The Discount Rate: Questions from Ministry of Justice for the Expert Panel arising from their report of 7 October 2015

Major comments

1. Comparison with Lord Irvine's approach

The panel's report stated [emphasis added]:

"1.12 The Lord Chancellor sourced ILGS yields from the Bank of England Debt Management Office for the three-year period to June 2001. The rationale behind Lord Irvine's decision is reproduced in Appendix A.1 of the first consultation paper referenced above. Additional insight is gained from the comments of Baroness Scotland in the House of Lords debate on the matter on 29th November 2001. In brief terms, Lord Irvine used a three-year average of those ILGS yields with over five years to maturity. The resultant figure was 2.46%. 6 A 15% reduction for tax was deemed appropriate giving a yield of 2.46% – 0.37% = 2.09%. The discount rate was then set at 2.5%. What can be seen is that the Lord Chancellor followed the precedent set in Wells and set the rate with reference to ILGS, but it is known that he additionally considered returns on other securities to be relevant, together with the interests of claimants and those of defendants more generally. The authors presume this further review, beyond the largely arithmetic exercise of calculating and then referring to average net ILGS yields, was reflected in the 'rounding upwards' decision that was made in 2001. The authors note that only the interests of claimants are deemed relevant in Wells, the impact of any decision about the discount rate on defendants was not deemed relevant…

"1.23 If the current Lord Chancellor were to replicate the analysis made by his predecessor in 2001, then:

- *The starting point would be the historic average of over five year ILGS yields.*
- *This is -0.30% over a 3 year period or -0.73% over a 1 year period.*
- *A modification then needs to be made for tax on the (indexed) coupon payments. The tax burden will vary from claimant to claimant, and their Lordships in Wells and, subsequently the Lord Chancellor, took a broad brush approach to solving this problem by simply reducing the prevailing gross real yield by 15%, suggesting a reduction to the gross yield at the time of 0.37%. The change in yields since 2001 and steady issuance of more securities with lower coupons complicates matters. The deduction for taxation will be modest. Time constraints have not allowed us to consider the issue of taxation in detail and for practical purposes we would suggest that this issue can be addressed in the rounding aspects of the calculation.*

"1.24 The calculations outlined above suggest that the discount rate in current circumstances, if set using exactly the same methods used by the Lord Chancellor in 2001, would be between -1% and 0.5% depending on the allowance for taxation and the averaging period being used. From an actuarial perspective, the one-year average is considered to be more appropriate, and the panel is in agreement that rounding should be to the nearest half-percentage rate for use in the current Ogden Tables. On this basis, the discount rate would be -1%."

Is the panel satisfied that the calculation in paragraphs 1.23 and 1.24, which appears to be intended to work out what the discount rate would now be if the Lord Chancellor followed the same method as Lord Irvine in 2001, takes sufficient account of all the factors mentioned by Lord Irvine in his decision notice (assuming that the effect of such factors was to be updated to reflect current circumstances)? In particular,

- his inclusion of ILGS with more than five years to maturity but exclusion of gross redemption yields of near maturity stock
- his decision that rounding was not a simple mathematical exercise (had it been so the rate would have been 2.0% not 2.5%)
- his references to distortions in the ILGS market; the then investment practice of the Court of Protection; and the likely investment choices of well advised claimants as between ILGS and a mixed portfolio.

Linked to this, the panel has calculated the five year yield as minus 0.3% over 3 years and minus 0.73% over one year. The panel says this suggests that the discount rate in current circumstances if set by exactly the same methods used in 2001 would be between minus 1 and minus 0.5% depending on the allowance for taxation and the averaging period. The panel's preference was to use a one year average, giving minus 1%. Unless the allowance for taxation takes the minus 0.73% yield to minus 0.75% or less the rounding does not appear to be an arithmetical rounding. Even if this is the effect of taxation what contribution is being made by the other factors (duly updated) that Lord Irvine took into account? In 2001 the rounding was not arithmetic (2.09% rounded to 2.5%), but was rounded upwards, the panel have rounded down. Please could you say why. Please also explain more fully why a one year average is considered preferable to a three year one, given that Lord Irvine used the latter.

Put another way in his decision notice Lord Irvine said that there was no single "right" discount rate and that a fairly broad brush approach had to be taken. Obviously it is for the Lord Chancellor to decide where in the permissible range the discount rate should fall in the light of the legitimate policy objectives and considerations but is the panel satisfied that it has given sufficient weight to the potential effect of this flexibility (difficult though it may be to measure)?

We have been unable to identify any aspect of Lord Irvine's reasons to suggest that he "took the interests of claimants and defendants more generally" into account, and would be grateful if the panel could clarify this reference. For the avoidance of doubt, we are assuming that the panel has *not* taken defendants' interests into account in recommending the rates considered above given their (correct) reference to the Wells decision indicating that this is not a relevant consideration in determining the rate. Could the panel confirm that this assumption is correct.

The responses of the panel members are colour coded as follows:

Dr Pollock
Dr Cox
PFP

I am satisfied that we have substantially mirrored the procedure followed by the Lord Chancellor in 2001. The graph on page 12 of our report shows that we considered only ILGS with more than 5 years to redemption. This is in any event not a material consideration as can be seen by the difference between the 'all stocks' and 'Over 5 year stocks' averages in our 1.16. I consider the 1-year average to be more appropriate, one cannot of course invest at yields that were available in the past, only what is on offer at the time of purchase. A shorter averaging period seems essentially reasonable.

The panel cannot say with certainty why the Lord Chancellor chose to 'round up' to 2.5 rather than 'round to the nearest' multiple of 0.5%, which was 2%, but the enclosed extract from Hansard gives some insight, covering the first underlined section above. Our opinion is that if considering risk free returns, as proposed by their Lordships in *Wells* there is no need to go beyond consideration of ILGS, and our preference would be to use a 1-year average rounding to the nearest 0.5%. The Lord Chancellor diverged from *Wells* by considering other factors, although as Baroness Scotland states this only had an impact at the margin, the basic procedure of setting the Discount Rate by reference to an inspection of ILGS was still adhered to in 2001.

I do not consider the ILGS market to be unduly distorted. The decline in risk free real yields has been a worldwide phenomenon, not confined to the UK (see our section 1.17). The lower level of UK yields relative to the Eurozone and the US is largely explained by the fact that ILGS are linked to the RPI, which tends to overestimate inflation relative to the CPI, the basis of indexation of inflation protected securities issued in other countries.

The Court of Protection generic investment policies referred to by the Lord Chancellor in 2001 were scrapped following implementation of the Mental Capacity Act in 2007, and have not been replaced. The investment branch of the Court of Protection was also closed at that time. Financial deputies are expected to seek specific independent financial advice from an authorised and regulated adviser. However, for the reasons set out in the panel's report, how claimants actually invest their award of damages is irrelevant to the setting of the discount rate, save for two significant factors:

1. The acceptance that a claimant cannot purchase a portfolio of ILGS that can be held to redemption each and every year over life and, therefore, must take an alternative approach in any event. It is PFP's view that the setting of the discount rate is an academic, rather than practical issue; with the aim being to set the discount rate to the most appropriate estimate of return achieved on suitable risk adjusted investments and not to set the discount rate to an assumed 'model portfolio' that cannot guarantee to meet needs over time even if followed; and
2. The inconsistency that would arise if the discount rate was to be increased by reference to real investment returns (experienced as a result of accepting investment risk), yet expected real increases in claimants' needs (such as experienced in respect of care and earnings) was ignored. In line with *Cookson -v- Knowles* no allowance such future increases can be made in a lump sum award of damages for future losses. Therefore, if allowed for in the discount rate, claimants will be forced to accept a higher level of risk than assumed when setting the discount rate in order to meet their needs, or else accept under-compensation. Claimants' must, in reality, hedge against real increases in costs over time, particularly in respect of usually the largest elements of the claim (care and earnings). Given the dominance of these elements of future loss, it is does not seem reasonable to PFP to assume that there are sufficient 'swings and roundabouts' in respect of the other elements of the claim that will escalate below the RPI to offset these real increases (detailed analysis in this regard falls outside of the scope of the panel's report). Consequently, even if the 'risk free' approach is adopted by the Lord Chancellor, claimants will still have to accept some investment risk.

It is for the Lord Chancellor to decide whether the inconsistency of taking into account real earnings growth on investment assets which would increase the discount rate, whilst disregarding real growth in claimants' needs is appropriate. PFP considers that if the inconsistency is removed, then the only appropriate approach is to ignore returns on risk assets and set the discount rate with reference to the 'risk free' approach.

If the Lord Chancellor considers that some real growth in assets above real growth in claimants' needs should be taken into account, then only the 'very low risk' approach is appropriate, as claimants will still have to invest at a higher risk level to cover real growth in needs over time.

The panel notes that the Lord Chancellor's reasons for setting the discount rate in 2001 included the statement "*I have taken account of matters which I consider are relevant to the setting of a discount rate which is just as between claimants as a group and defendants as a group*". The panel understand this to mean that the interests of defendants were taken into account. Our brief was to exclude the interests of defendants, and we can confirm that we have not taken them into account.

The panel considers that the reference by the Lord Chancellor to the 'other issues' mentioned in your questions can only have influenced the decision to 'round up'. The panel are satisfied that our report provides enough information to enable such a calculation to be made. The procedure followed is noted below.

- Determine the average gross yield on ILGS of over 5-year duration. From our report these are - 0.73% or -0.3% (1 and 3 year averages).
- Determine an appropriate deduction for tax. The deduction was 0.37% in 2001, but at that time income formed a greater part of total returns. In recent years ILGS issuance has been with stocks with trivially small coupons, so one would expect a smaller yield reduction. Detailed calculations were not made, due to time constraints. Assuming the deduction was 0.25% this would place the 1 year average net yield at -0.98% and the 3 year average net yield at -0.55%. This is the rationale behind our comments in 1.24 and the discount rate of -1.0% and -0.5% respectively. The rounding is arithmetic. While other factors are not considered, elsewhere in the report we do consider the discount rate when other investments are introduced.

Note: there is a typographical error in the quotation from paragraph 1.24 of the Report in the MoJ's question above. The quotation refers to the range of discount rates as "-1% and 0.5%", which should in fact be -1.% and -0.5%, as per the original report (the minus sign was omitted).

2. Acceptable level of risk

Developing the above theme, the panel's report further stated:

"4.9 The panel is in complete agreement that, if forced to accept some investment risk, then the second portfolio (three-quarters ILGS and one-quarter in an optimal mix of risky investments) is potentially appropriate for a very low risk, but not a 'risk free', investor and the 100% rule...

"6.11 The level of risk is too high when 100% is put into the optimally constructed portfolio of risky assets but the risk can be moderated by combining the chosen portfolio with real risk free investments. The lower the proportion of risky investments the lower the risk, and the lower the return. In order to provide 'very low' levels of risk there is some agreement among the panel that up to 25% of the portfolio could be allocated to non-risk free assets. In such circumstances the discount rate would be 0%."

Lord Irvine considered (to some extent) returns from investments other than ILGS. How in general terms does his approach differ from adopting the mixed portfolio approach described at paragraphs 4.9 and 6.11? In short, did Lord Irvine adopt a no risk, very low risk or low risk approach when setting the discount rate?

In setting the rate at 2.5% the Lord Chancellor considered, to an extent, the returns from other investment opportunities. On page 2 of the appended extract from Hansard, Lord Kingsland quotes the Lord Chancellor as saying

> *"there are sensible, low-risk investment strategies available to claimants which would enable them comfortably to achieve a real rate of return at 2.5 per cent or above without them being unduly exposed to risk in the equity markets".*

Our approach is no different to that above. We too adopt an investment strategy available to claimants without them being unduly exposed to risk in the equity markets. Lord Irvine wasn't precise about the level of risk associated with the extra return he took into account but presumably the investment approach to deliver this extra return remained consistent with a risk averse investor in the overall sense.

The panel's report adopted a" low risk" and "very low risk" approach. The motivation for this was the following information:

1. The Personal Injury Discount Rate slides provided to the panel by the MoJ (slide 5) that "the claimant must be regarded as risk averse ….this tends to impact on the nature of the investments selected to date – low risk". This justified the low risk approach considered.
2. The Consultancy Specification Document provided to the panel by the MoJ (section 5, p3, Scope) that "the claimant investor is deemed to be very risk averse". This justified the very low risk approach considered.

Most of the investment strategies that provide potentially higher returns without undue exposure to equity risk will involve what we now call a multi-asset portfolio. A multi-asset portfolio captures the benefits had from undertaking investment diversification. In the report an optimal combination of assets appropriate for a low and very risk investor without undue exposure to the equity markets is taken. The work is calibrated to that of a small, retail investor.

Lord Kingsland, quoted above, was opposing the Lord Chancellor's decision to set the discount rate (at 2.5%) in 2001, and that in the same debate, Baroness Scotland (for the Government) said:

> *"I have listened with great care to what the noble Lord, Lord Kingsland, has said, but perhaps I may gently suggest that some of the quotations were a little selective"*

The panel's report also sets out the "no risk" approach founded upon the principles established in *Wells*.

If the Lord Chancellor is not persuaded that such an approach is appropriate, and is persuaded that claimants should accept some investment risk then it must follow that the Lord Chancellor would also have to accept the inconsistency that would result from a discount rate that allowed for inclusion of real assets in the portfolio, and the exclusion of real growth from a lump sum award for future losses. Only in those circumstances would we find the very low risk portfolio described by Dr Cox to be acceptable, as explained in answer to question 1. above.

3. Distribution of risk appetite

The panel's report stated [emphasis added]:

"4.24 A way of reducing risk is to only invest one part of the investor's capital into the optimal mix of risky investments and the other part in risk free investments (ILGS). Two portfolios have been analysed that could, for some investors, be considered to be very low risk. The two portfolios chosen are based on the same optimal mix of risky investments. The two portfolios differ only by the proportion held in the optimal mix of risky investments and the proportion held in risk free investments. We are conscious that if departing from a risk free investment approach that 'very low risk' is something that will mean different things to different investors. There is not a unique answer to the problem, once a departure is made from a risk free framework."

In discussing the mixed investment approach the panel referred in paragraph 4.24 to the portfolios considered being very low risk for some investors (as emphasised). Does the panel have a view on what proportion of investors this comprises? What features/ characteristics does the panel consider that class of investors have (in the personal injury context) that others (by implication) do not? See also paragraph 4.17.

The term "For some investors" was inserted during the drafting of the document. The term was needed because the panel was not in complete agreement as to the appropriateness of a multi-asset approach for personal injury claimants. The table below illustrates that the asset allocation of the low risk and very low risk portfolios are 90% bonds and 10% equity, and 95% bonds and 5% equity respectively. To arrive at a view of what proportion "for some investors" comprises the following three aspects to risk are important to acknowledge:

1. *Risk tolerance:* the risk that people are psychologically inclined to take based on their subjective appetite for risk.
2. *Risk capacity:* the risk people are able to take based on their circumstances. Risk capacity is normally positively linked to human capital – the ability to earn income from work.
3. *Risk need:* the risk people need to take to achieve their investment goal. Most people have future life goals that involve a need to take some investment risk.

The psychological risk tolerance of almost everyone's exceeds the two portfolios below. By almost everyone is meant 99% of investors, or more. Empirical studies show that people are loss averse but they also wish for the opportunity to make some gain. Balancing these two leads people to an amount of investment risk that is somewhat greater than the portfolios' below.

Asset allocation of low risk and very low risk portfolio		
Asset	Low risk portfolio weight (%)	Very low risk portfolio weight (%)
ILGS	50	75
UK Corporate bonds	25	12.5
Overseas developed country government inflation linked bonds	15	7.5
World developed equities	10	5

Turning to an objective assessment, in the private client, wealth management, and institutional investment industry the two portfolios would be considered extremely low risk. This is because both portfolios have no or extremely low sequencing risk, drawdown risk (peak to trough drop), tail risk (left extreme of investment return distribution), and shortfall risk based on their expected return. So both portfolios are subjectively and objectively low risk and very low risk for almost everyone with some risk tolerance and risk capacity.

Personal injury claimants are distinct and not like almost everyone, from a risk perspective. Personal injury claimants are presumed to have very limited risk capacity, if any, and to compensate for this are awarded an amount that takes away almost all of the risk need. The fact that their psychological risk tolerance is often not so different to everyone else leads a significant proportion of personal injury claimants to invest as other people do, as the IPSOS MORI study found. Psychologically, they may also consider the portfolios above to be very low risk – but that is not relevant to the analysis.

A discussion of risk capacity is important because this leads to the need for the term "for some investors". If people in a personal injury context are deemed to have no risk capacity at all then the portfolios above, may well exceed a view of "very low risk". But if people in a personal injury context are deemed to have some very limited risk capacity based on the effect of time on investment then the portfolios above will not exceed a view of "very low risk". Because the panel is not in complete agreement about the risk capacity of personal injury claimants or the ability of financial instruments when combined to deliver a series of returns not exceeding that risk capacity, there has been the need to insert the term "for some investors".

PFP considers that the discount rate is to be set in the context of an award for personal injury. That must take into account the duration of future losses, the need for regular cash flows and the established principle that claimants are not 'ordinary investors'. To quote from *Wells*:

> *"The plaintiffs are not in the same happy position. They are not 'ordinary investors' in the sense they can wait for long-term recovery….For they need the income, and a portion of their capital, every year to meet their current cost of care."*

PFP agrees with Dr Cox that personal injury claimants are distinct but disagree that observations about how damages are actually invested can be said to result from a tolerance of investment risk akin to what might be expected of an ordinary investor.

Claimants faced with real world investment decisions are forced to choose between accepting a greater level of risk than assumed or under-compensation. In other words, accepting investment risk is not a positive choice for claimants, whereas it is for ordinary investors. PFP considers that Dr Cox's assumption of claimants' acceptance of investment risk ignores the growing number of claimants who choose to receive their damages in the form of periodical payments, and (where a choice was available) exhibited precisely the risk averse behaviour that was expected in *Wells*.

In addition, PFP considers that the duration of loss impacts on the acceptance of risk, which is another reason for the term 'for some investors'. PFP considers that the risk associated with the 'very low risk' and 'low risk' portfolios set out by Dr Cox are materially increased if the duration of loss were modest (i.e. 10 to 15 years). Duration and rate of drawdown are both issues that PFP consider have not been taken into account in either the 'very low risk' or 'low risk' portfolios.

4. Choice of assets

Appendix 2 derives a 'best risk portfolio' in a two-step process.

- In step 1, assets with better alternatives or undesirable features are eliminated. For example, UK Gilt are eliminated because they have have lower volatility than world government bonds, lower downside risk, less drawdown risk and less sequencing risk. UK Treasury Bills are eliminated because of their sequencing and drawdown risks.
- In step 2, the best risk portfolio is constructed from the remaining assets to produce the maximum return with near-minimum volatility. This approach eliminates world government bonds and is associated with low conditional value at risk and virtually zero sequencing risk.

The statistical characteristics of assets are based on historical time series of asset values. The lengths of these time series differ and this may have affected some comparisons, particularly those that measure trends, such as drawdown risk and sequence risk. In particular, UK Treasury Bills may have higher drawdown than, say, UK corporate bonds, partially because the time series for Treasury Bills goes back to 1900, while that for UK corporate bonds dates only to 1999: UK Treasury Bills have simply had longer to display the full range of fluctuations characteristic of this asset class. This possibility appears to be reflected in Chart 6, which shows that in years since 1990, the ten-year drawdown for UK Treasury Bills has not been notably worse than the asset classes UK corporate bonds of UK index linked gilt. Also, the drawdown was far lower than for World Equities, which passed step 1 because they had better performance than UK equity and formed part of the best risk portfolio in step 2.

These observations lead to the possibility that, had all assets had time series of equal length, the mix of assets considered in step 2 might have been different. In particular, UK Treasury Bills, which track RPI very well and have low downside deviation may have been unfairly eliminated. UK Treasury Bills have high sequencing risk compared with other assets with similar history lengths but their performance in this regard with respect to UK Corporate Bonds, which have shorter histories, is unclear. Furthermore, it is possible that, when in a mixed portfolio, the sequence risk of UK Treasury Bills might be sufficiently mitigated.

Could the panel comment on the likely influence that different history lengths may have had on the choice of portfolio and whether this would have a material effect on the merits of a low-risk, mixed portfolio? In particular, are there further arguments that would eliminate UK Treasury Bills from consideration? The potential bias of shorter histories may have also influenced the apparent volatility of assets. Could the panel comment on any steps they may have made to eliminate this bias from the mean variance optimisation?

Just to be clear, the report does not state that "UK Gilts are eliminated because they have lower volatility than world government bonds, lower downside risk, less drawdown risk and less sequencing risk." Measured relative to RPI, UK Gilts have quite high downside risk, drawdown risk and sequencing risk on a total return, mark-to-market basis.

Length of time series do differ. Dr Cox is of the opinion that analysing all data from inception provides better understanding than analysing all data only from the date when all are jointly available i.e. 1999. The report is completely transparent on dates and data lengths.

In the analysis UK Treasury Bills proxy the nominal risk free rate. This is industry standard. UK Treasury Bills are not part of the chosen multi-asset portfolio principally because of their sequencing and drawdown risks. A further reason why the asset class is not as well suited as other assets classes is correlation, which provides diversification within a multi-asset portfolio. Appendix 2 B.32 presents the correlation structure of the asset classes since inception i.e. over as many different economic regimes as the data allow. The correlation structure of UK Treasury Bills is not quite as favourable in terms of potential diversification as UK Corporate bonds.

The MoJ is quite correct that the data lengths of assets are not equal and that could lead to the elimination of an asset simply because more data are available and we know more about the behaviour of one asset than we do for another. This potential drawback is known so we overcome it where and when we can. That is why Chart 6 splits drawdown into different sub-periods. Might UK Treasury Bills have been unfairly eliminated and UK Corporate bonds unfairly included? With fairly high conviction, no. Here is more detail about sequencing risk not included in the report for reasons of space and complexity to the reader. In a runs, or sequencing, test calibrated for inflation, each annual investment return in a data series is designated a minus (-) if it's lower than annual RPI and a plus (+) otherwise. The result is a set of minuses and pluses, for example – + + – – + – + + + + – + + –. A negative run occurs when two or more consecutive annual returns are below inflation. The run ends when the investment return is no longer a minus.

A runs test has several outputs. One is a count of how long below inflation return sequences last. This is presented in Chart 7. For example, looking at World equity within Chart 7 (second column from the left) there are 11 periods with 2 consecutive years of returns below inflation out of 115 years of data. There were 6 periods when each annual return was below inflation for 3 consecutive years, 3 instances of 4 consecutive years of returns below inflation, 2 counts of 5 consecutive years of below inflation returns, and 1 period of 6 consecutive years of returns below inflation.

A second output not in the report is the proportion of below inflation return sequences that did occur relative to those that could have occurred within the length of data available. The data series of some asset classes are longer than others. The data in Chart 7 can be adjusted for this. The chart below shows the proportion of below RPI annual investment return sequences that did occur relative to those that could in theory have occurred. For example, looking at World equity , the 32 years of data when the annual return was less than RPI is 28% of the below inflation returns that could have occurred in the 115 years data sequence. The 11 periods of 2 consecutive years of below

inflation returns is 10% of the different ways that 2 consecutive years of below inflation returns could have occurred.

The data show that UK equity has a higher occurrence of below RPI annual investment return runs than World equity. The data also show that conventional World government bonds, UK Gilts, UK Treasury Bills have higher occurrences of below RPI runs than UK corporate bonds and World IL government bonds. UK ILGS also have a high occurrence of below RPI sequences.

Proportion of below RPI annual investment return runs, or sequencing, adjusted for length of data

Years of consecutive below RPI annual returns	World Equity	UK Equity	World Gov bond	UK Gilt	UK Treasury Bill	UK Corporate bond	UK IL Gilt	IL World Gov bond
1	28%	36%	43%	48%	34%	31%	47%	39%
2	10%	15%	18%	28%	25%	13%	29%	18%
3	5%	6%	9%	18%	18%	7%	13%	6%
4	3%	2%	4%	12%	13%	0%	7%	0%
5	2%	0%	1%	9%	9%	0%	4%	0%
6	1%	0%	0%	7%	6%	0%	0%	0%
7	0%	0%	0%	6%	4%	0%	0%	0%
8	0%	0%	0%	4%	3%	0%	0%	0%
9	0%	0%	0%	3%	2%	0%	0%	0%
10	0%	0%	0%	2%	1%	0%	0%	0%
Years of data	115	115	115	115	115	16	32	18
Start date of data	1900	1900	1900	1900	1900	1999	1983	1997

Source: Barclays & Dimson, Marsh, Staunton.
Notes: low % = low occurrence of runs calibrated to length of time series. High % = high occurrence of runs calibrated to length of time series

UK Treasury Bills were eliminated from consideration within a multi asset portfolio because they had greater real risk than UK Corporate bonds after controlling for the length of data. The optimiser would also have rejected UK Treasury Bills because of their low real return, just as it rejected ILGS.

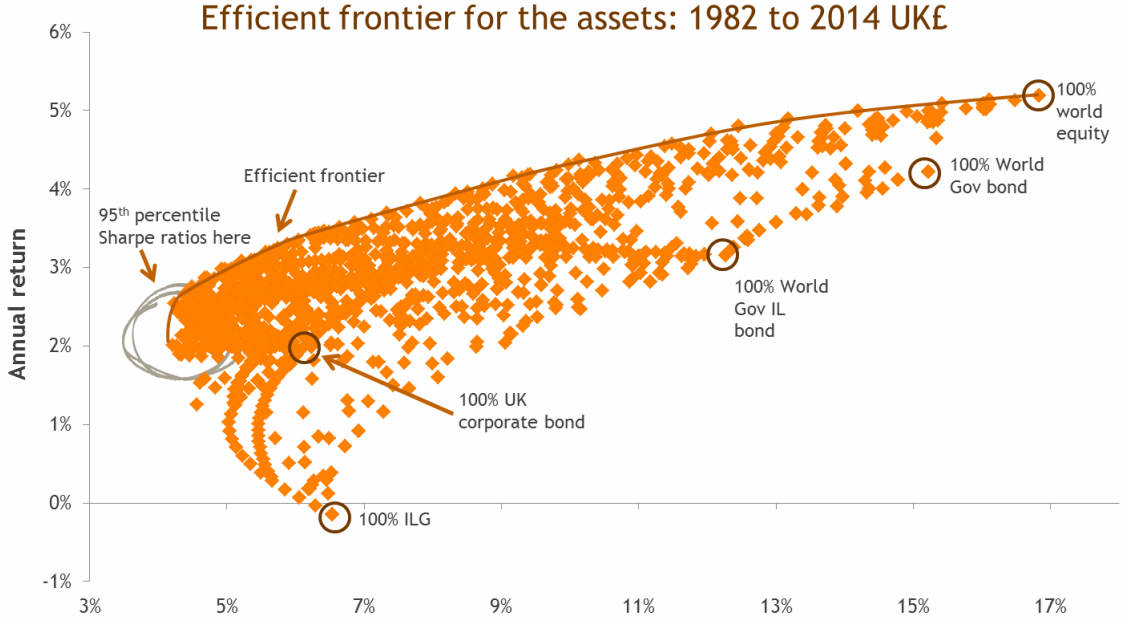
The different data lengths are not ideal but that is what we have. It's true that asset classes introduced relatively recently, including UK ILGS and UK Corporate bonds, have not been tested in strong inflationary or deflationary economic regimes in the way that asset classes with much longer histories have. When the discount rate was set relative to ILGS the data history was about 15 years, which is the same as we have for UK Corporate bonds, and the lack of history seemed not to hinder that asset's suitability. Relative to UK Treasury Bills ILGS had performed poorly for more than a decade but that seemed not to matter.

If UK Treasury Bills are to be considered the appropriate place is instead of ILGs as a risk free rate. Multi asset portfolios constructed with UK Treasury Bills have lower return per unit of risk and are not close to optimal. This result is also due to the diversification benefits of UK Treasury Bills not being quite as strong when combined with other assets.

None of us know what the future holds but we can improve our confidence through performing more and different tests, as well as sensitivity analysis. One further step taken to eliminate any time period bias from the mean variance optimisation is described below. Dr Cox carried out further analysis, not in the report, to examine the discount rate if all data are truncated to start in 1982 or

later as per inception. As one would expect, using correlations, returns and standard deviations from 1982 creates a different asset allocation for the multi-asset portfolio. The 2 charts below illustrate this. As one would hope, and as illustrated below, the annualised return and risk for the multi-asset portfolio is virtually the same as the one that uses data going back to 1900. The discount rate, and dispersion around that rate, are almost the same, and this can be used to provide a high conviction that the discount rate according to the multi-asset portfolio and specified in the report is correctly calibrated and robust. That the exact composition of a mixed portfolio shifts should be of no concern. A portfolio of ILG stocks will also differ with time according to maturities, availabilities and yields.

Efficient frontier for the assets: 1982 to 2014 UK£



Source: Barclays & Dimson, Marsh, Staunton.

Notes: From 1 January 1982 or since inception of data series.

Investment allocation ranges within 95th percentile Sharpe ratio: 1982 to 2014 UK£

Investment allocation	World equity	UK Index linked government bond	World Index linked government bond	World government bond	Corporate bond
Max	25%	13%	40%	35%	80%
Min	0%	0%	0%	0%	39%

Example portfolios within 95th percentile

Portfolio 1	10%	10%	10%	10%	60%
Portfolio 2	12%	12%	12%	9%	55%
Portfolio 3	20%	0%	40%	0%	40%
Portfolio 4	7%	8%	8%	22%	55%

PFP understand that the minimum purchase of Treasury Bills is £500,000. If, say, 10% of a portfolio were allocated to this asset class, then only individuals with a lump sum award for future losses in excess of £5 million could actually purchase Treasury Bills. Since this represents a very small minority of claimants, and the discount rate is set for all claimants, we consider this does in fact rule out inclusion of Treasury Bills in the asset mix if some investment risk is deemed to be appropriate.

The 'risk-free' approach is founded upon purchasing and holding ILGS to maturity. As such, past data is only relevant to the extent it is used in the averaging of the yield on ILGS when assessing the discount rate. For the reasons set out by Dr Pollock, PFP agrees a 1-year average is more appropriate than a 3-year average.

PFP notes that Dr Cox has estimated the returns on the risk portfolios using past data averaged over very long periods, which include times when economic growth, interest rates and inflation have been significantly higher than is presently the case. This is also true of the return of 'risk free' investments. In the period since 1900, developed economies have matured and the developing economies have grown much more strongly. PFP expects the choice of history lengths to have an impact on investment returns across the spectrum of available asset classes, although Dr Cox's research concludes otherwise.

PFP notes that if ILGS yields were to be averaged since 1982, the result would be a higher discount rate than a 1-year average would produce, and clearly the result would be under-compensation, since claimants cannot purchase or benefit from higher interest rates in the past. PFP considers that there can be no certainty that, in the future, any of these or other relevant variables will revert to the mean.

Minor comments

- Just to be clear, for the purposes of majority and minority, the panel comprised three members only. Is this correct?

Yes. Mr Cropper and Mr Gunn ('PFP') are one of three members of the panel. Whilst the report is framed in anonymised terms is it probably appropriate to confirm for the sake of clarity that Dr Pollock and PFP are of the opinion that, to be consistent with the existing legal framework, the basis of our instructions, the discount rate should be set by reference to ILGS alone and that consideration of other investments with expected higher yields and known additional risks is inconsistent with the prevailing legal framework as expressed in *Wells* and with our directive to ignore real productivity growth in the economy going forward (see comments in 3.37). A risk free framework, as deemed appropriate in *Wells*, is also consistent with current actuarial practice for insurers reserving for similar liabilities, in both type and duration, even if they hold free reserves. Dr Cox, who has comprehensively analysed historic risks and returns from other investments, is by contrast more content that a mixed portfolio is consistent with *Wells*. This essentially encapsulates the majority/minority position within the expert group.

- In Section D of the Annex, D.24 (p.112) 'The low volatility, low VaR, CVaR, low peak to through drops in the market value…'; what is the threshold for 'low'? How is it measured i.e. if the CVaR was 5% is that still low? Is there an objective set of criteria that can be used to categorise an investment portfolio as low risk?

There is still no agreed or unambiguously superior approach to the measurement of risk. Instead a wide range of risk measures exist. Probably the most reliable and simple of these measures is standard deviation. It is often more reliable than more complicated measures. Because standard deviation reflects the consistency of performance, it gives you a good idea if you can tolerate an investment's ups and downs. The higher this number, the more likely you are to experience dramatic moves in either direction.

The standard deviation of the two multi-asset portfolios are:

- Low risk portfolio: has a mean annual return (discount rate) of 0.75% has a standard deviation of 2.5%, so you would expect the real annual investment return to be between -1.75% and +3.25% from RPI about 68% of the time, and between -4.25% and +5.75% from RPI about 95% of the time. With an average RPI of 2.9%, this suggests that 5% of the time (1 in every 20 years) the investor should expect a nominal portfolio return of 2.9% - 4.25% = -1.35%.
- Very low risk portfolio: has a mean annual return (discount rate) of 0.0% has a standard deviation of 1.25%, so you would expect the real annual investment return to be between -1.25% and +1.25% from RPI about 68% of the time, and between -2.5% and +2.5% from RPI about 95% of the time. With an average RPI of 2.9%, this suggests that 5% of the time (1 in every 20 years) the investor should expect a nominal portfolio return of 2.9% - 2.5% = +0.4%.

These standard deviations are through the cycle estimates and are not the result of a particular point in time.

It is perhaps not the uncertainty relating to the value of the investment from year to year that would be of most concern to a personal injury investor, but instead the dispersion of the value of that investment at a particular point in the future around the target capital value as it's drawn. VaR, CVaR, downside risk, drawdown, and sequencing risk give the investor more information about that dispersion, as well as the order in which investment returns occur.

Within the investment community there is no single common criteria for categorising these risks to produce risk-graded categories. Various trade bodies for the industry have tried. The level of risk moves with economic conditions and is not stationary. There is no standard objective threshold for what low looks like for any of the measures. A categorisation system with thresholds is possible to achieve using sampling techniques but that is beyond the scope of the current report and would require some further work. Expert practitioners understand these numbers for they work with them regularly, but this has not so far been documented.

To provide some indication of the low risk end of portfolio construction, before the Association of British Insurers and Investment Association stopped quoting what a defensive fund looked like, the most defensive portfolio often quoted was 80% bonds, 20% equities. The Wealth Management Association currently maintains four model multi-asset portfolios. The four are reproduced below.

Asset Allocation from 3rd August 2015

	Conservative Index	Income Index	Growth Index	Balanced Index	Underlying Asset Index
UK Equities	19.0	35.0	40.0	35.0	FTSE All-Share Index
International Equities	11.0	17.5	37.5	30.0	FTSE All World Ex-UK Index (calculated in Sterling)
Bonds	45.0	32.5	7.5	17.5	FTSE Gilts All Stocks Index
Cash	5.0	5.0	2.5	5.0	7-Day LIBOR – 1% (London Interbank Offer Rate)
Commercial Property	5.0	5.0	5.0	5.0	FTSE All UK Property Index
Alternatives	15.0	5.0	7.5	7.5	FTSE/APCIMS Hedge (Investment trust) Index
Total	100	100	100	100	

Source: WMA

Claimants require regular cash flows to meet their recurring future losses or expenses. For the reasons already stated, they are not 'ordinary investors': they are forced into a position of having to accept investment risk unless there is a risk-free alternative available (periodical payments). The WMA portfolios referred to by Dr Cox are for investors who can make choices about the level investment risk they are prepared to tolerate, and therefore are not appropriate for consideration in the context of 'low risk' portfolios for claimants.

Dr Cox assumes that past investment returns are normally distributed and therefore that standard deviation can be used as a measure of risk. In a normal distribution, around 68% of the observed data is within one standard deviation from the mean, 95% is within two standard deviations and 99.7% is within three standard deviations. This approach requires an assumption that investment returns will always revert to the mean, and acceptance that out of sample random events will not occur in the future. This is not a universally accepted view. Our regulator, the Financial Conduct Authority, makes it very clear that past performance must not be relied upon as a guide to the future.

Furthermore, in a time sample of 114 years, on this basis around 78 years will be within one standard deviation, and 108 years will be within two standard deviations. This tells us nothing about the years ahead: the next 10 years could, for example, all be within two standard deviations below the mean, or indeed completely outside the sample. Dr Cox's analysis assumes that any future period of time will have the same distribution of returns as the number of years in his sample. We therefore have a concern that, even in the very low risk portfolio, the duration of the loss, particularly if it is short, is a material factor that could distort the perceived risk and lead to under-compensation.

This concern is amplified by the need, as already expressed, to accept more risk than implied in the discount rate in order to try and ensure that the real value of the award is not awarded relative to earnings rather than prices, particularly in relation to future care and given the expectation that real earnings growth is likely to occur more often than not in the future.

We also consider it important to differentiate between risk and uncertainty. Risk is a quantity that can be measured, as Dr Cox has done. Uncertainty is risk that is difficult to measure, and estimates of it can therefore be very significantly wrong. It is therefore our view that implied levels of risk in the portfolios described by Dr Cox could be significantly understated.

- The chart below para 2.9 shows the discount rate set by insurers when valuing PPOs, this is net of ASHE rather than RPI so not directly comparable to the PI discount rate. Does the panel know what these rates would be net of RPI?

This is not known from the material available. What is known is that whilst actuaries generally continue to make assumptions that earnings growth will outpace RPI over long periods for aggregated employees at varying stages of their career the situation is different when looking at a specific earnings level for a specific category of workers. ASHE 6115 has grown by 1.7% p.a. over the 10 years to end 2014. By contrast the RPI has grown by 3.2% p.a. Against this background and knowing that economic activity is weak Dr Pollock is of the opinion that there is unlikely to be a significant differential between the discount rate net of assumed inflation in ASHE 6115 and RPI. This is the background behind the opinions given by the panel in 2.09 and 2.10 of our report. The average rate of 0% shown in 2.9 is then likely to be reflective of the discount rate used by insurers, relative to RPI, when valuing liabilities of this nature.

PFP understand that Dr Pollock is essentially confirming the issue surrounding taking real investment growth into account when setting a real discount rate, that we have referred to in the context of *Cookson v Knowles* above. It therefore does not surprise us that, when reserving for an ASHE-linked PPO, whilst the asset mix may change over time, real growth is provided for by investment in risk assets, such that the risk-adjusted discount rate used by insurers is effectively a constant. We see this is entirely consistent with the views and concerns we have expressed about using risk assets to set the discount rate in personal injury claims, when real growth in the claimant's (care) costs must be disregarded.