrates the underlying economics which could help the USS move forward in a way that creates benefits all round.

The appendix has a much fuller analysis of how such an offer might be framed and who might find it attractive. There we spell out the economic environment and the start position of the USS in more detail. We assume equities (or risky assets) have returns that are uncertain but yield – on average – well in excess of a safe real rate of return. We use a particular way of thinking about scheme members' attitudes to risk – allowing us to gauge how people with very different attitudes to risk might wish to take up an offer to switch some part of their accumulated pensions rights from a guaranteed outcome to an investment with some risk but, on average, higher value.

What we find is that the extent to which an offer might be taken up varies significantly with attitudes to risk and with the expected average returns on risk assets (holding the extent of risk constant).

The chart below illustrates the amount of transfer three types of scheme member might choose where we vary risk aversion from an average value to one plausible for someone highly risk averse and someone of low risk aversion. (The appendix explains how these risk preferences are set). Clearly there is great variability in the extent to which such an offer might seem attractive – ranging from little more than 10% being likely to be transferred to most of accumulated pension rights.

The chart on the right is one measure of the gain in the effective value of the pension from taking up such an option – we label this "welfare increase". This is high for those who are not risk averse and when the expected return on risk assets is also high, but very modest when risk aversion is large and expected returns far below historic averages.



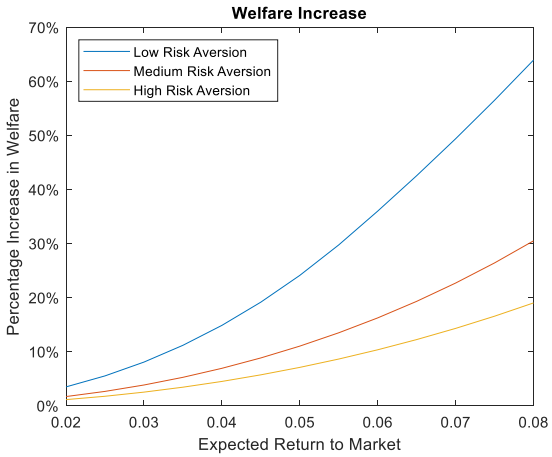


Figure 1: Estimate of Percentage of USS Pension transferred out (left) and resultant estimated percentage change in welfare (right) as a function of both the expected return to the market and the risk aversion of the USS member. The model is very stylised but is calibrated to be as informative as possible. Details of this model are given in the Appendix.

Complexities and caveats:

The calculations above abstract from several significant real-world complexities. While the results are indicative of large potential gains, these real-world factors suggest caution. But by no means all of these factors mean the potential gains illustrated need be in excess of what is likely. Here we consider some of those factors.

- We have focussed on the value of pension rights at retirement – but there is a difference in that historic accumulated USS benefits in the DB scheme are for an annuity while the money value is just that – a sum of money and not an annuity. In our calculations we are effectively assuming that whatever terms the USS annuitises at in its valuations of liabilities (and in the transfer value offered) it is the same as that available to a scheme member should they purchase an annuity. This may well be optimistic. It may be that when annuities would be purchased by those that want to annuitise it is at a significantly less favourable rate than the one implicit in the transfer value. But it could also be more favourable should safe rates of interest rise. Furthermore, there is a very substantial potential benefit in the option NOT to annuitise – an option only possible if some pension value is transferred out of the scheme. This is that any remaining pension pot at death can be bequeathed (currently with favourable tax treatment) if it is not annuitised but is all lost otherwise. Not annuitising also brings almost complete flexibility in drawdown of pension assets.

- We assume that scheme members make decisions that are very well informed and evaluate risk and return trade-offs based on knowing precisely what they are. This is not realistic, though it is not clear it biases outcomes in favour of transferring too much rather than too little. Nonetheless, the overly optimistic might tend to transfer out and transfer too much. This might call for limits on the maximum fraction that can be transferred out.

- We assume that to date it has been very hard to transfer out and so the fact that few people have done so is not evidence that demand to do so is largely non-existent. We may have exaggerated the cost to transfer out already. Transfers have been possible but the process is lengthy (taking many months) and the effort to do so has to come from the scheme member – no offer is readily made available. It has also been an all or nothing offer – one our results show is unlikely to be attractive to many people. A flexible offer which is made available (rather one that needs to be extracted) would be a big change[4].

[4] It might be possible to transfer some proportion of pension rights in the DB part of the USS ("the income builder") to the DC part ("the investment builder"). Were that to be feasible it might reduce the complexity of transferring pension rights.

- We have ignored tax issues; these can cut both ways. The flexibility that having access to one's own pension assets is potentially helpful in tax planning. The chances of hitting a life- time pension allowance limit might, however, be somewhat higher for someone with very high accumulated benefits who transfers some pension rights out because the valuation of those pensions may be greater outside the scheme than within it.

- To guard against risks of mis-selling any transfers need to be done in a transparent way and with advice. This is not without cost and would reduce somewhat the transfer offer relative to one with no advice. But such advice is crucial. It would mean that scheme members became better informed both about what their current benefits mean and about an alternative form those benefits could take, should they wish to make a partial switch.

There is a final, and in some ways fundamental, objection to the proposal. Some might argue that a transfer price that could be offered by the USS on the terms we describe in the annex (which we believe is fair to all remainers) implies that pension rights would be being sold at a price below their true value. We believe this claim is false; it misses the point which is central to why such a transfer can benefit both parties. It is true that if the USS were to sell the rights to a guaranteed pension at the present value of that stream of income discounted at the current real interest rate on entirely safe assets the transfers would be infeasible. This is because the USS is clearly in deficit if pensions were to be valued in this way. So they must offer terms less generous than this. But precisely because scheme members would not wish to invest any transfers 100% in such safe assets the transfer can be of great value when offered on terms the USS can afford to offer. This is precisely what the calculations in the annex show.

There is also a significant potential benefit to those that do **not** wish to transfer and to those who want to continue to put new contributions into the USS. If transfers are made the residual risk to the scheme sponsors – UK Universities – can fall. As it does the ability of the sponsors to face residual risk is enhanced – the strength of the covenant is greater. This effectively means that the pensions offered to those in the scheme become better value; cuts in pensions because the scheme sponsor is not seen as very strong might be avoided.

It is important that any option to transfer out be made on terms that do not weaken the claims of those who do not transfer out – and in the annex we explain how this can be done by using a rate offered for such transfers that reflects the current assets and pension liabilities that the USS has. A transfer on such terms means that it does not fall on continuing (younger) members to take most of the burden of ensuring past pension promises are made good, which would not be intergenerationally fair.

A possible proposal with a challenging time-line:

The USS takes 6 months to work out the terms of transfer offers to those with existing defined pension benefits; members then might have 6 months to choose whether to transfer any money and if so how much. In a year or so we would see how much risk is left with the USS. It is possible that then that the strength of the scheme sponsors (Universities) relative to the net risk the USS retains will have risen. That would be a relevant factor in setting future contribution rates and in setting the generosity of new pensions bought in exchange for future contributions.

The timetable suggested here is **very** challenging. It needs to be if it is have a chance of resolving the current dispute without extended strike action.

ANNEX: A Model of the Optimal Transfer Share

To compare different pension arrangements, we need a measure of welfare that a member will derive from a particular pension arrangement. The ubiquitous and benchmark model for this type of exercise is a power utility function; where the welfare derived from assets, W_T, held at retirement date T is given by

$$\text{Welfare} = [E(W_T^{1-\gamma})]^{1/(1-\gamma)}, \qquad (1)$$

where E is the expected value operator, and $\gamma \geq 0$ is referred to as the coefficient of relative risk aversion. The higher is γ, the greater the risk aversion. We note here that there is a huge body of literature on decision making under uncertainty and this model is only one, though it is by far the most widely used.

We assume that a USS member has currently accrued a DB pension (under the USS retirement builder) of value P for when they retire in T years. This pension value is probably better thought of as the annuity value of the pensionable salary (plus their lump sum). For a scheme member whose only wealth at retirement is their USS pension (and assuming that there is no effective risk to this pension claim) then their welfare (equation (1)) is simply equal to their pension value, P.

We propose in this paper that every member is offered the option to transfer out a percentage, α, of the value of their pension into an alternative SIPP (self-invested personal pension). The attractiveness of this option depends crucially on the transfer value of the pension. One proposal, and the one we adopt here, is that the transfer value should be the discounted value of the pension rights, where the discount rate is the rate that would bring the USS pension fund into balance (i.e the discount rate such that the sum of discounted values of all accrued pension rights in real terms is equal to the asset held in the fund). We calculate that in March 2020 this effective real internal rate was 1.13%, but in June 2021 -

following the recovery in assets values after the initial shock of the pandemic – this rate has fallen to 0.1%. We denote this balancing discount rate as r^*. Thus if the member transfers out a percentage α of the rights, *P*, they receive today a cash settlement of $\alpha P e^{-r^* T}$. We believe that this is a fair way to calculate transfer values as it leaves the funding ratio of USS unaffected (the funding ratio being the ratio of the size of deficit or surplus to the value of the liabilities). It also has the property that there would be sufficient assets should everyone decide to transfer entirely out of the USS.

We shall assume that the transfer is invested in risky assets in the SIPP. The annual returns to this risky asset, *R*, are assumed to be independently lognormally distributed with mean μ and standard deviation σ, i.e $\log(R) \sim N(\mu, \sigma^2)$. Therefore, if ε denotes a normalised and normally distributed random variable, $\varepsilon \sim N(0,1)$ then we can write the value of the SIPP fund at retirement as

$$\alpha P e^{T(\mu - r^*) + \sigma\sqrt{T}\varepsilon}$$

In choosing their transfer percentage, α, our member will choose the transfer percentage $0 \leq \alpha \leq 1$ that maximises their welfare at time T, that is

$$\underset{0\leq\alpha\leq 1}{\text{Max}} \left[E\left(W_T^{1-\gamma}\right)^{1/(1-\gamma)} \right] = \underset{0\leq\alpha\leq 1}{\max} \left[E\left(\left(\alpha P e^{T(\mu - r^*) + \sigma\sqrt{T}\varepsilon} + (1-\alpha)P \right)^{1-\gamma} \right) \right]^{1/(1-\gamma)} \quad (2)$$

It is not possible to calculate the expectation of this expression analytically, and therefore we perform this maximisation numerically for various parameter values. However, one could use the log-linear approximation in Campbell *et al* (2003, equation 10) to derive the following approximate value for α that maximises welfare in equation (2),

$$\alpha \approx \min\left(\frac{\mu - r^* + \sigma^2/2}{\gamma\sigma^2}, 1 \right).$$

(This approximation turns out to be remarkably good for the parameter values we use in our illustration below).

Numerical Results

We shall now calibrate and solve the model for the optimal transfer percentage. The results are insensitive to the time to retirement, *T*. We therefore assume 10 years to retirement in all the results below, though the value of *T* does make a minor difference. We shall set the volatility of returns to the risky asset, *R*, to 17.5%, which is close to the average volatility of the global equity markets over the last 100 years. We set the balancing discount rate, r^*, to 0 as this is close to its estimated value in June 2021.

There have been many empirical papers trying to estimate γ; Cohen & Einav (2007), Barseghyan et al (2013), Paravisini et al (2017) being prominent examples. Paravisini et al

(2017) suggest in a large heterogeneous panel a median value for γ of 2.81 with an interquartile range between 0.56-3.59, and a 10-90 percentile range of 0.29-7.16. Barseghyan et al (2018) review the literature and suggest numbers not dissimilar to these. In the main body of the paper, we shall use γ=2,4 and 6 to denote low, medium and high levels of risk aversion.

In Figure 2, we solve the optimisation problem above for different values of risk aversion, and for alternative estimates of the expected return to the risky asset, $E(R) = e^{\mu+\sigma^2/2}$.

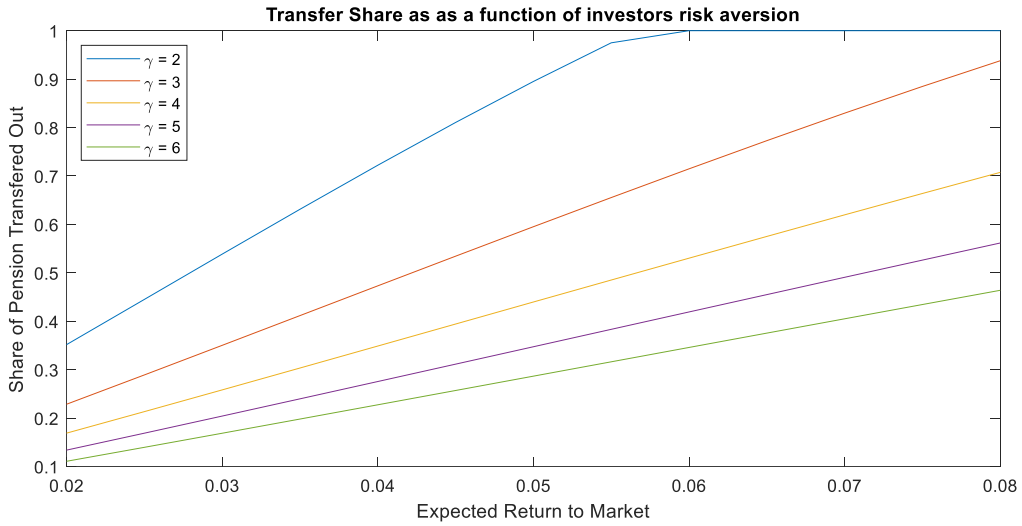


Figure 2: The optimal transfer percentage of a USS member

If we use as an expected return to the market of 5%, if a USS member has a risk aversion given by γ=2, then it is optimal for them to transfer nearly 90% of the accrued pension rights out of the USS. However, if the member's risk aversion is higher, γ=6, this percentage drops to 25%. A value of γ as high as 6 would reflect high risk aversion. Empirical studies suggest that an average value of risk aversion amongst investors might be around 3-4, though there is great heterogeneity.

Figure 3 displays estimate the improvement in welfare for USS members transferring out optimally. Our expression for welfare in equation (1) is normalised to money terms. Thus an improvement in welfare of 20%, can be thought of as equivalent to an improvement in the pensionable salary of 20%. Thus for USS member with risk aversion of γ=2, and given returns to the market of 5%, their option to transfer out is equivalent to an almost 25% increase in their pensionable salary in welfare terms.

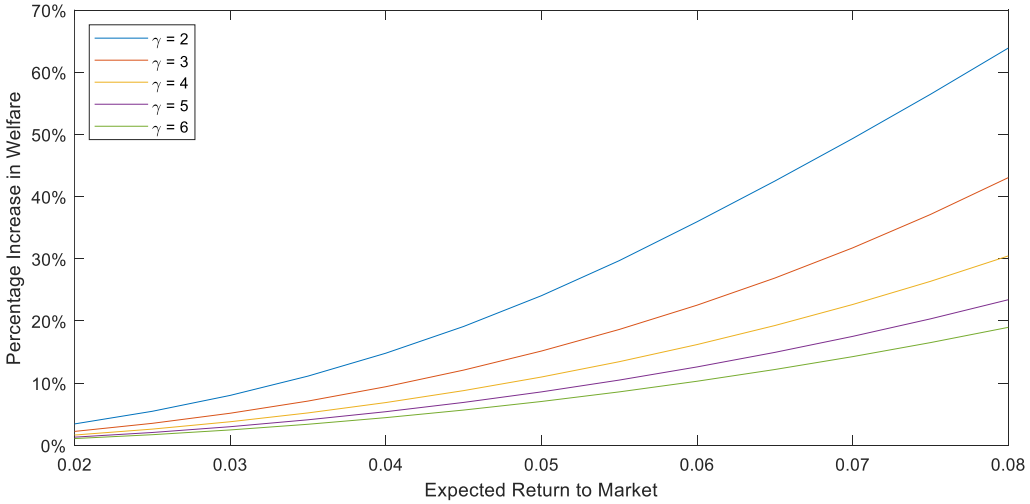


Figure 3: The percentage increase in Welfare of a USS member if they choose to transfer out optimally

In Figure 3, we introduce another consideration. Most members will have accrued rights some state pension rights too. If we assume this state pension is *s*% of their USS pension, then now the member will solve the following optimisation problem

$$\max_{0\le\alpha\le1} E\left(W_T^{1-\gamma}\right)^{1/(1-\gamma)} = \max_{0\le\alpha\le1} E\left(\left(\alpha P e^{T(\mu-r^*)+\sigma\sqrt{T}\varepsilon} + (1-\alpha)P + sP\right)^{1-\gamma}\right)^{1/(1-\gamma)}$$

In Figure 4 we assume the state pension is worth 50% of their USS pension.

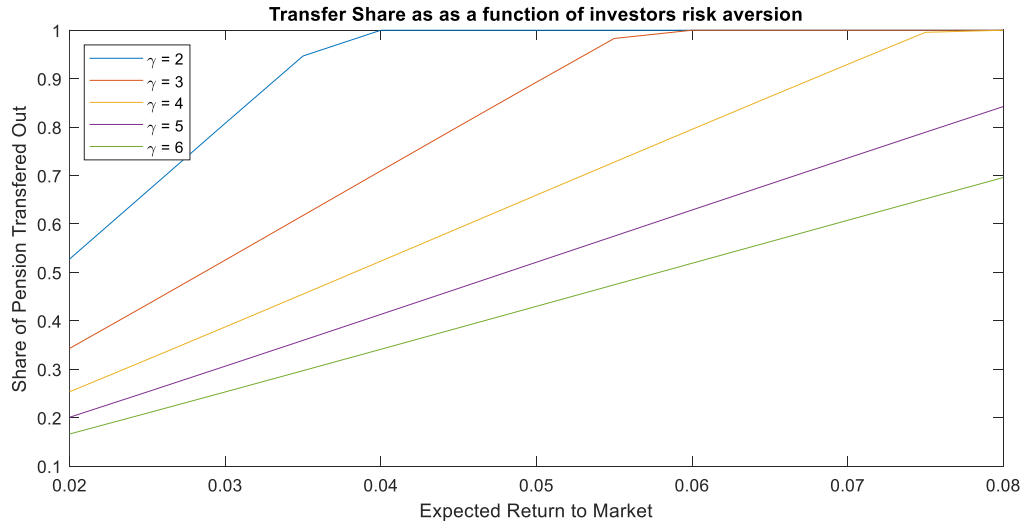


Figure 4: The optimal transfer percentage of a USS member with a state pension worth 50% of their USS pension.

Taking into consideration the state pension, which is treated here as an additional risk free annuity, then the transfer percentage of members increases significantly. Again, with a market return of 5%, our less risk averse members, γ=2, have now entirely transferred out,

whilst our more risk averse members, γ=6, now transfers around 40% of the pension out of the USS.

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